



U.S. Department of the Interior
Bureau of Land Management

Utah

Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area Draft Resource Management Plans and Environmental Impact Statement

Volume II (Appendices A–W)



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August 2018

BLM Mission

It is the mission of the Bureau of Land Management to sustain health, diversity, and productivity of the public lands for use and enjoyment of present and future generations.

**Grand Staircase-Escalante National Monument
and Kanab-Escalante Planning Area
Draft Resource Management Plans and
Environmental Impact Statement**

**Volume 2 of 2
Appendices A–W**

**U.S. Department of the Interior
Bureau of Land Management
Grand Staircase Escalante National Monument, Utah**

August 2018

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***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

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August 2018

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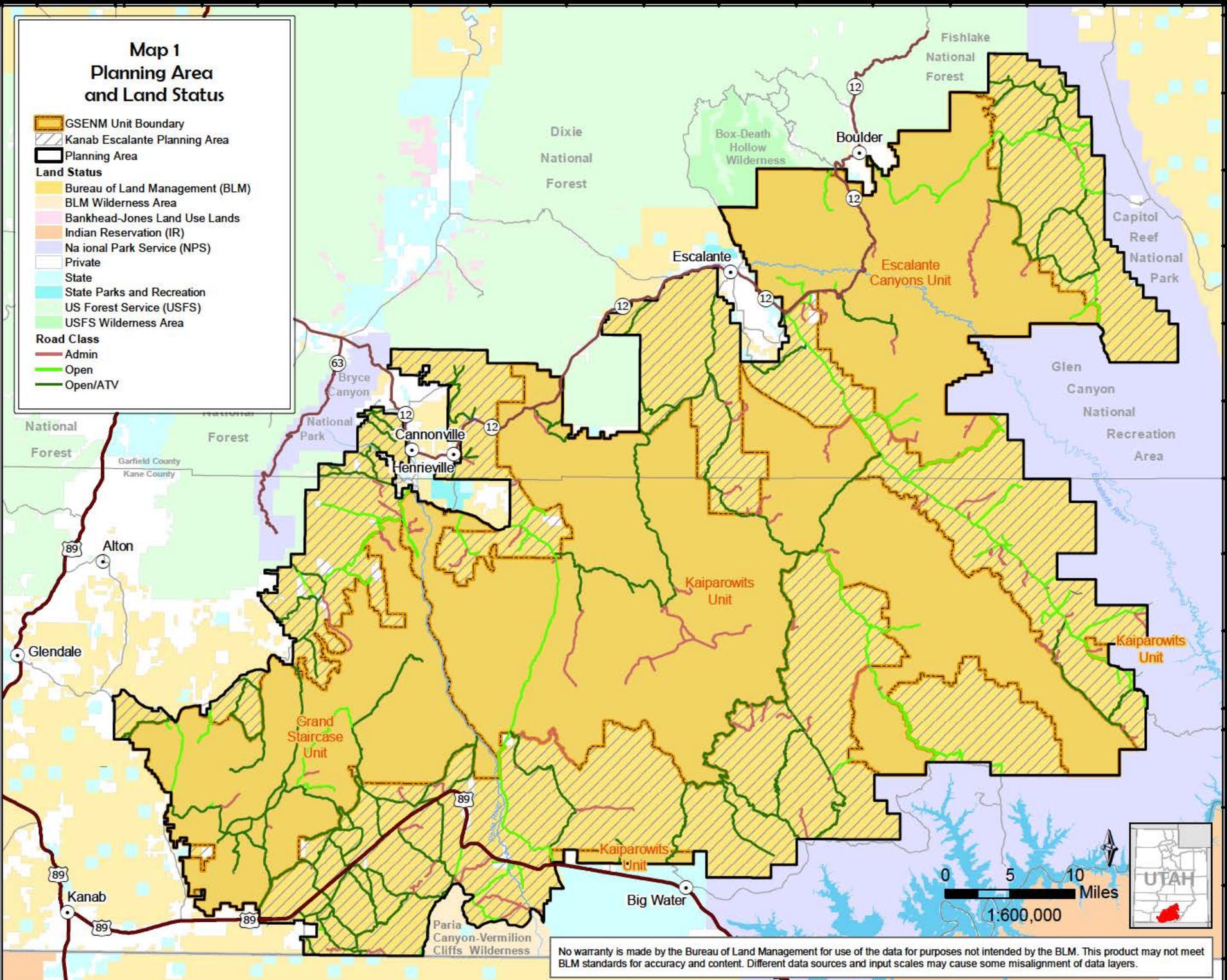
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T33 S
T34 S
T35 S
T36 S
T37 S
T38 S
T39 S
T40 S
T41 S
T42 S
T43 S

Draft Resource Management Plans and Environmental Impact Statement
Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area
BLM UTAH

Map 1 Planning Area and Land Status

-  GSENM Unit Boundary
-  Kanab Escalante Planning Area
-  Planning Area
- Land Status**
-  Bureau of Land Management (BLM)
-  BLM Wilderness Area
-  Bankhead-Jones Land Use Lands
-  Indian Reservation (IR)
-  National Park Service (NPS)
-  Private
-  State
-  State Parks and Recreation
-  US Forest Service (USFS)
-  USFS Wilderness Area
- Road Class**
-  Admin
-  Open
-  Open/ATV



0 5 10 Miles

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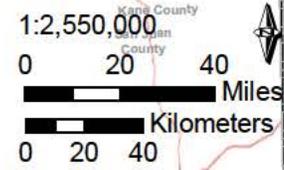
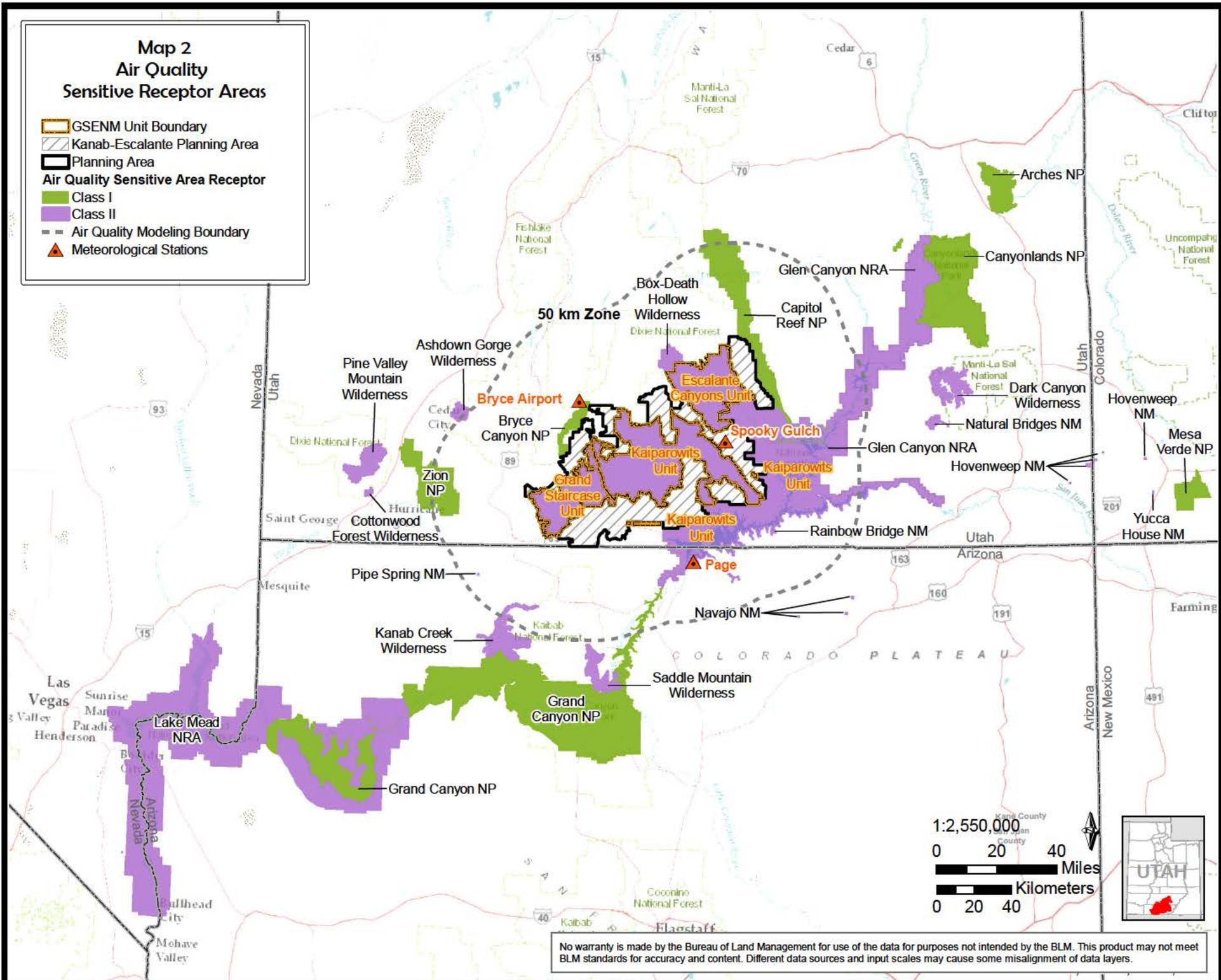


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Map 2 Air Quality Sensitive Receptor Areas

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Air Quality Sensitive Area Receptor**
-  Class I
-  Class II
-  Air Quality Modeling Boundary
-  Meteorological Stations

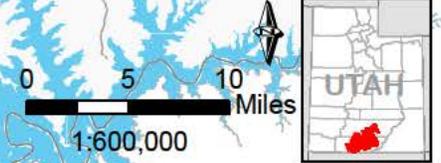
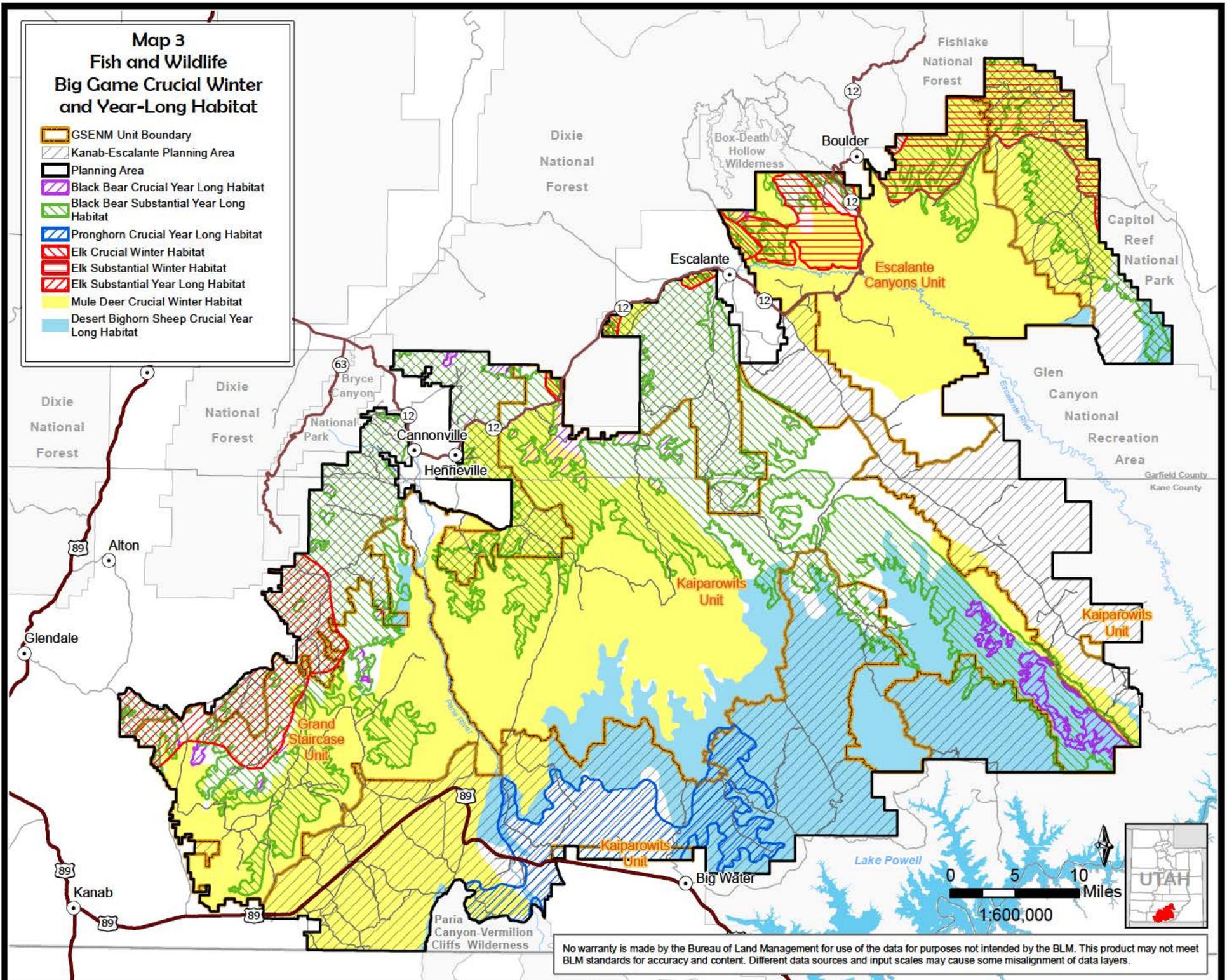


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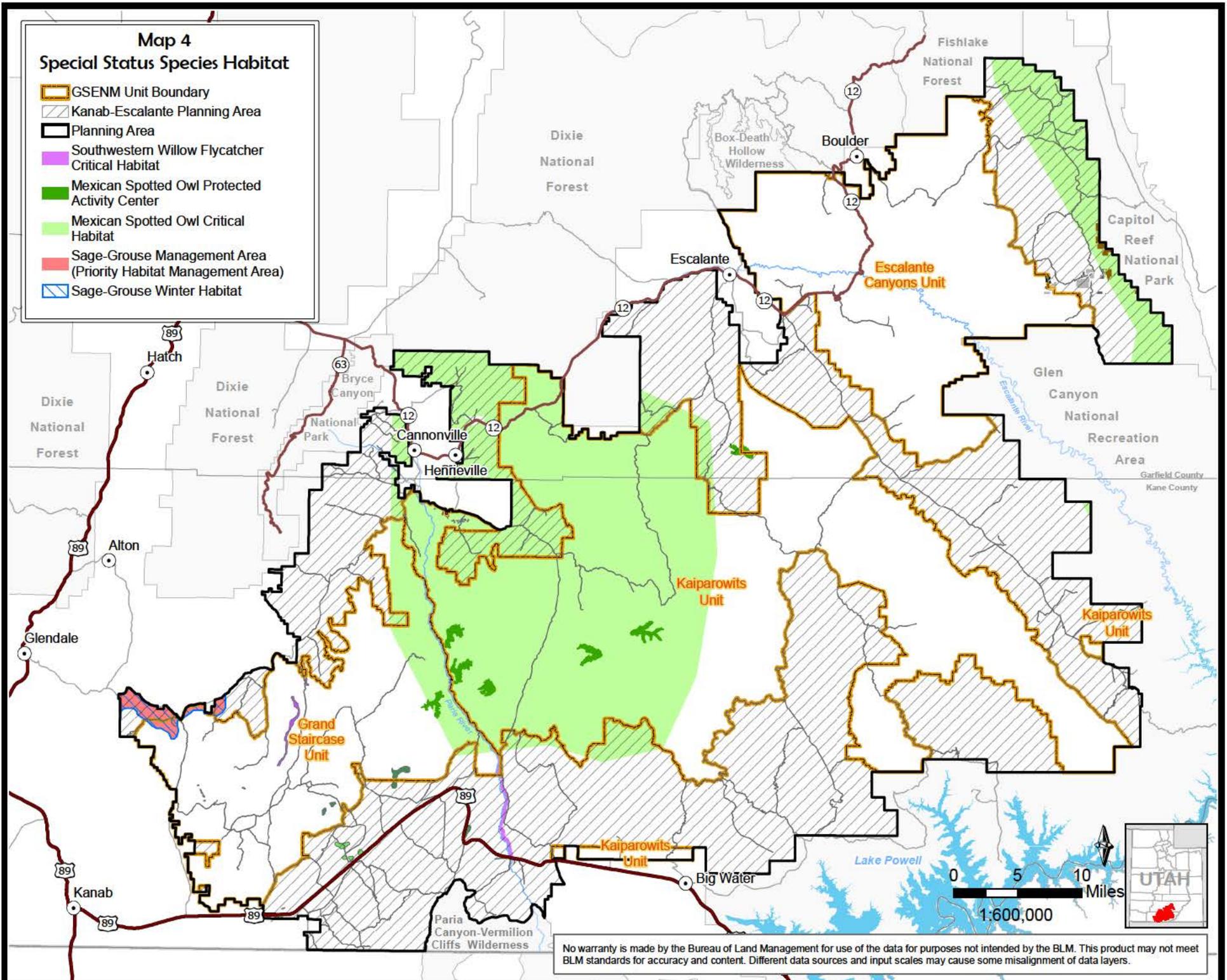
Map 3 Fish and Wildlife Big Game Crucial Winter and Year-Long Habitat

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Black Bear Crucial Year Long Habitat
-  Black Bear Substantial Year Long Habitat
-  Pronghorn Crucial Year Long Habitat
-  Elk Crucial Winter Habitat
-  Elk Substantial Winter Habitat
-  Elk Substantial Year Long Habitat
-  Mule Deer Crucial Winter Habitat
-  Desert Bighorn Sheep Crucial Year Long Habitat



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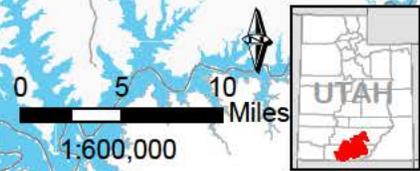
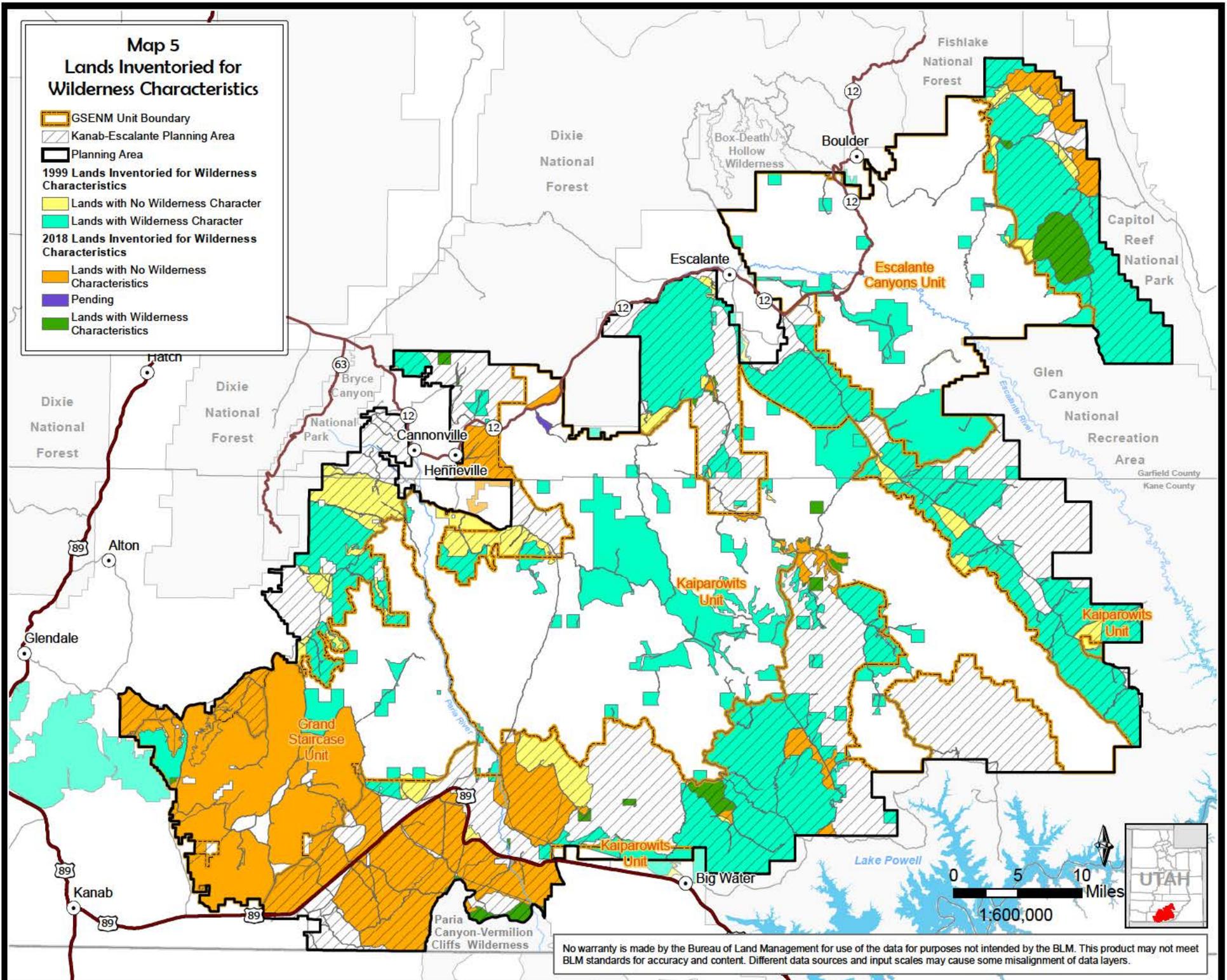
Map 4
Special Status Species Habitat

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Southwestern Willow Flycatcher Critical Habitat
- Mexican Spotted Owl Protected Activity Center
- Mexican Spotted Owl Critical Habitat
- Sage-Grouse Management Area (Priority Habitat Management Area)
- Sage-Grouse Winter Habitat

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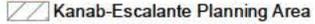
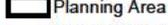
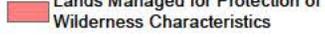
Map 5 Lands Inventoried for Wilderness Characteristics

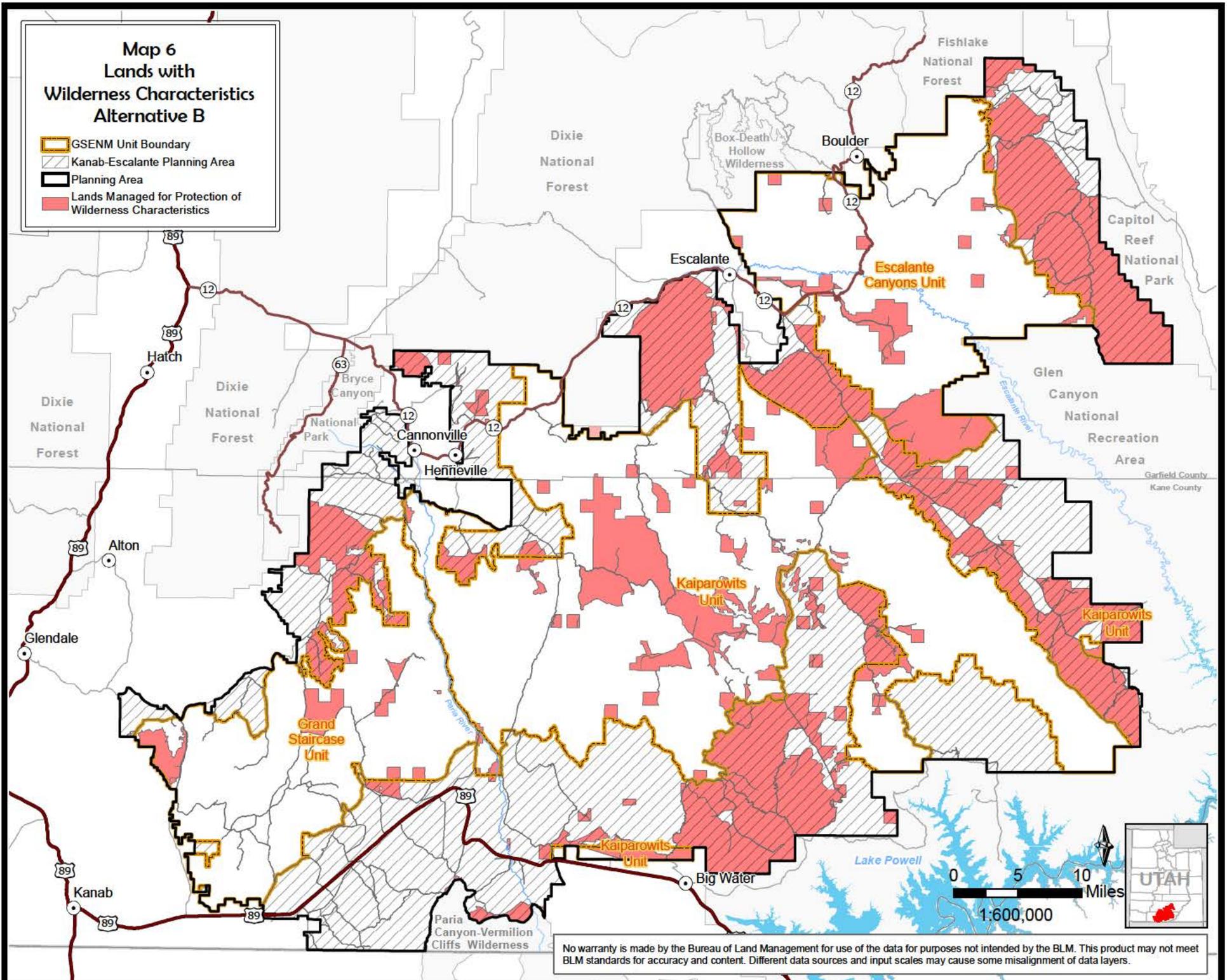
- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- 1999 Lands Inventoried for Wilderness Characteristics**
- Lands with No Wilderness Character
- Lands with Wilderness Character
- 2018 Lands Inventoried for Wilderness Characteristics**
- Lands with No Wilderness Characteristics
- Pending
- Lands with Wilderness Characteristics



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**Map 6
Lands with
Wilderness Characteristics
Alternative B**

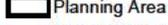
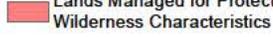
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Lands Managed for Protection of Wilderness Characteristics

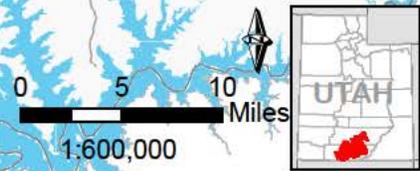
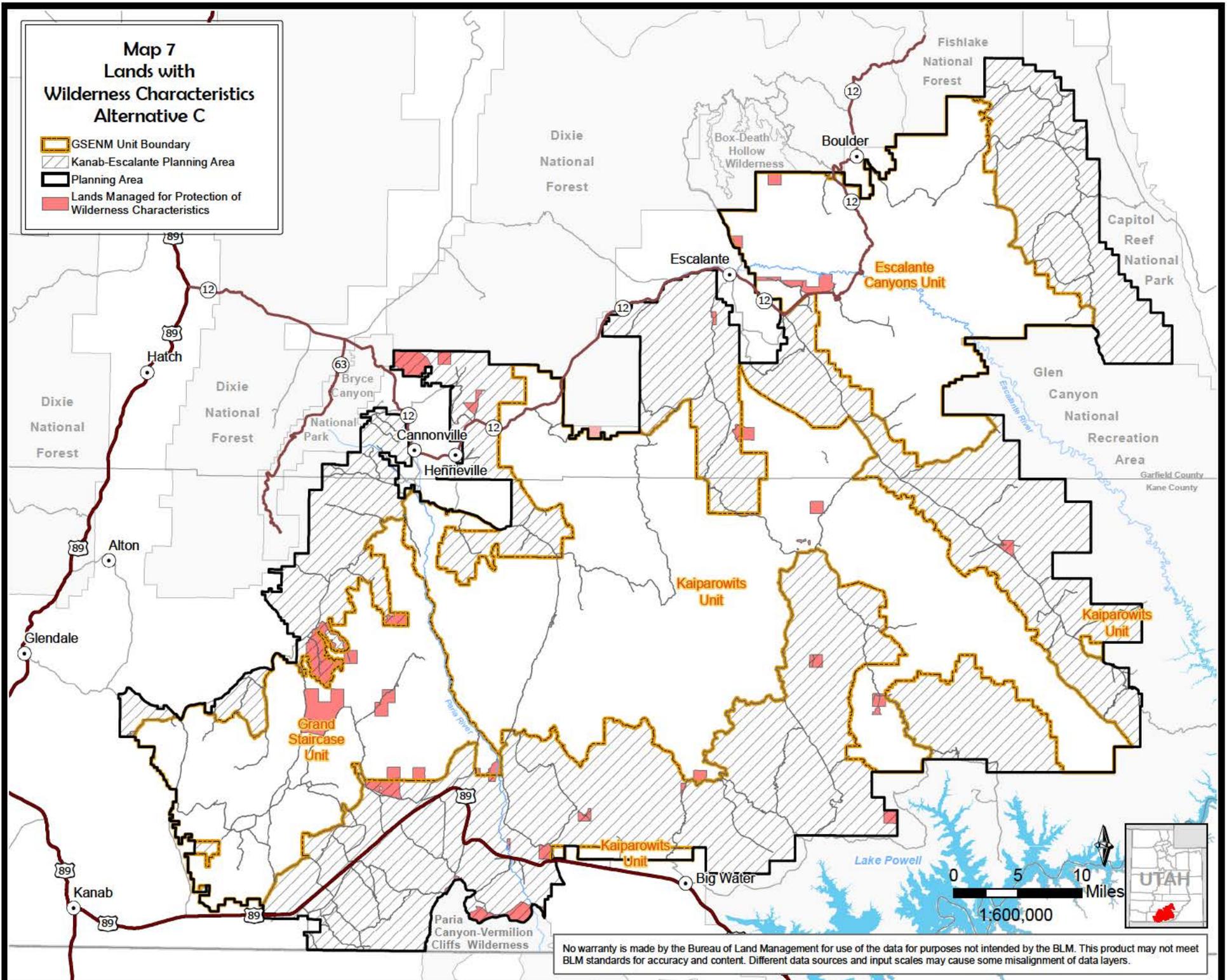


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Map 7 Lands with Wilderness Characteristics Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Lands Managed for Protection of Wilderness Characteristics

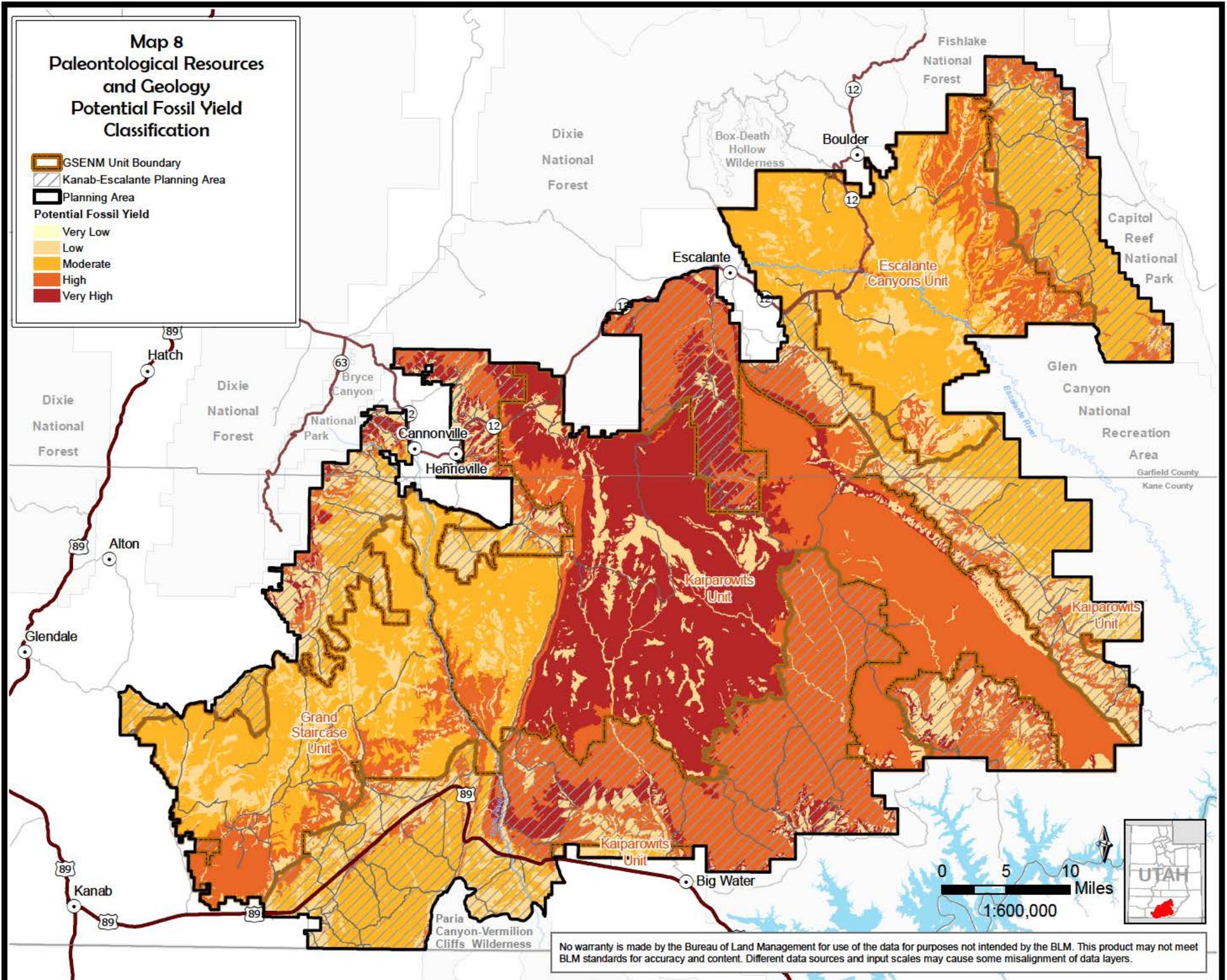


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Map 8 Paleontological Resources and Geology Potential Fossil Yield Classification

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Potential Fossil Yield**
-  Very Low
-  Low
-  Moderate
-  High
-  Very High



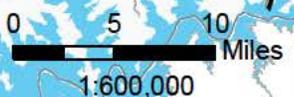
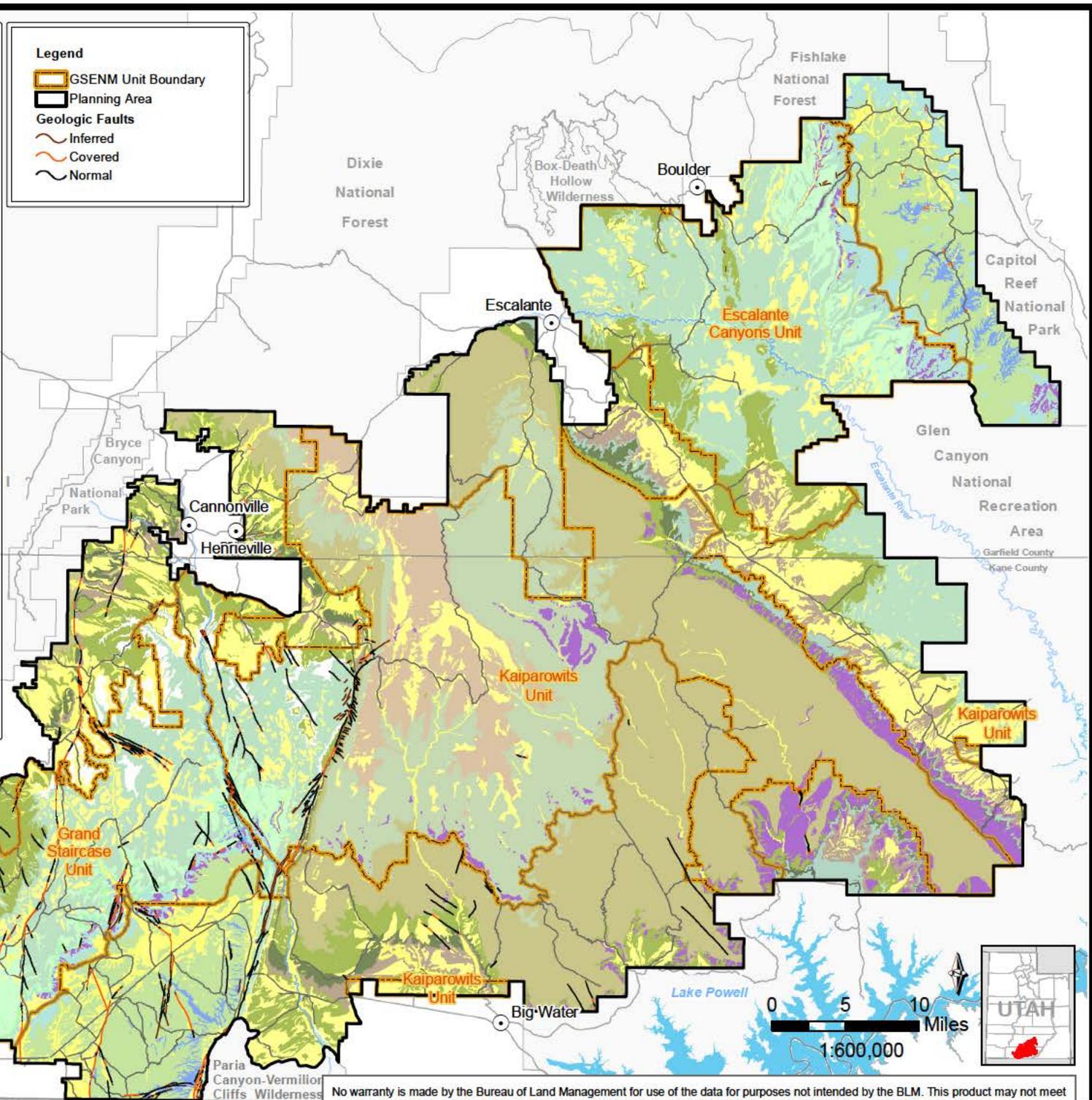
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Map 9 Paleontological Resources and Geology Geologic Formations

Era	Period	MYA	Map Symbol	
Cenozoic	Neogene	2	Qa - Alluvium	
		2	Qms - Landslides & slumps	
		2	Qb - Olivine basalt	
Cretaceous	65	Kk - Kaiparowits Formation		
	80	Ks - Straight Cliffs Formation		
	85	Kwu - Wahweap Formation		
	93	Kt - Tropic Shale		
	95	Kd - Dakota Formation		
	Mesozoic	Jurassic	145	Jm - Morrison Formation
			150	Je - Entrada Sandstone
164			Jc - Carmel Formation	
166			Jn - Navajo Sandstone	
185			Jk - Kayenta Formation	
193			Jmo - Moenave Formation	
198			Jw - Wingate Formation	
Triassic	200	TRc - Chinle Formation		
	210	TRm - Moenkopi Formation		
	245	P - Permian Formations		
Paleozoic	Permian	251		
		275		

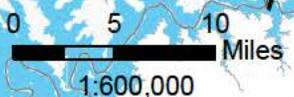
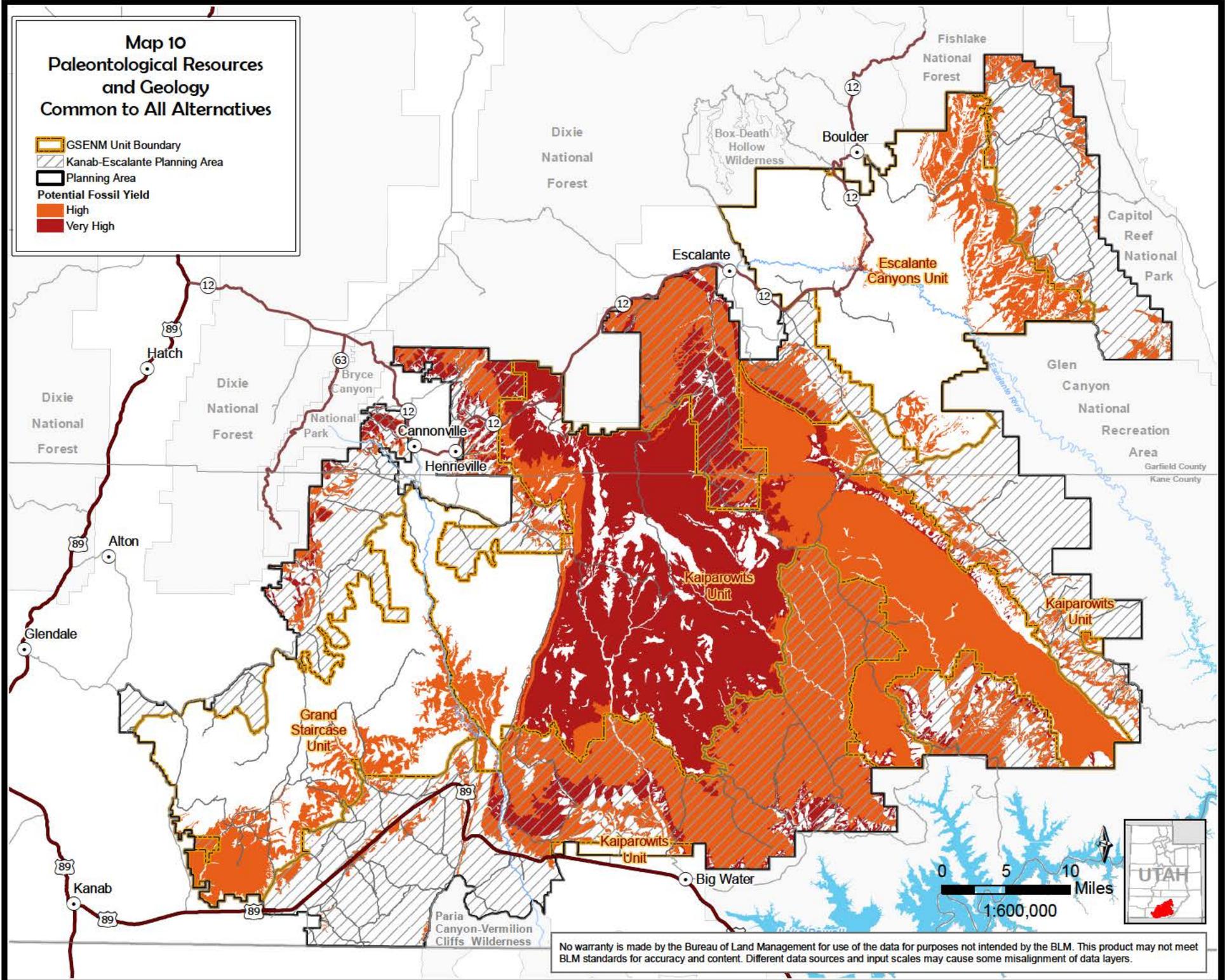
- Legend**
- GSENM Unit Boundary
 - Planning Area
 - Geologic Faults
 - Inferred
 - Covered
 - Normal



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Map 10 Paleontological Resources and Geology Common to All Alternatives

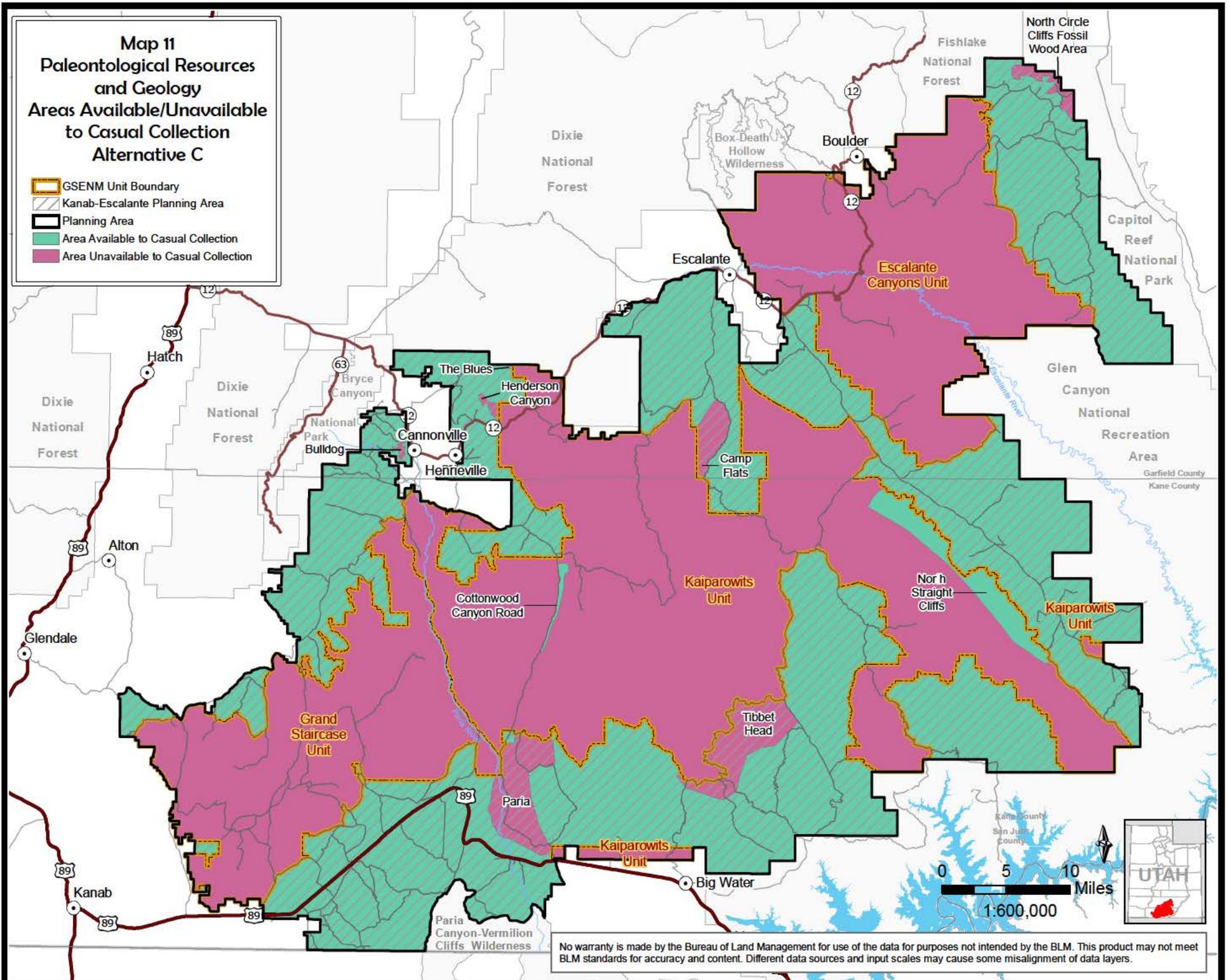
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Potential Fossil Yield**
-  High
-  Very High



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Map 11
Paleontological Resources
and Geology
Areas Available/Unavailable
to Casual Collection
Alternative C

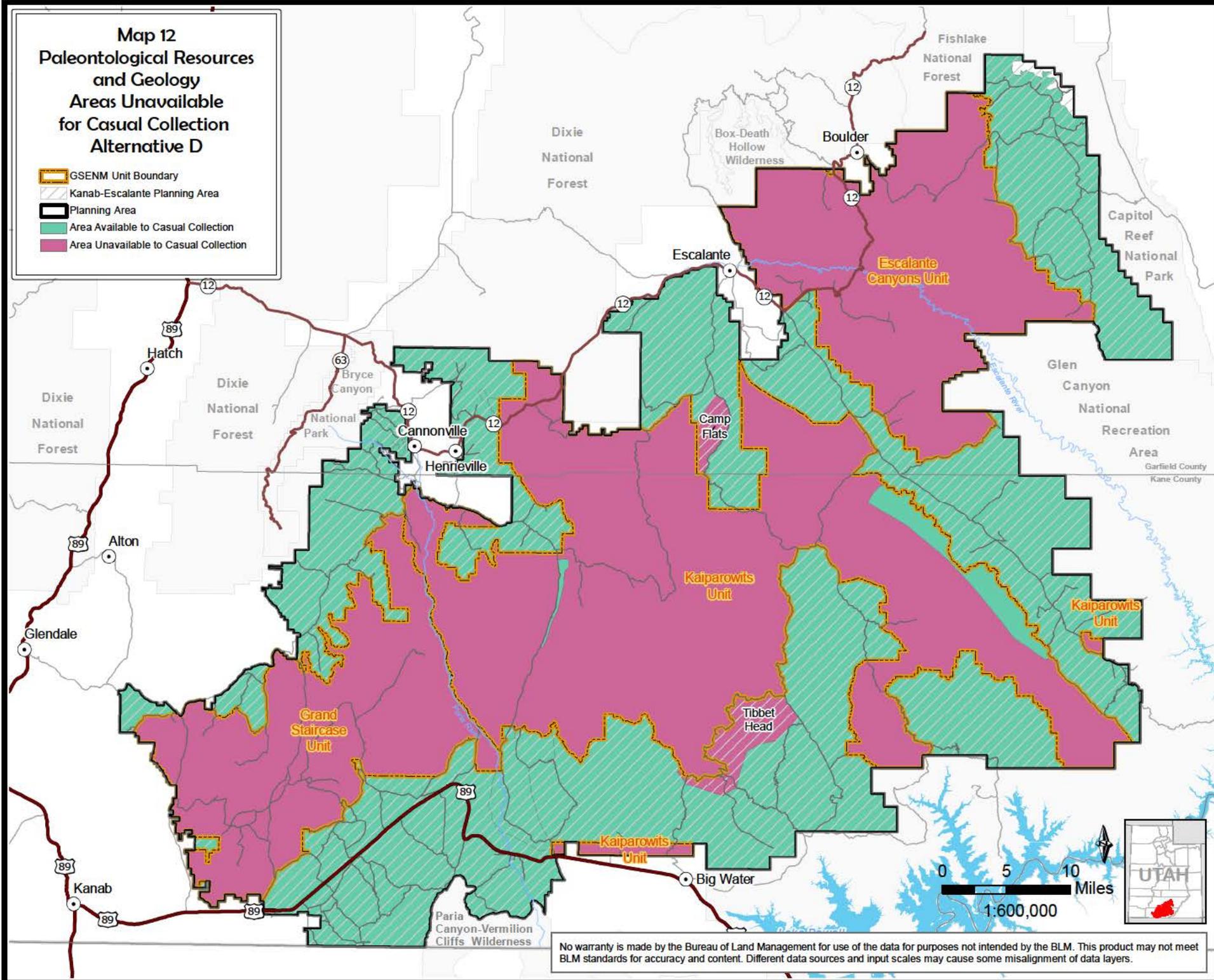
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Area Available to Casual Collection
-  Area Unavailable to Casual Collection



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**Map 12
Paleontological Resources
and Geology
Areas Unavailable
for Casual Collection
Alternative D**

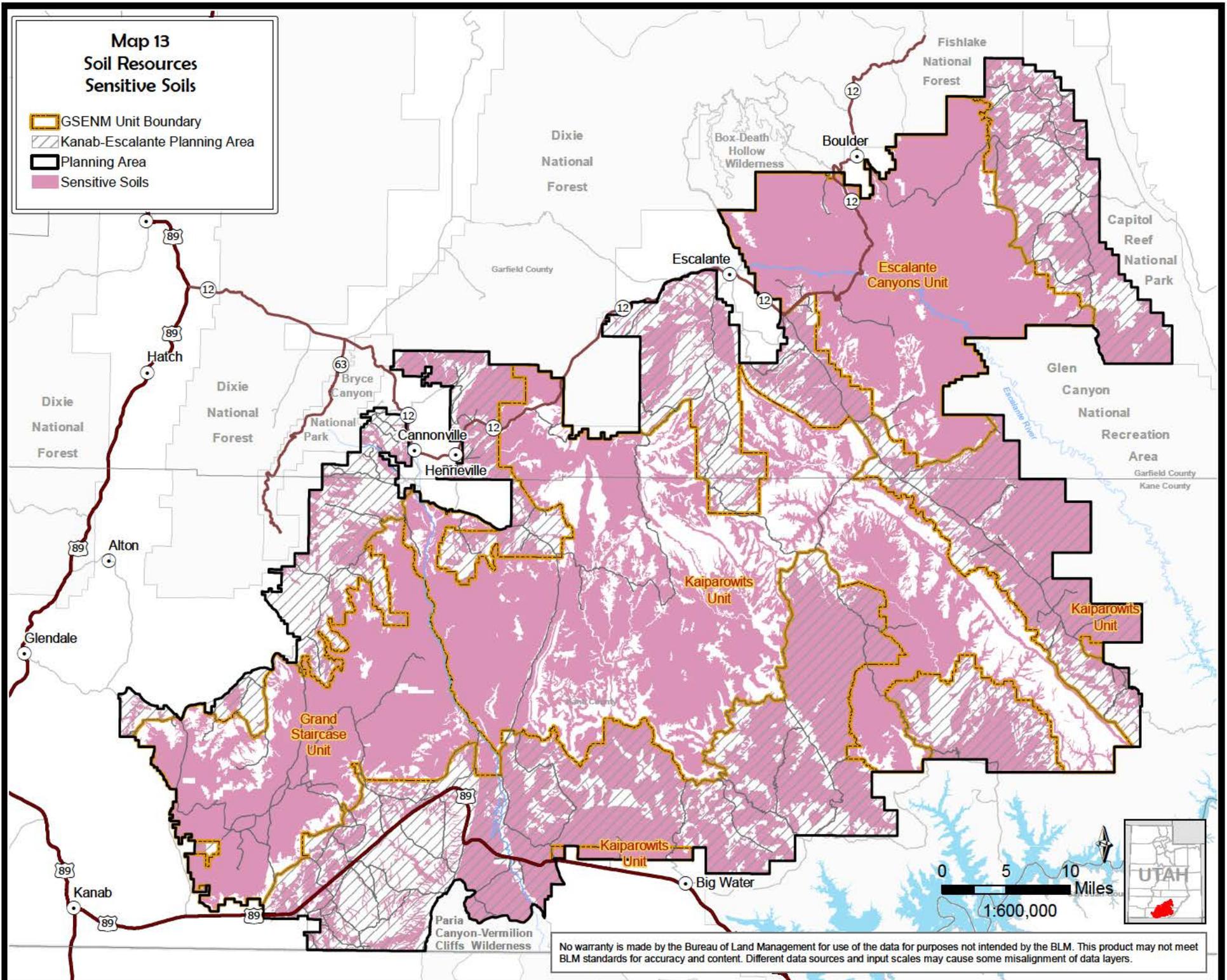
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Area Available to Casual Collection
-  Area Unavailable to Casual Collection



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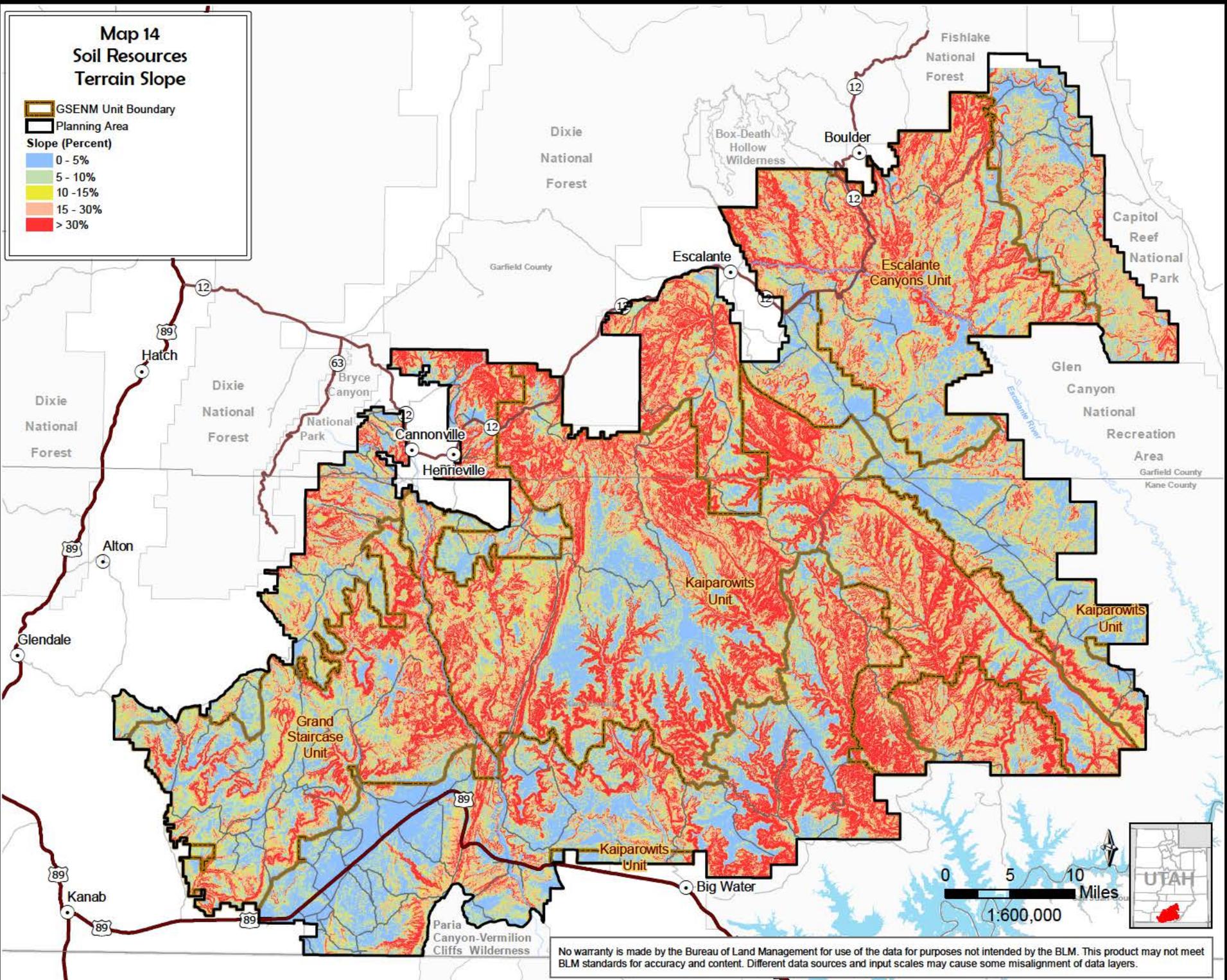
Map 13
Soil Resources
Sensitive Soils

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Sensitive Soils



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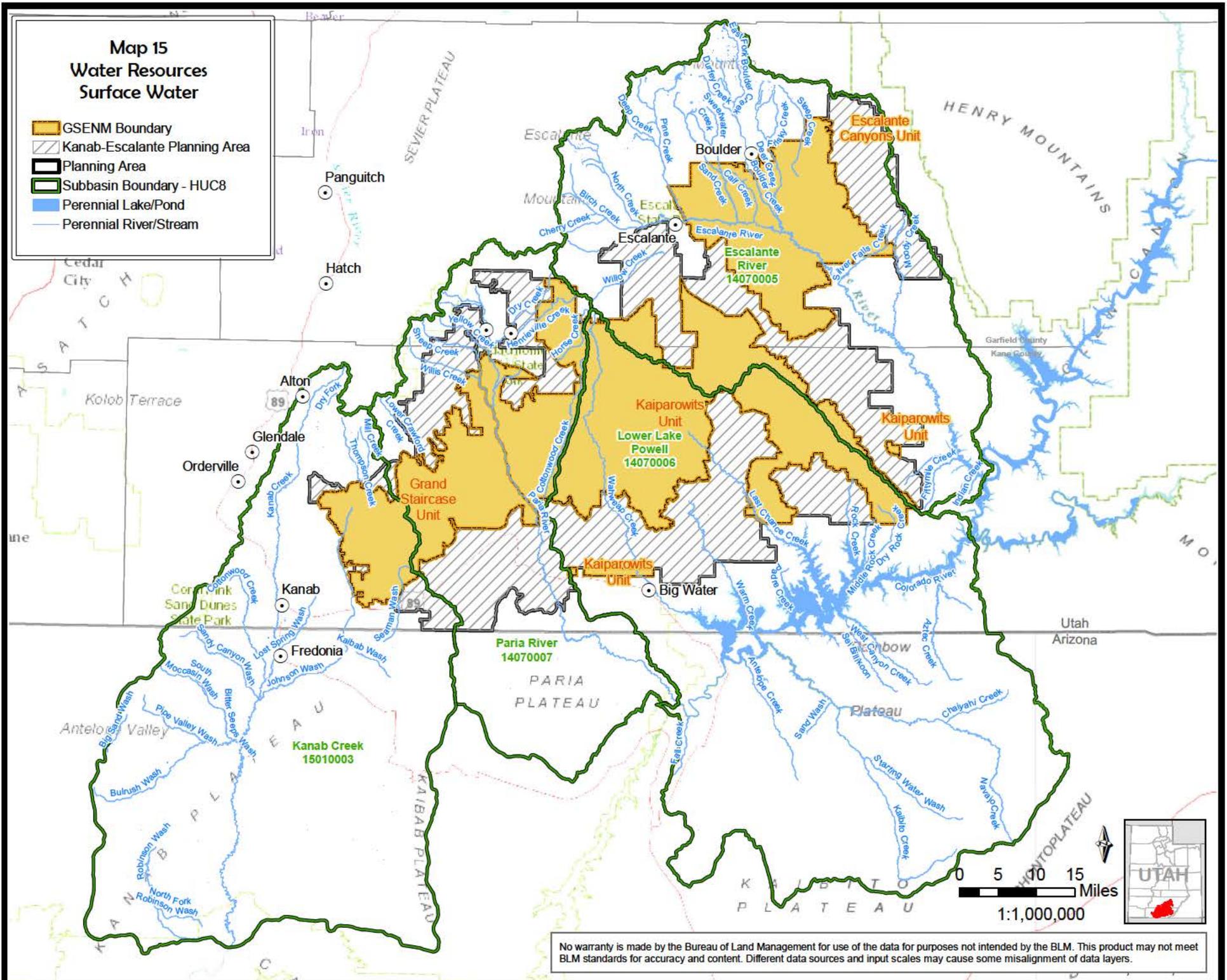




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Map 15 Water Resources Surface Water

-  GSENM Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Subbasin Boundary - HUC8
-  Perennial Lake/Pond
-  Perennial River/Stream

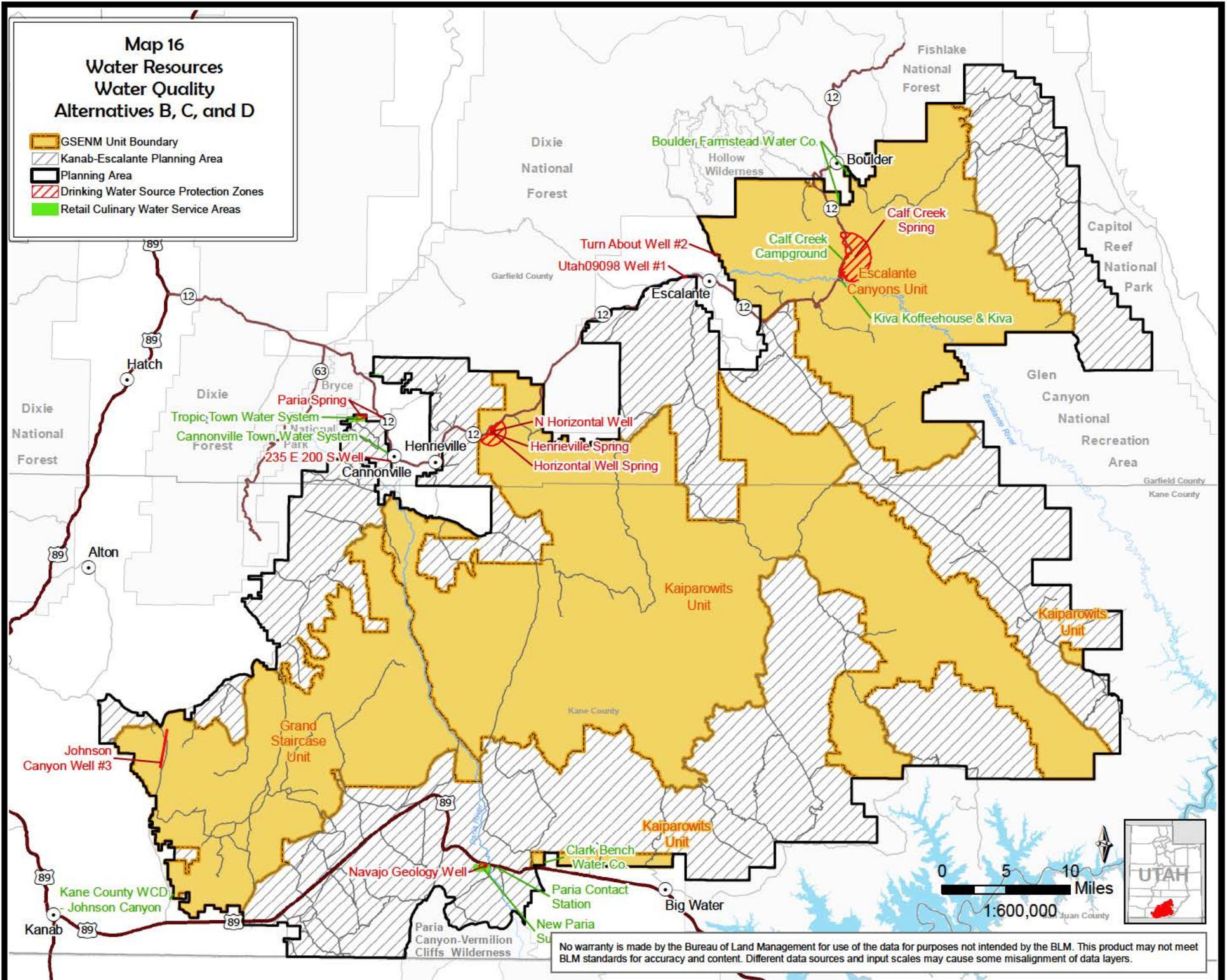


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Map 16 Water Resources Water Quality Alternatives B, C, and D

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Drinking Water Source Protection Zones
-  Retail Culinary Water Service Areas

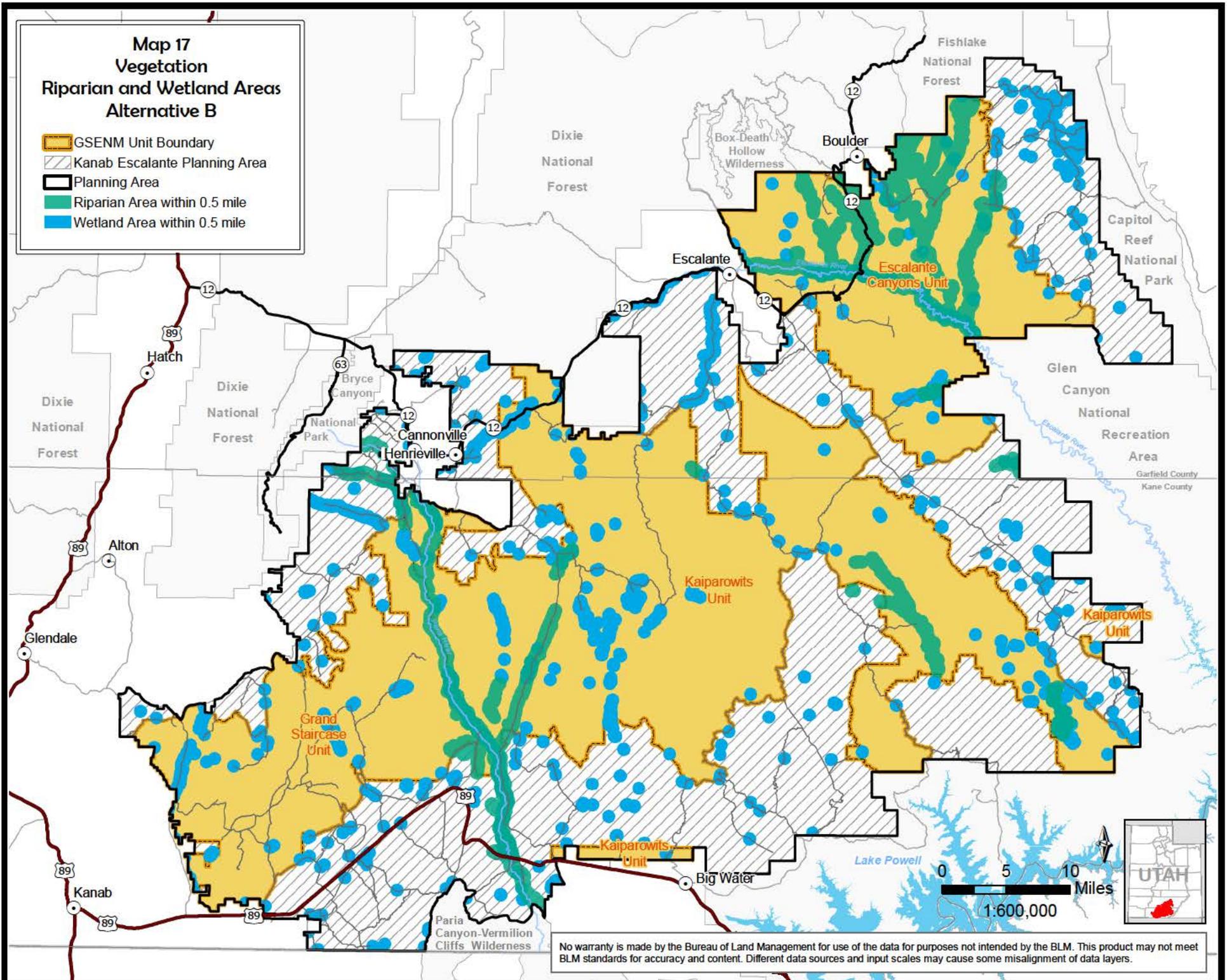


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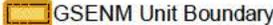
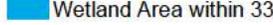
**Map 17
Vegetation
Riparian and Wetland Areas
Alternative B**

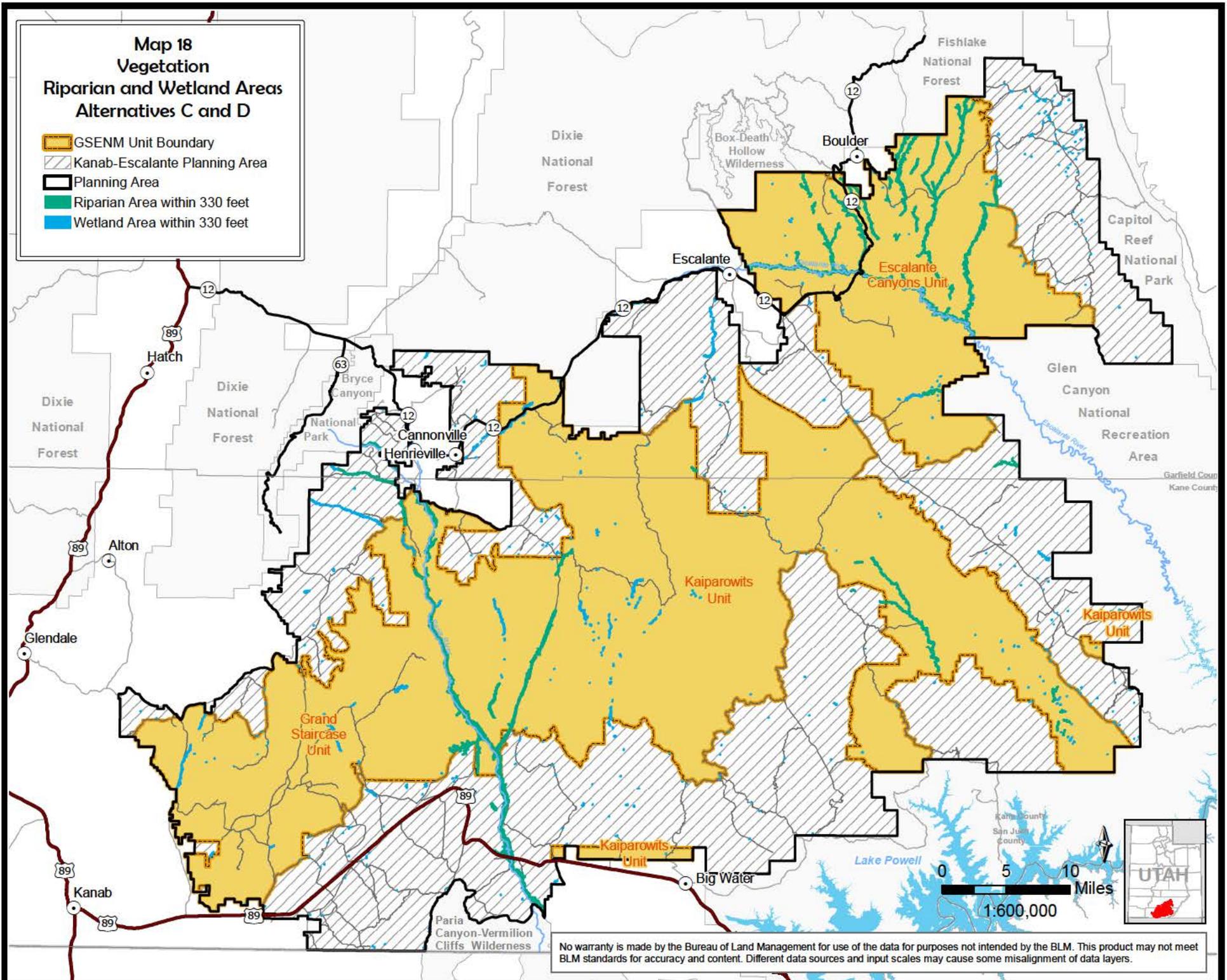
-  GSENM Unit Boundary
-  Kanab Escalante Planning Area
-  Planning Area
-  Riparian Area within 0.5 mile
-  Wetland Area within 0.5 mile



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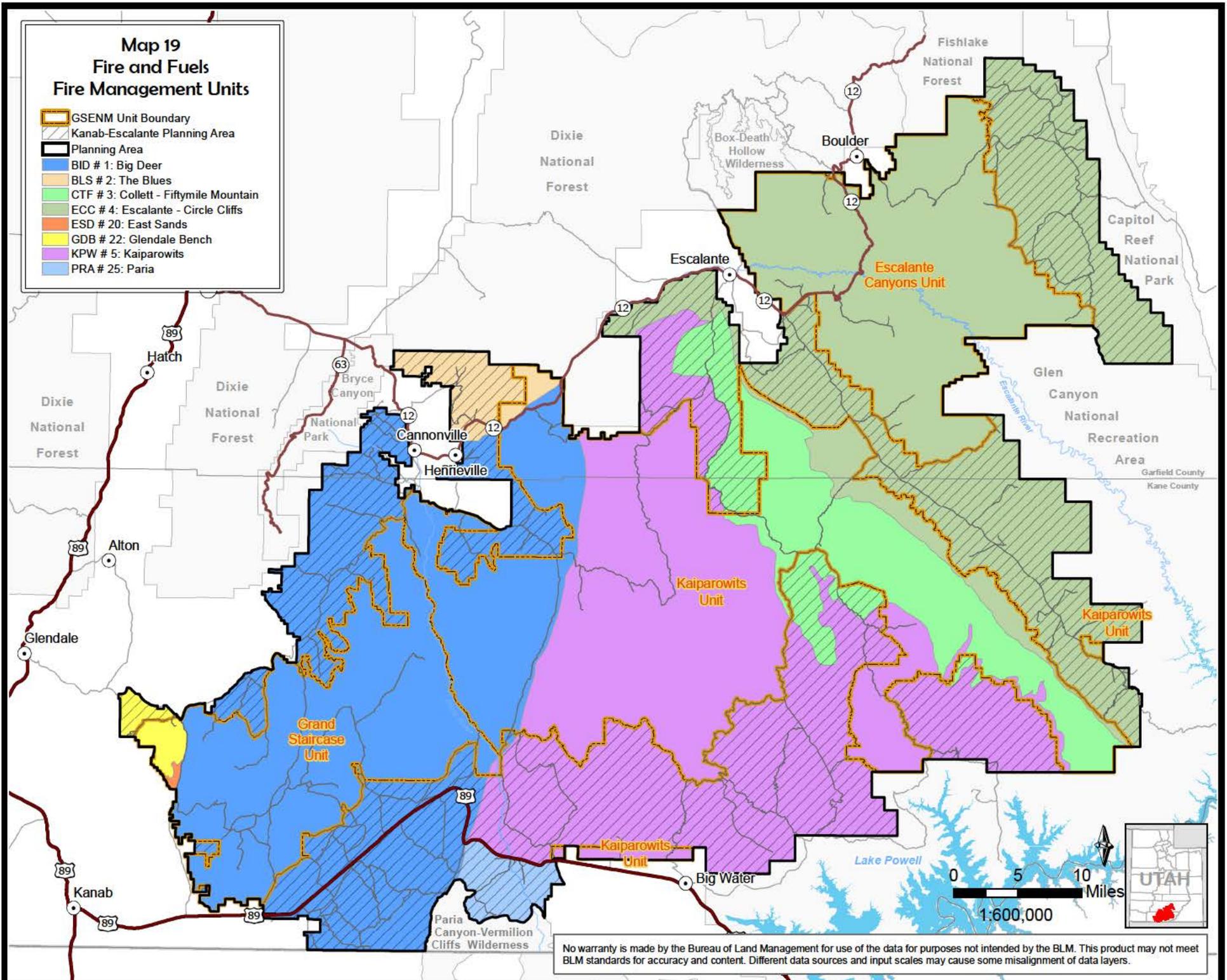
Map 18
Vegetation
Riparian and Wetland Areas
Alternatives C and D

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Riparian Area within 330 feet
-  Wetland Area within 330 feet



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Map 19
Fire and Fuels
Fire Management Units

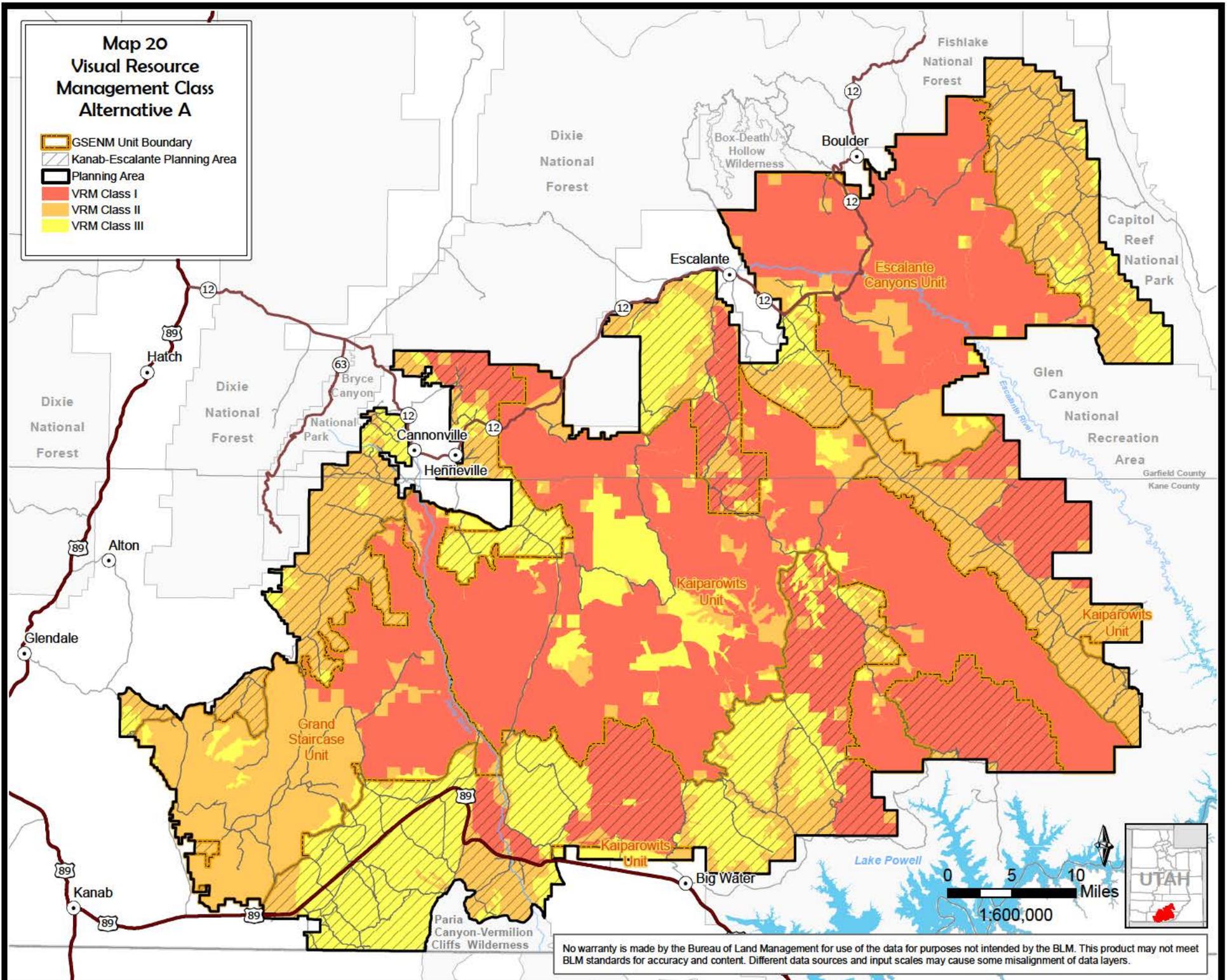
- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- BID # 1: Big Deer
- BLS # 2: The Blues
- CTF # 3: Collett - Fiftymile Mountain
- ECC # 4: Escalante - Circle Cliffs
- ESD # 20: East Sands
- GDB # 22: Glendale Bench
- KPW # 5: Kaiparowits
- PRA # 25: Paria

0 5 10 Miles
 1:600,000

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Map 20
Visual Resource
Management Class
Alternative A

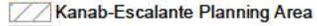
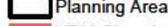
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  VRM Class I
-  VRM Class II
-  VRM Class III

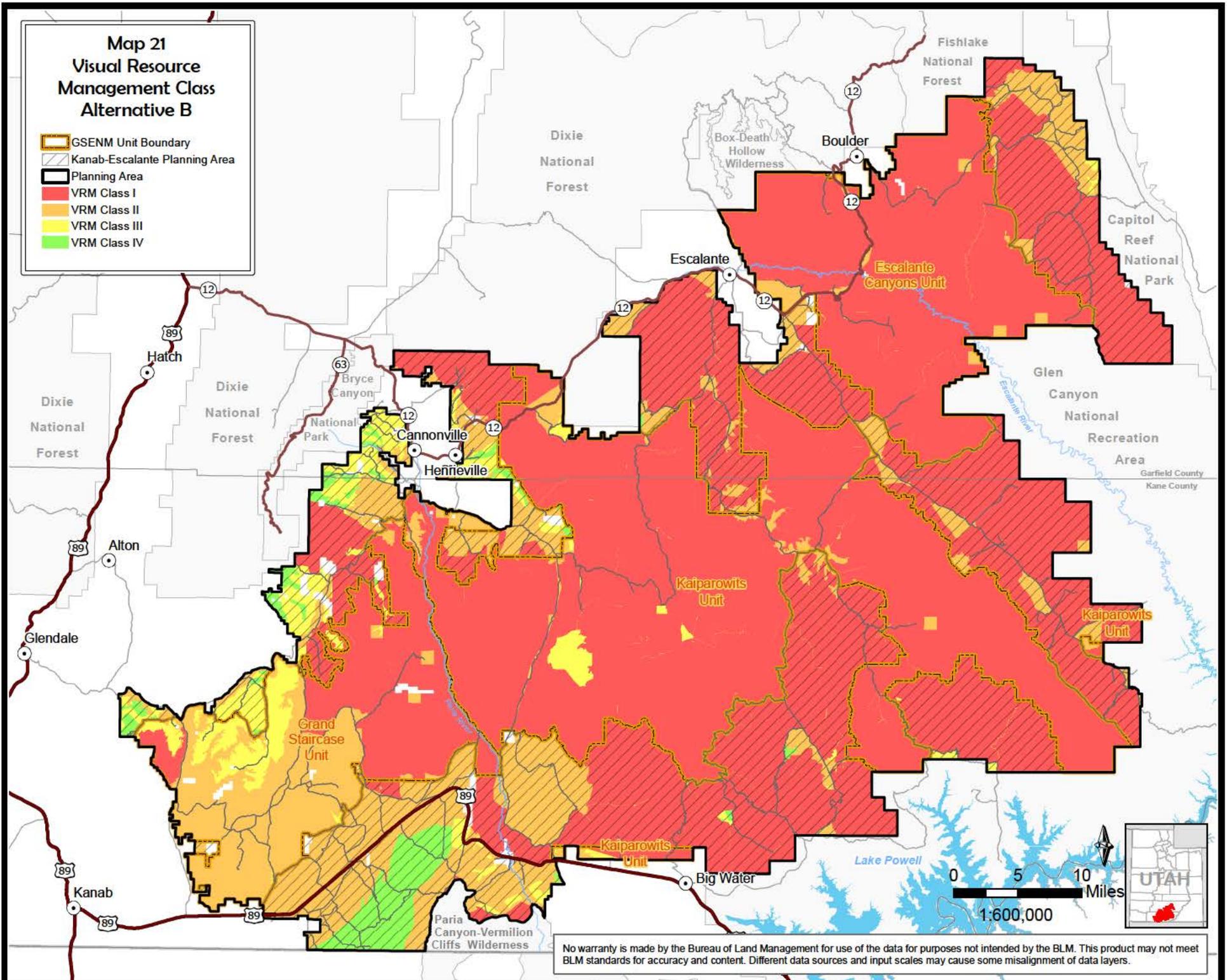


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Map 21 Visual Resource Management Class Alternative B

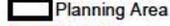
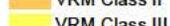
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  VRM Class I
-  VRM Class II
-  VRM Class III
-  VRM Class IV

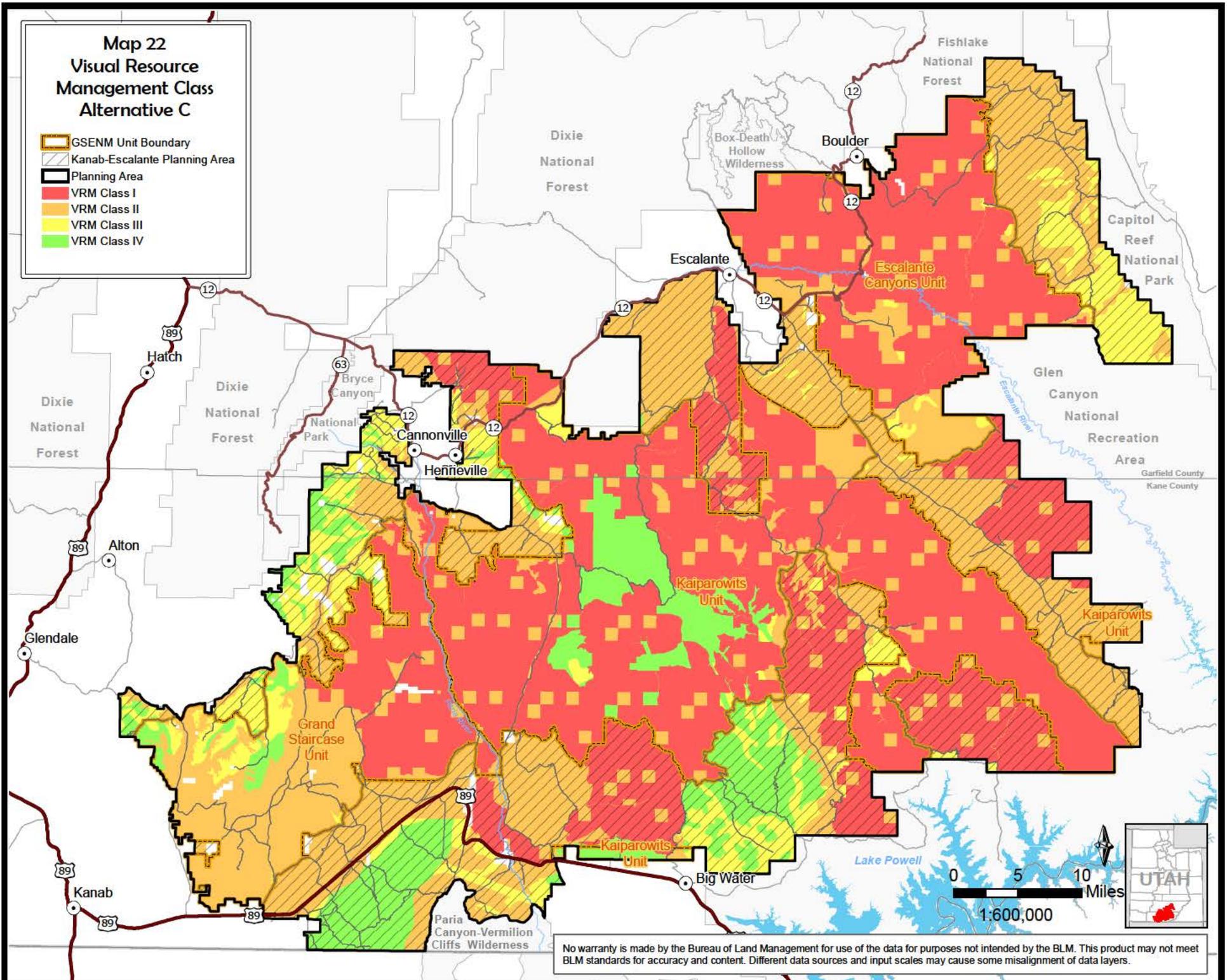


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Map 22 Visual Resource Management Class Alternative C

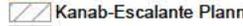
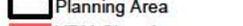
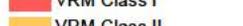
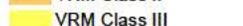
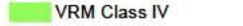
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  VRM Class I
-  VRM Class II
-  VRM Class III
-  VRM Class IV

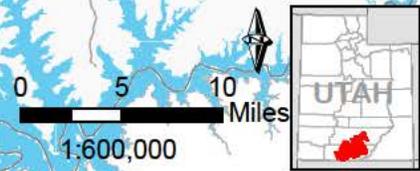
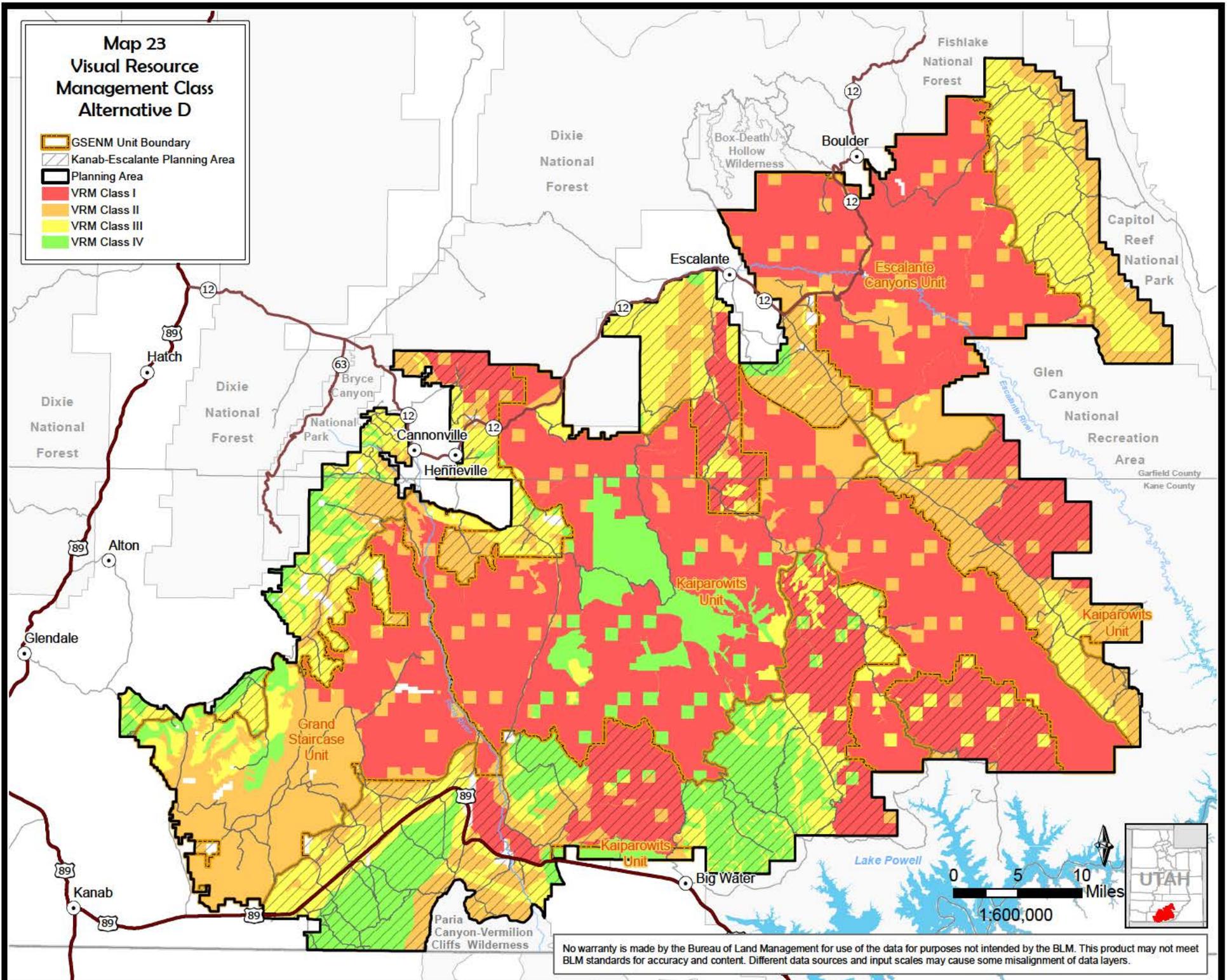


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Map 23
Visual Resource
Management Class
Alternative D

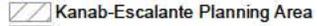
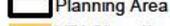
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  VRM Class I
-  VRM Class II
-  VRM Class III
-  VRM Class IV

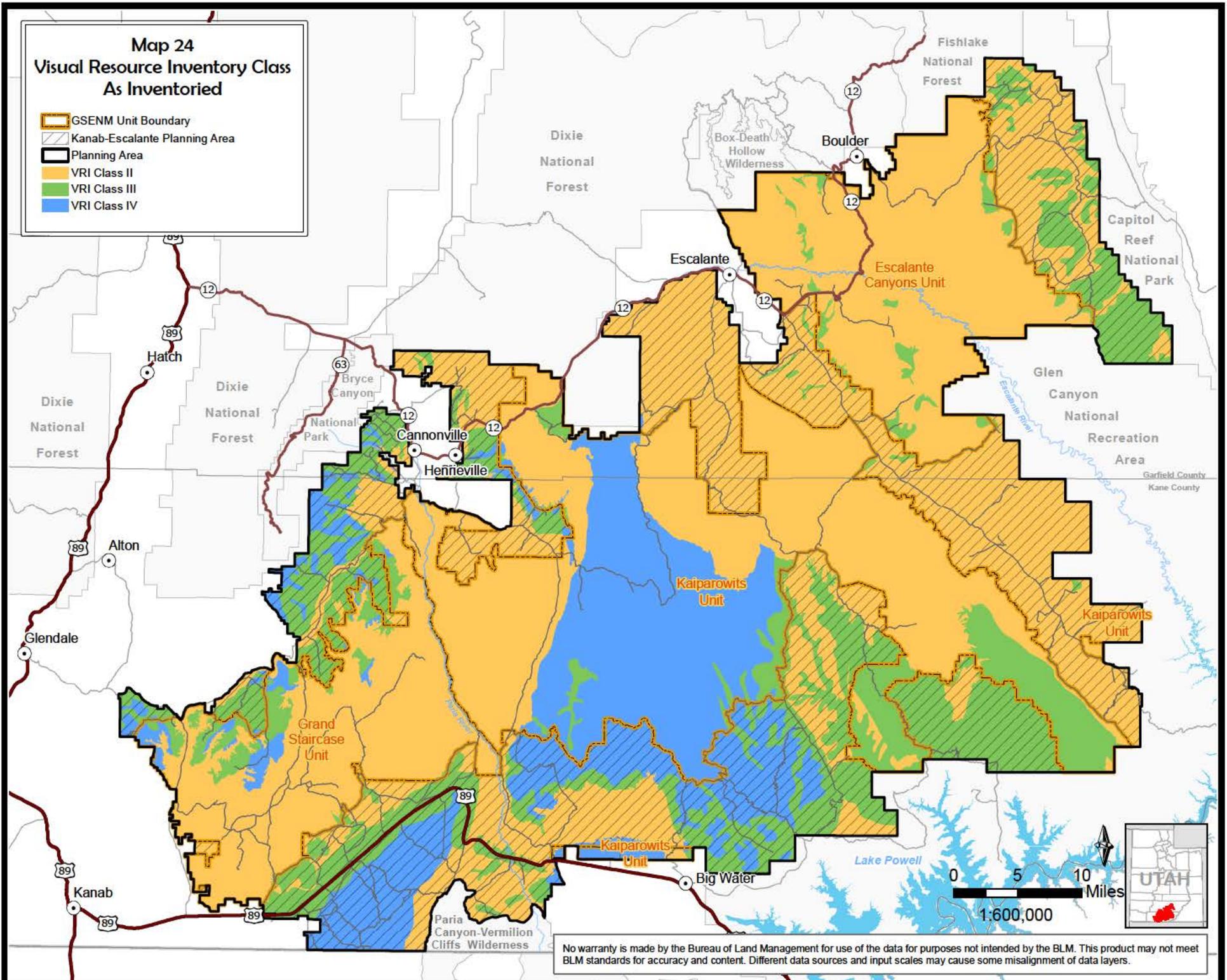


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Map 24
Visual Resource Inventory Class
As Inventoried

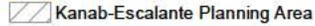
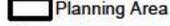
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  VRI Class II
-  VRI Class III
-  VRI Class IV

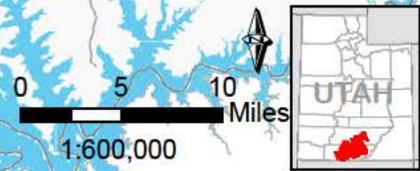
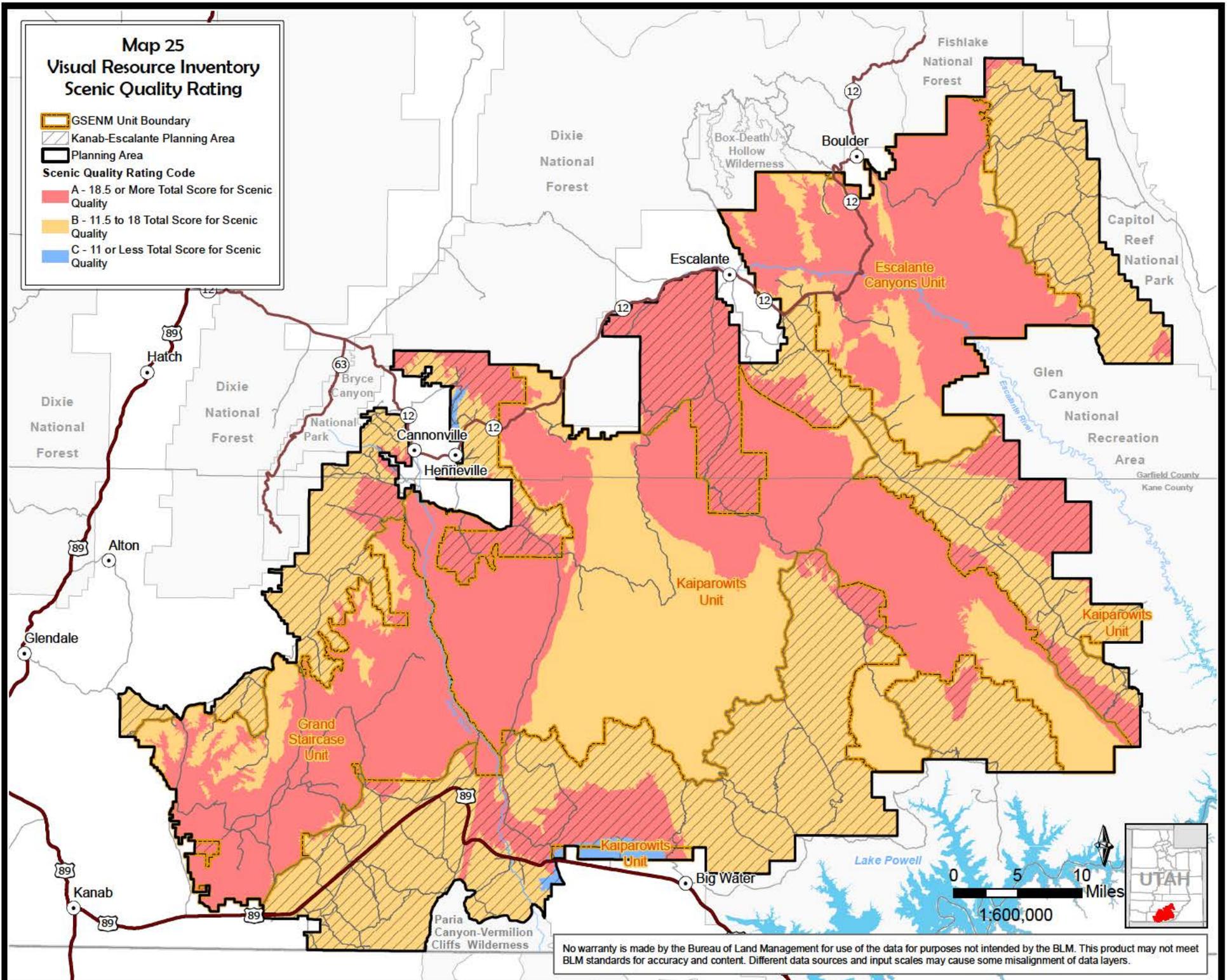


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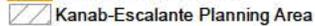
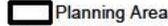
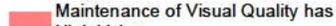
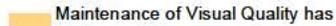
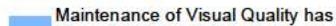
Map 25 Visual Resource Inventory Scenic Quality Rating

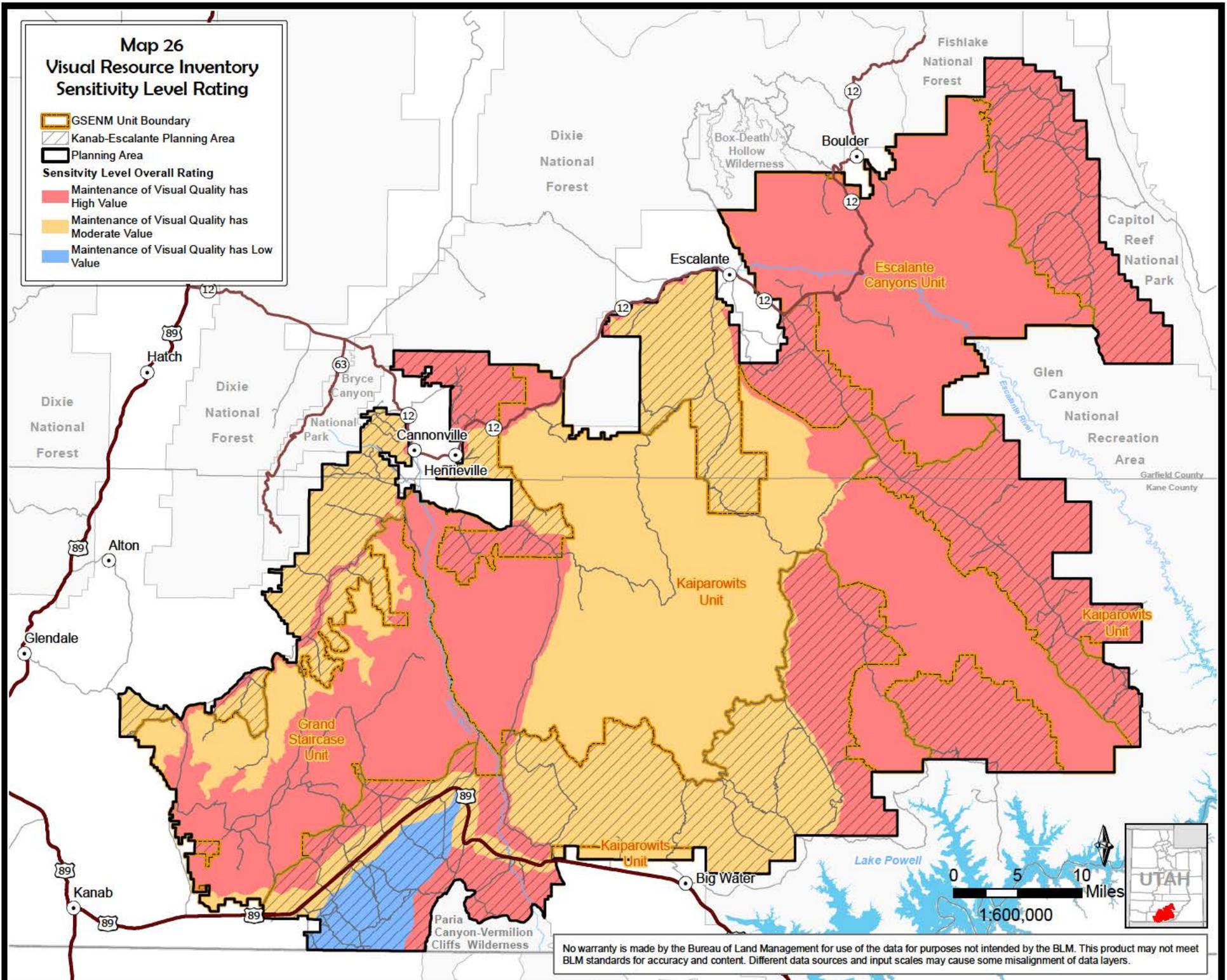
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Scenic Quality Rating Code**
-  A - 18.5 or More Total Score for Scenic Quality
-  B - 11.5 to 18 Total Score for Scenic Quality
-  C - 11 or Less Total Score for Scenic Quality



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Map 26 Visual Resource Inventory Sensitivity Level Rating

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Sensitivity Level Overall Rating**
-  Maintenance of Visual Quality has High Value
-  Maintenance of Visual Quality has Moderate Value
-  Maintenance of Visual Quality has Low Value

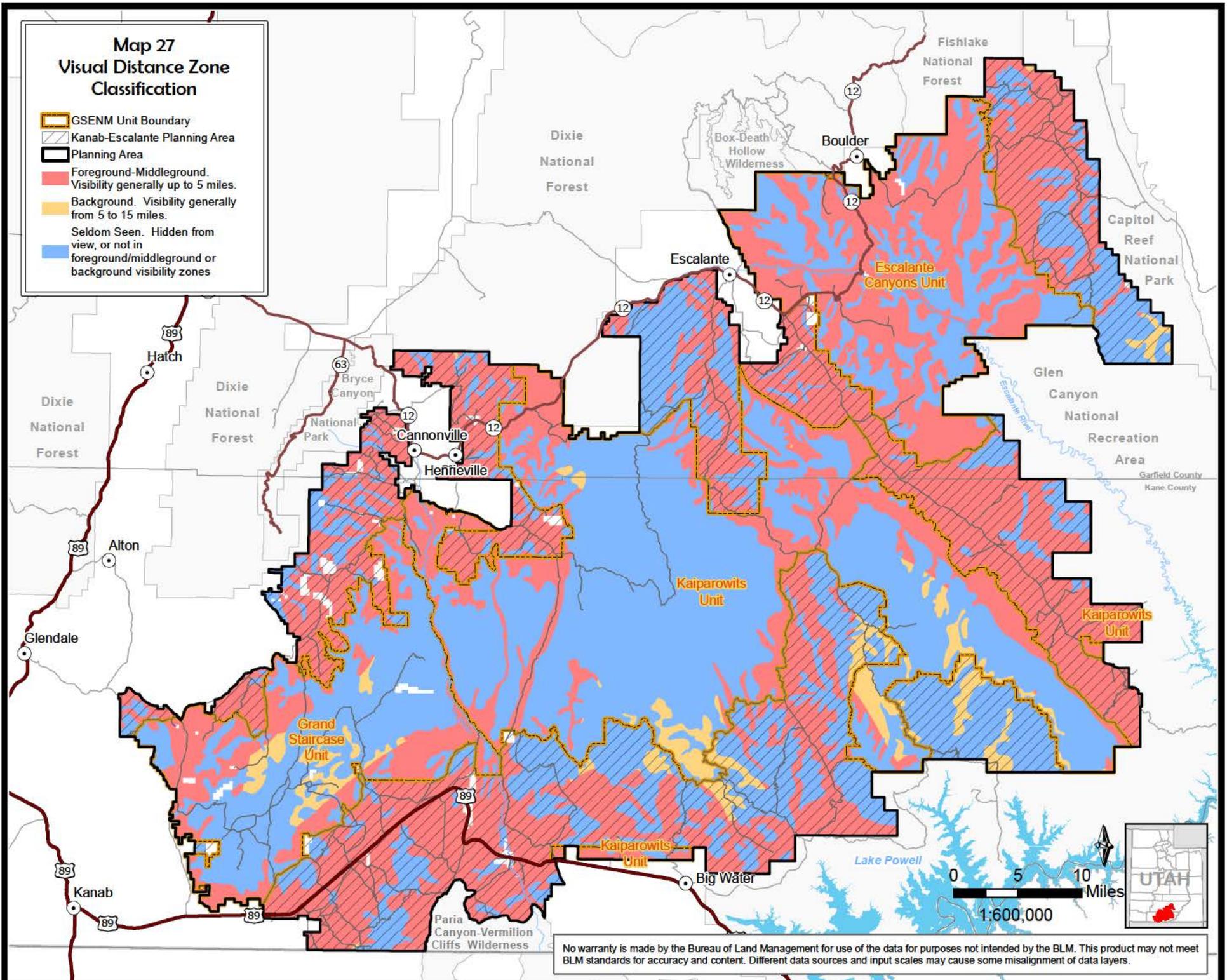


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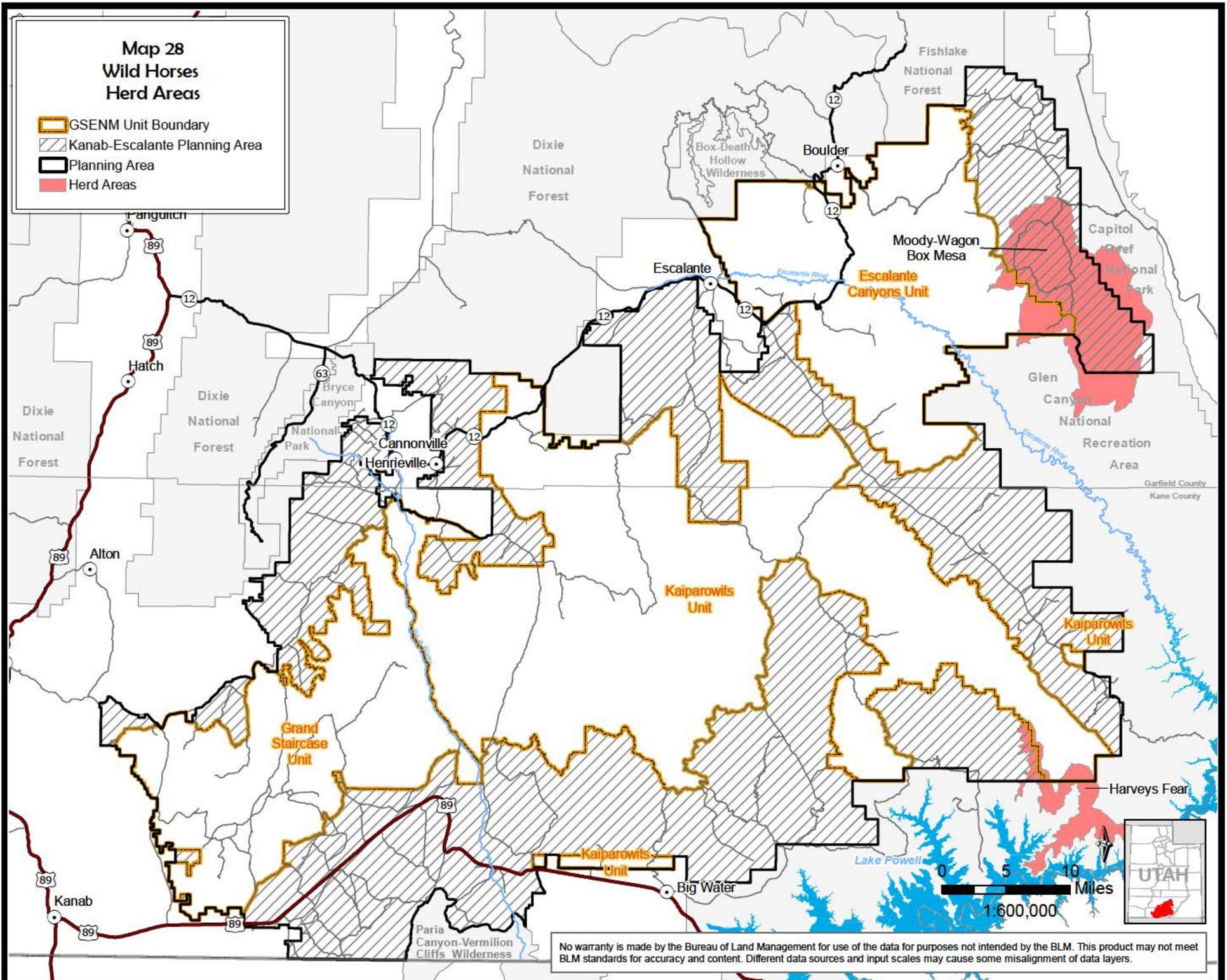
Map 27 Visual Distance Zone Classification

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Foreground-Midground. Visibility generally up to 5 miles.
-  Background. Visibility generally from 5 to 15 miles.
-  Seldom Seen. Hidden from view, or not in foreground/midground or background visibility zones



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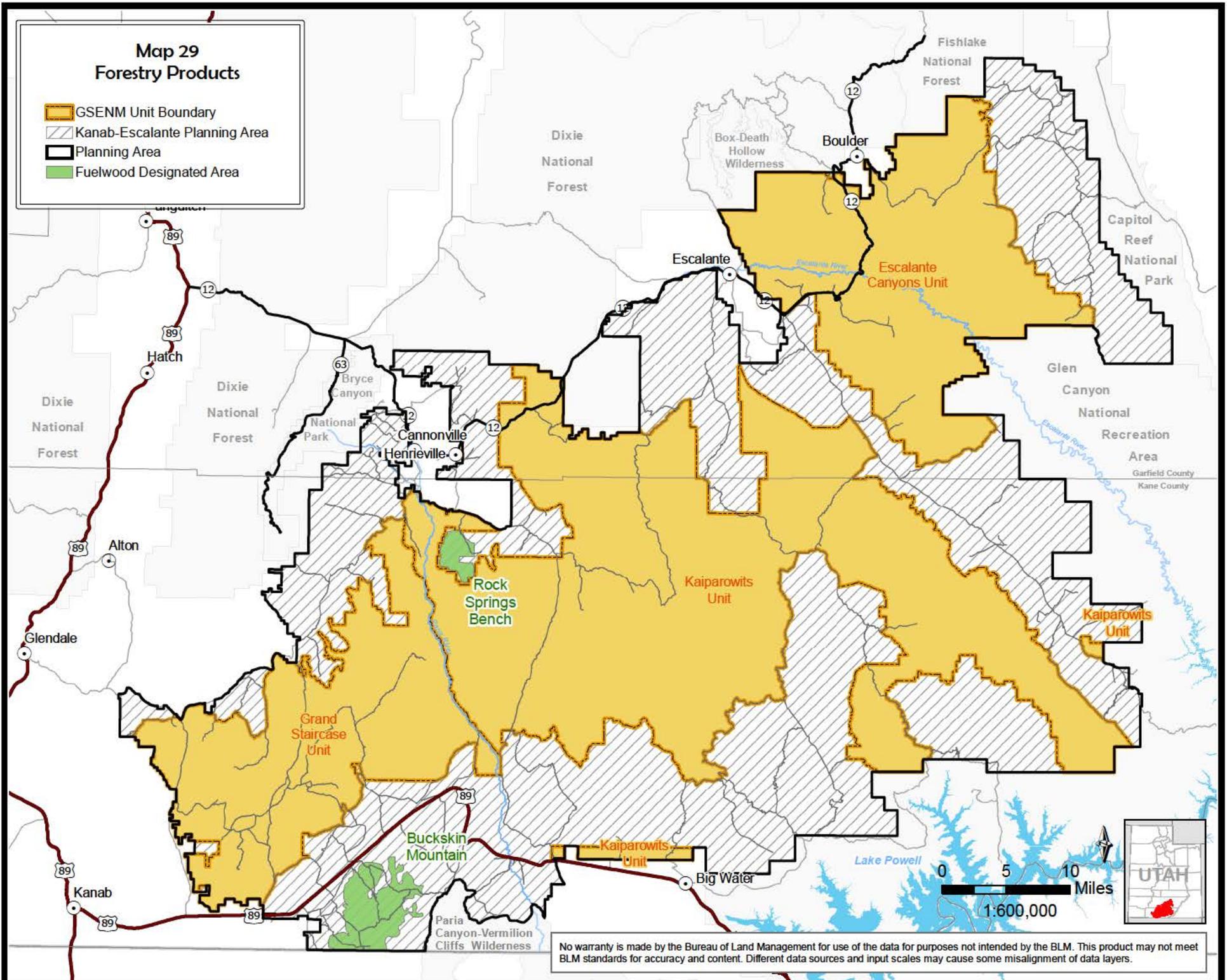
**Map 28
Wild Horses
Herd Areas**

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Herd Areas

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Map 29 Forestry Products

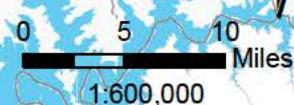
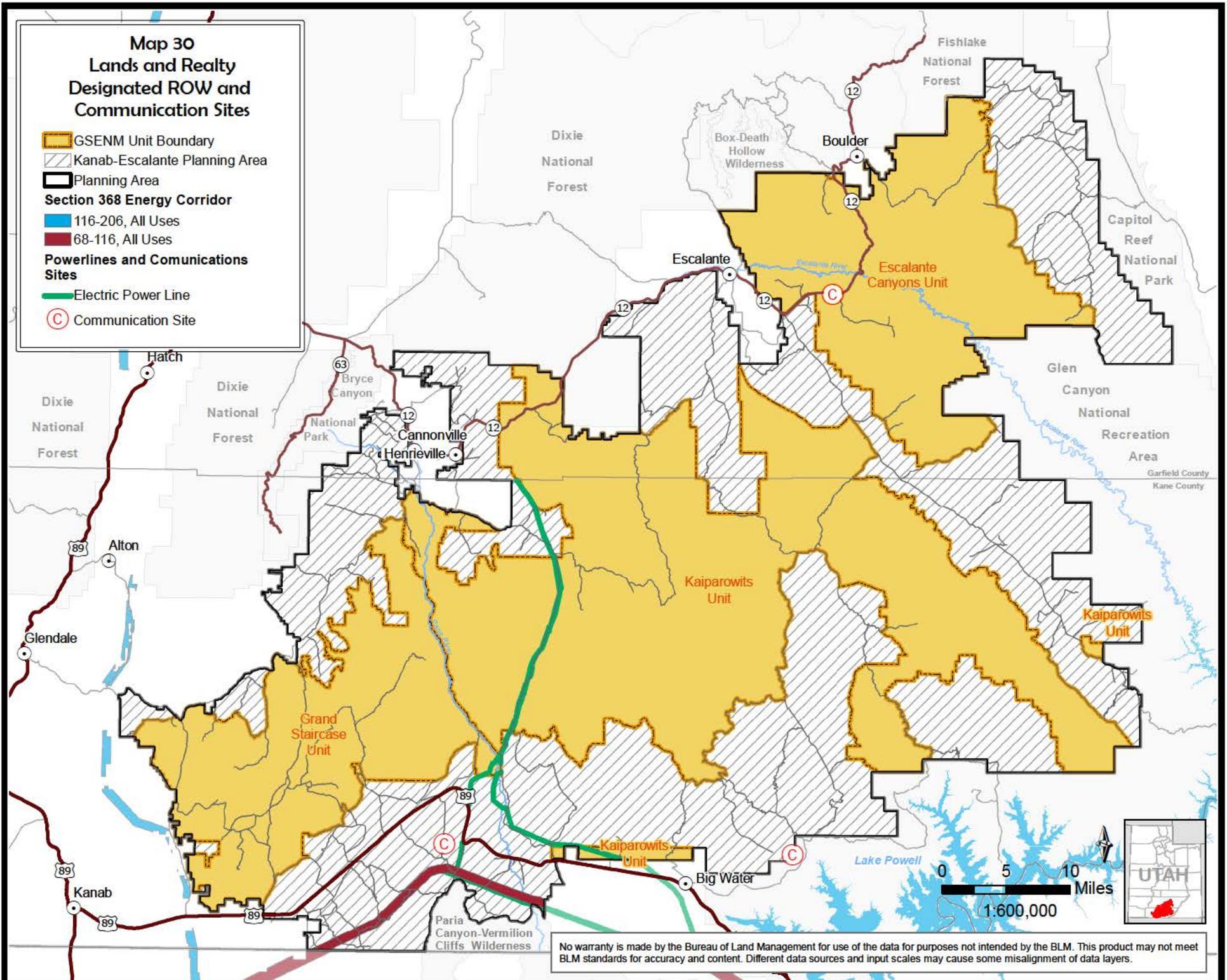
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Fuelwood Designated Area



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**Map 30
Lands and Realty
Designated ROW and
Communication Sites**

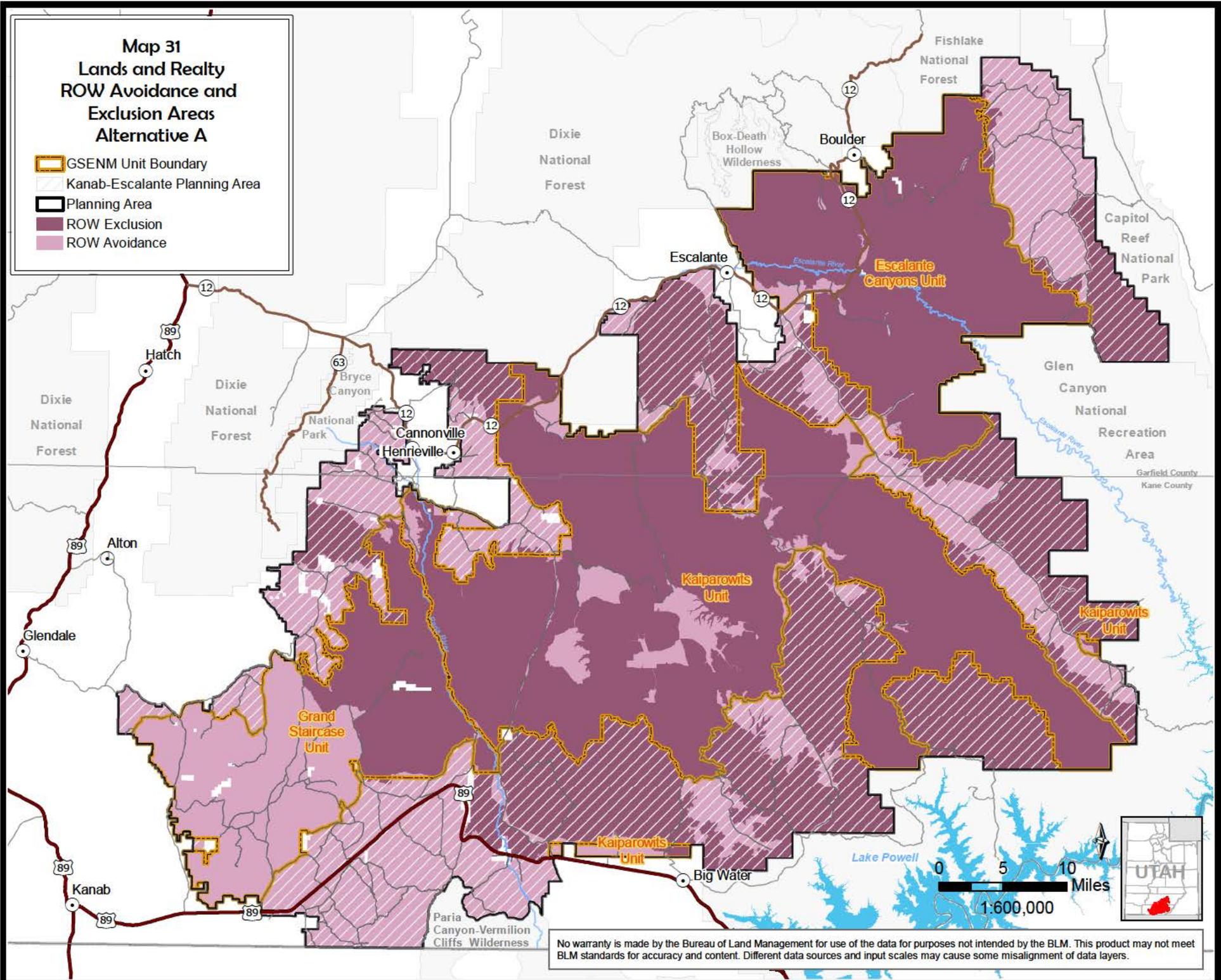
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Section 368 Energy Corridor**
-  116-206, All Uses
-  68-116, All Uses
- Powerlines and Communications Sites**
-  Electric Power Line
-  Communication Site



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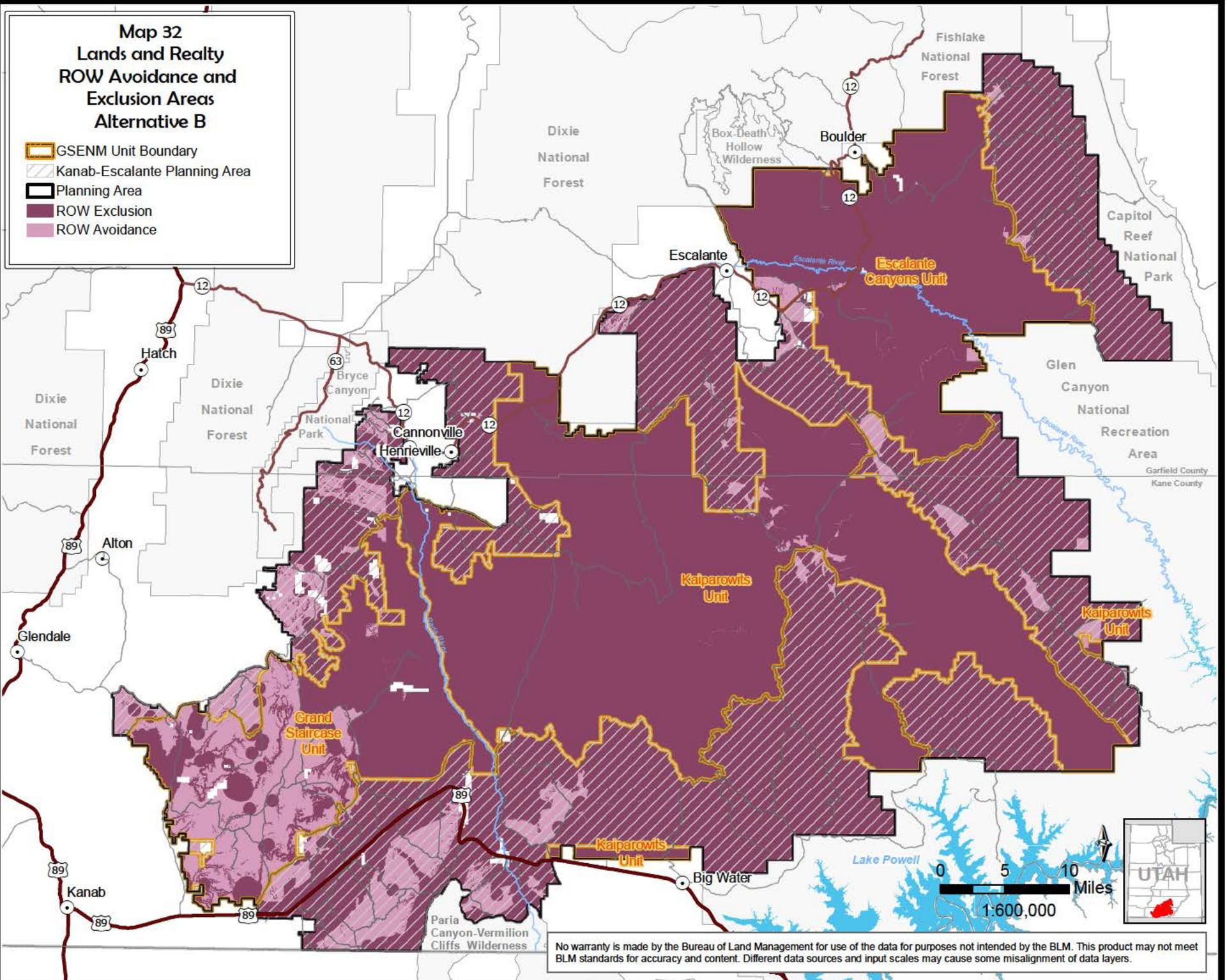
**Map 31
Lands and Realty
ROW Avoidance and
Exclusion Areas
Alternative A**

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  ROW Exclusion
-  ROW Avoidance



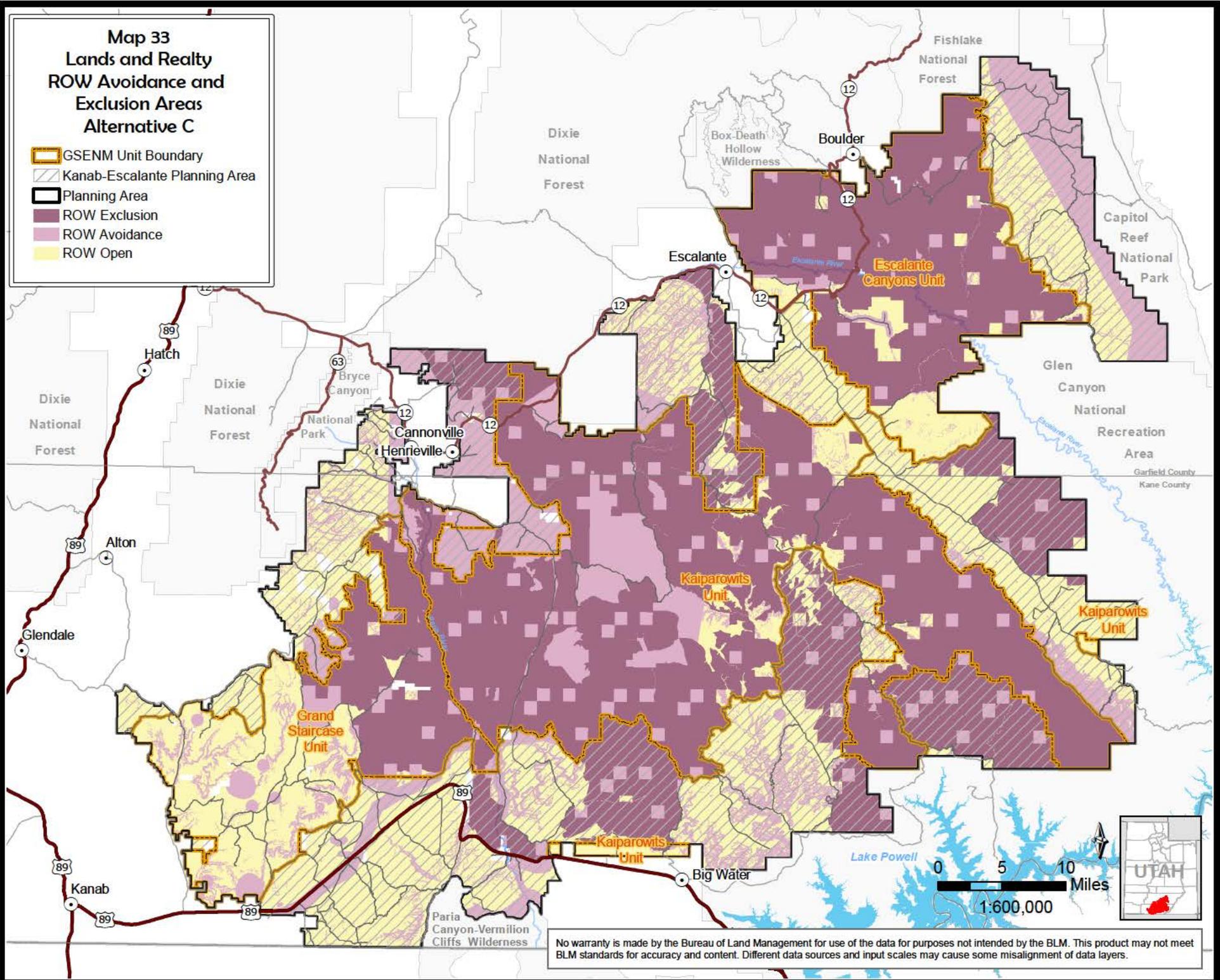
No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.





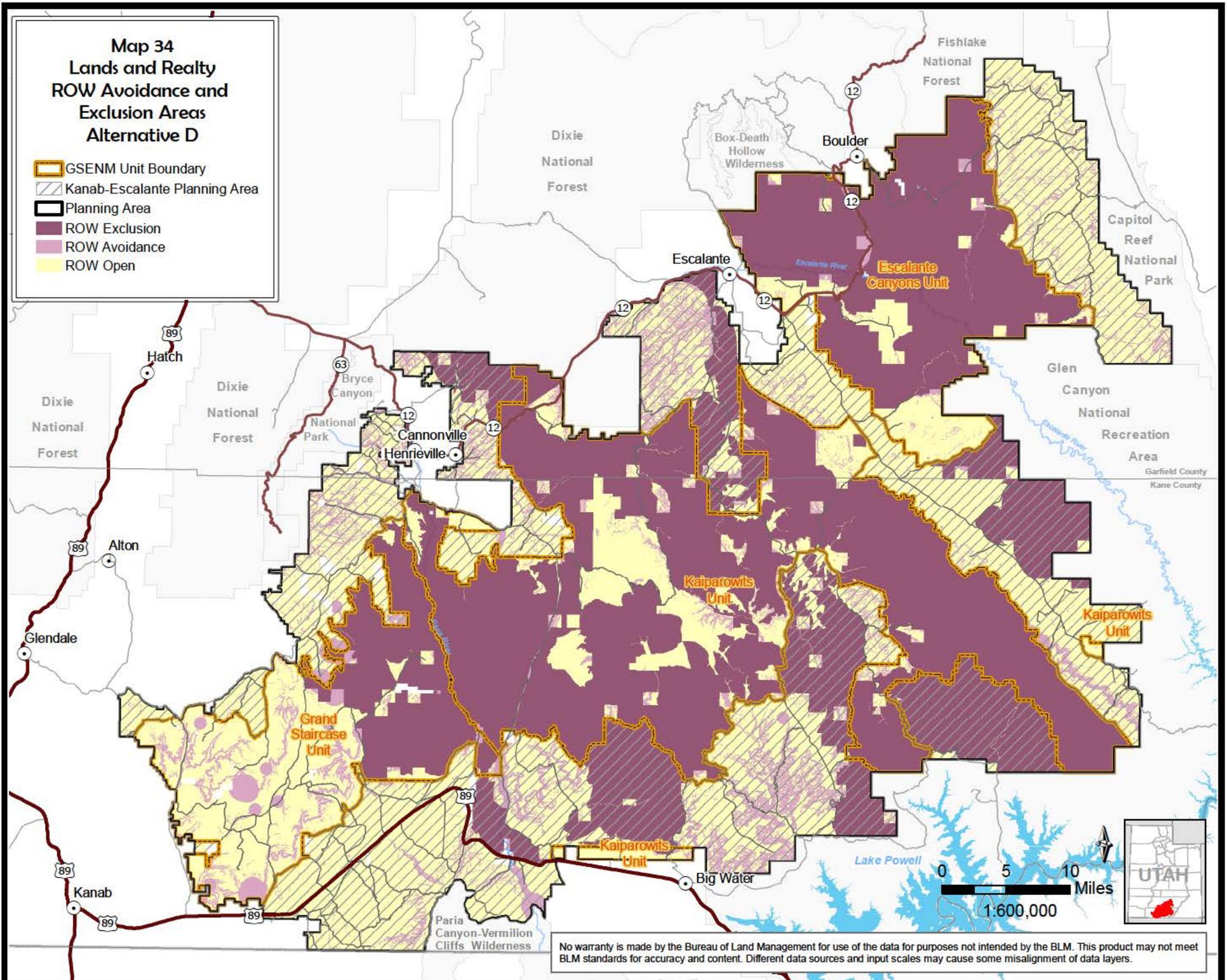
**Map 33
Lands and Realty
ROW Avoidance and
Exclusion Areas
Alternative C**

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  ROW Exclusion
-  ROW Avoidance
-  ROW Open



**Map 34
Lands and Realty
ROW Avoidance and
Exclusion Areas
Alternative D**

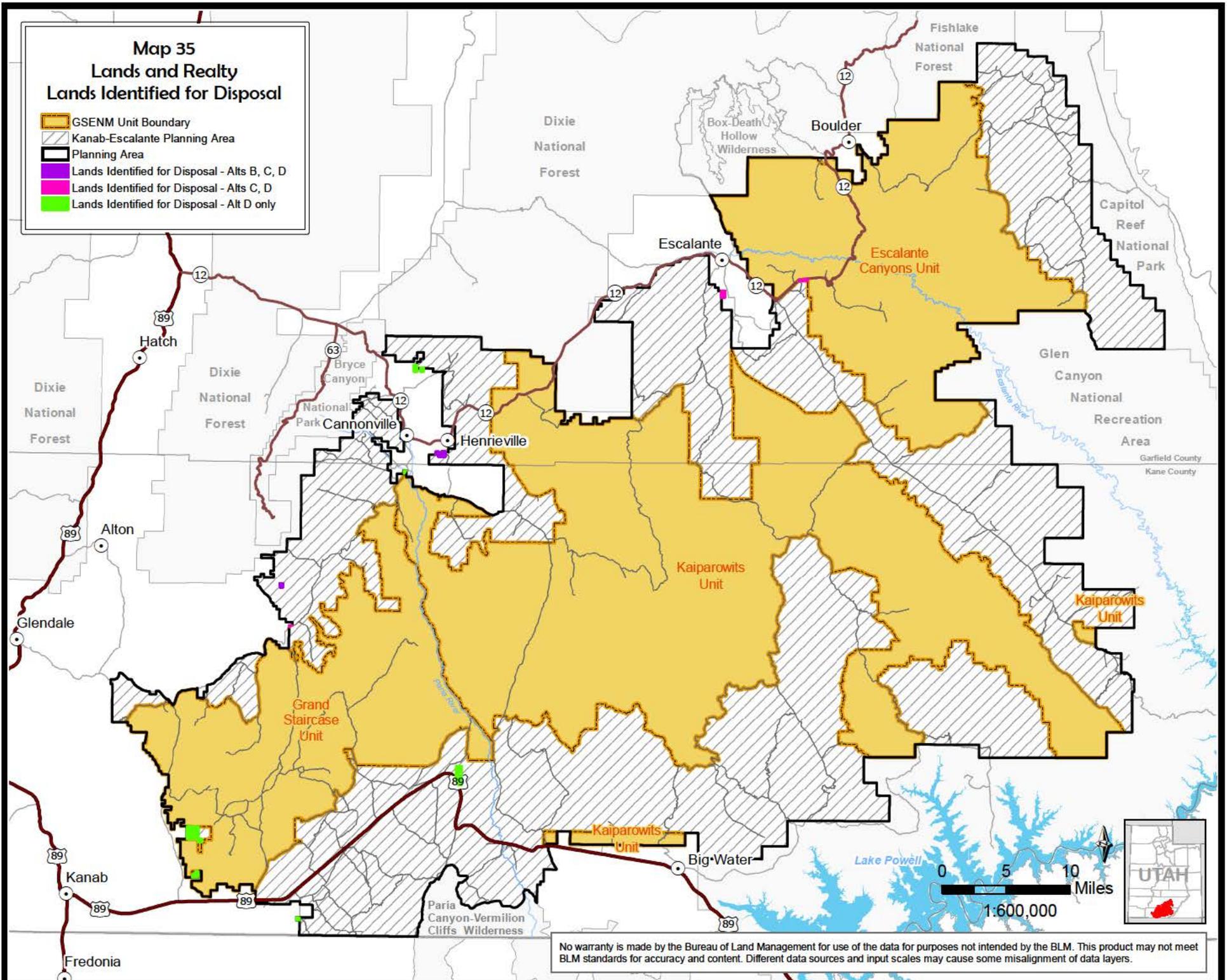
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  ROW Exclusion
-  ROW Avoidance
-  ROW Open



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Map 35
Lands and Realty
Lands Identified for Disposal

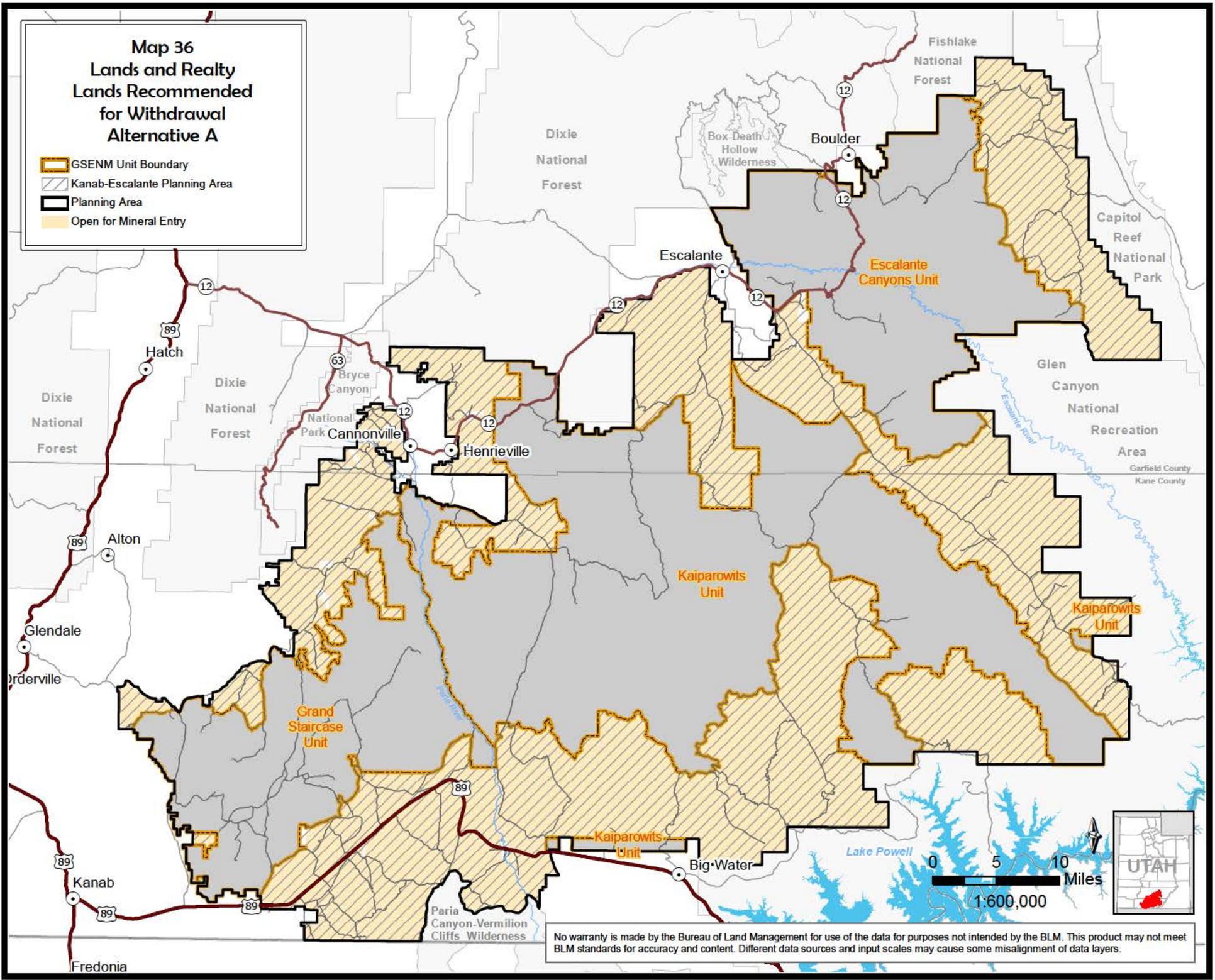
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Lands Identified for Disposal - Alts B, C, D
-  Lands Identified for Disposal - Alts C, D
-  Lands Identified for Disposal - Alt D only



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Map 36
Lands and Realty
Recommended
for Withdrawal
Alternative A

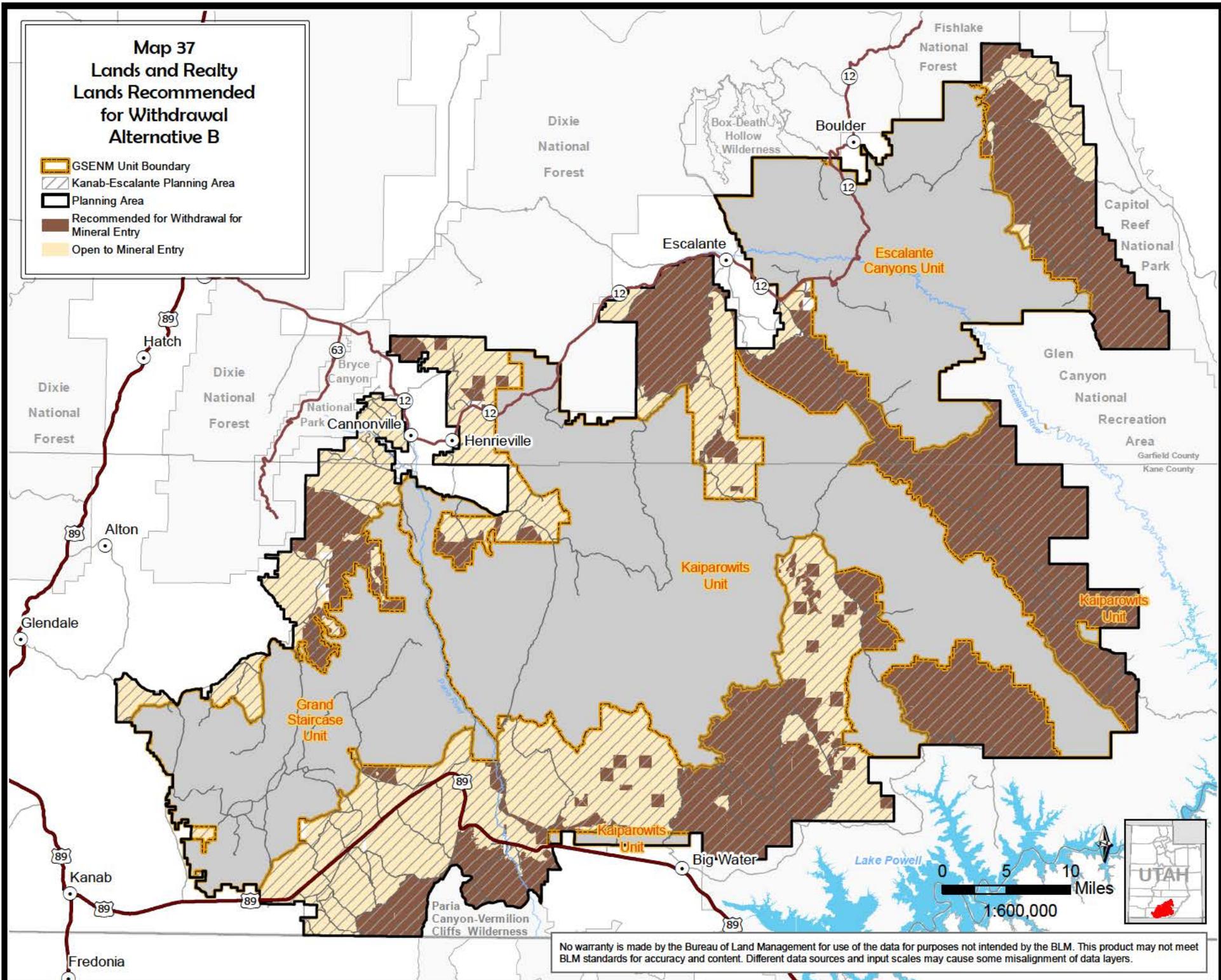
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Open for Mineral Entry



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Map 37
Lands and Realty
Lands Recommended
for Withdrawal
Alternative B

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Recommended for Withdrawal for Mineral Entry
-  Open to Mineral Entry

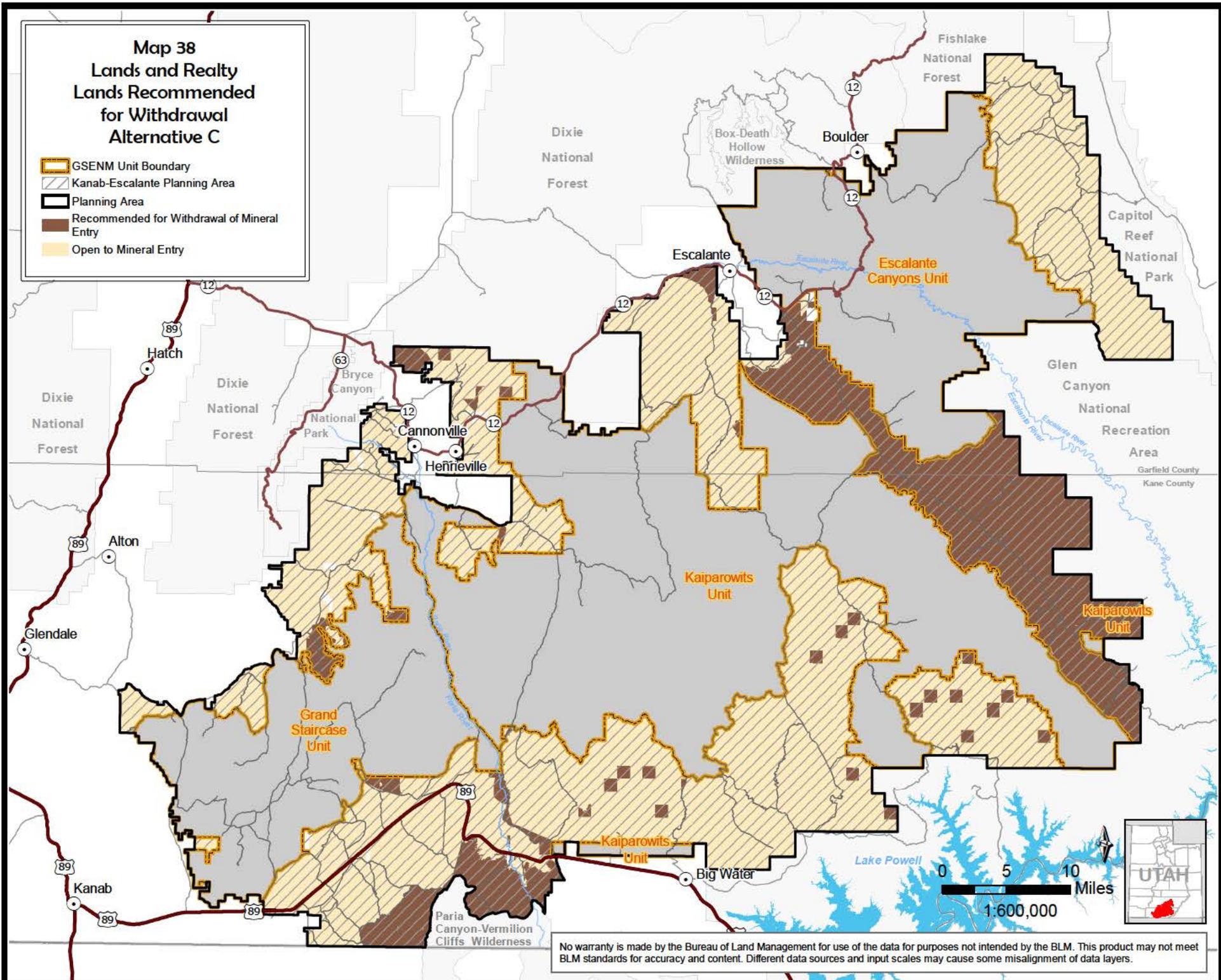


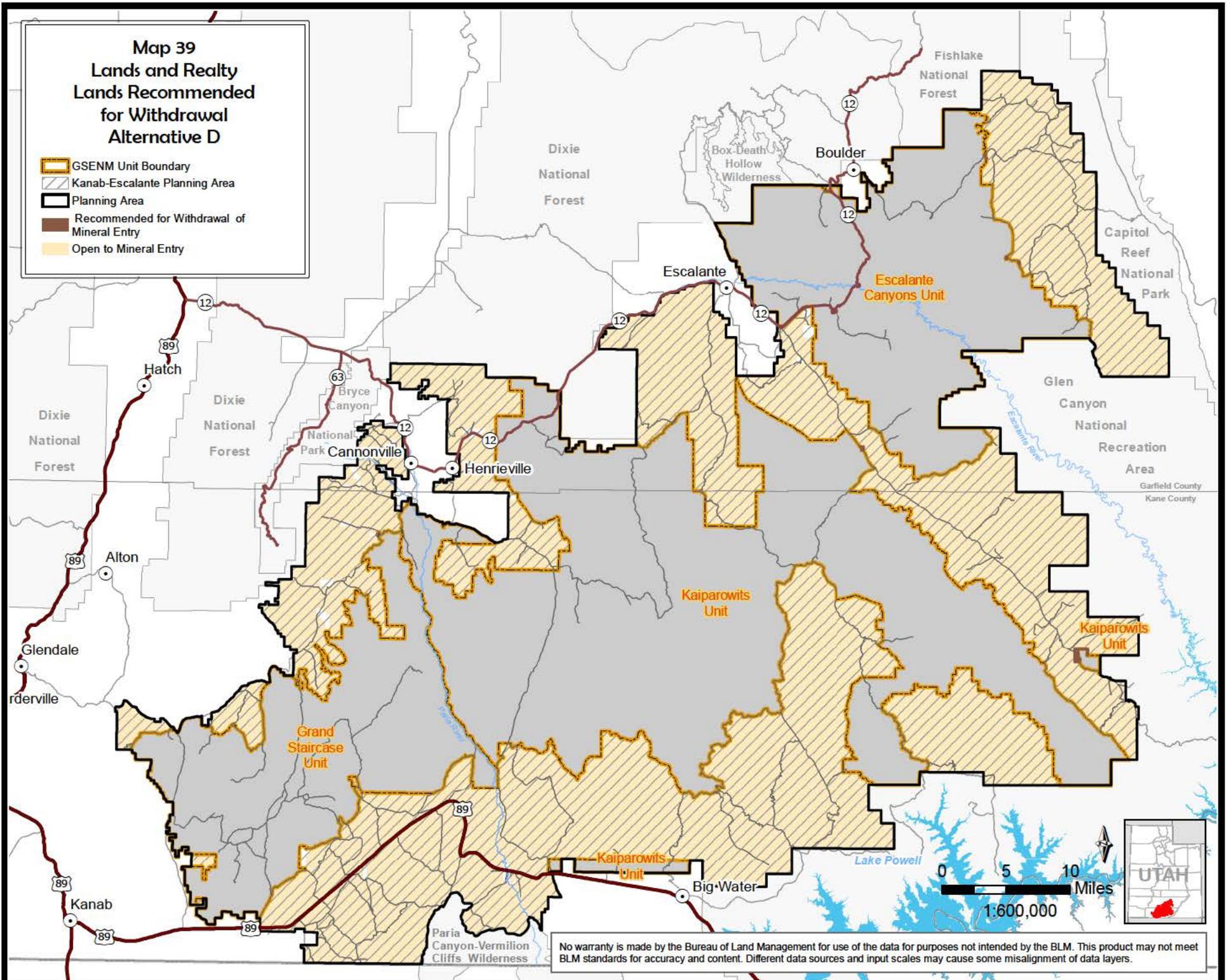
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Map 38
Lands and Realty
Lands Recommended
for Withdrawal
Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Recommended for Withdrawal of Mineral Entry
-  Open to Mineral Entry





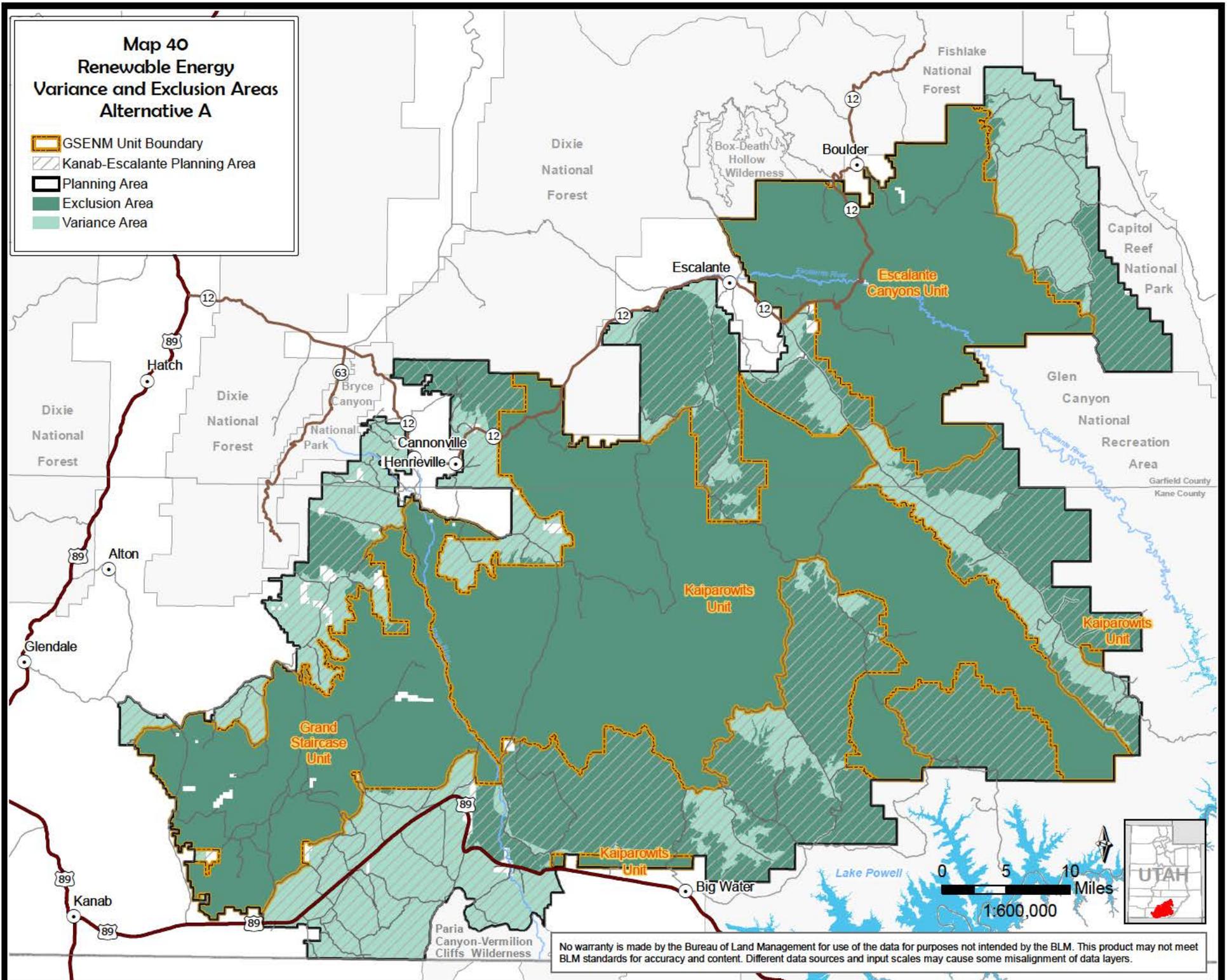
Map 39
Lands and Realty
Lands Recommended
for Withdrawal
Alternative D

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Recommended for Withdrawal of Mineral Entry
- Open to Mineral Entry

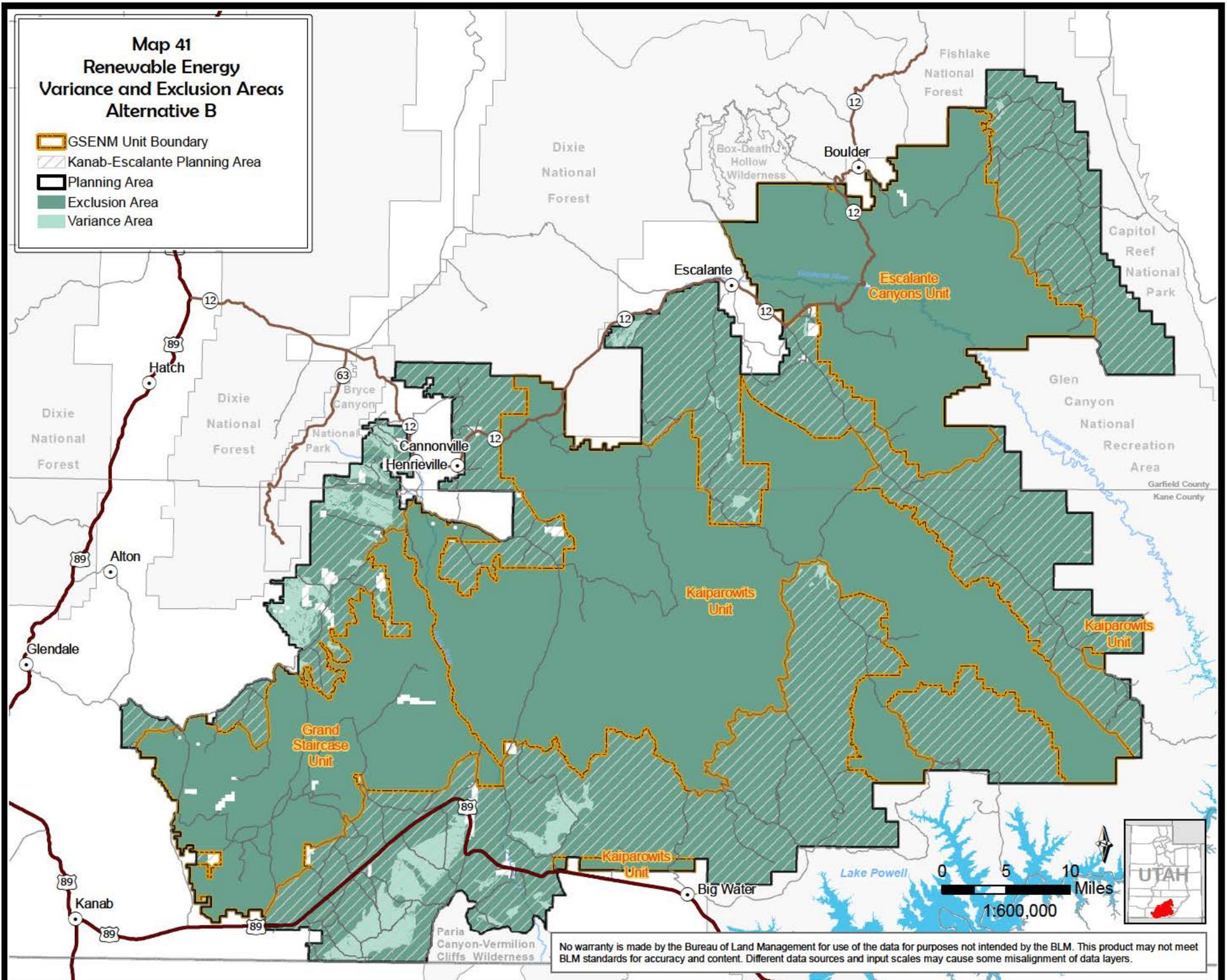
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Map 40 Renewable Energy Variance and Exclusion Areas Alternative A

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Exclusion Area
-  Variance Area

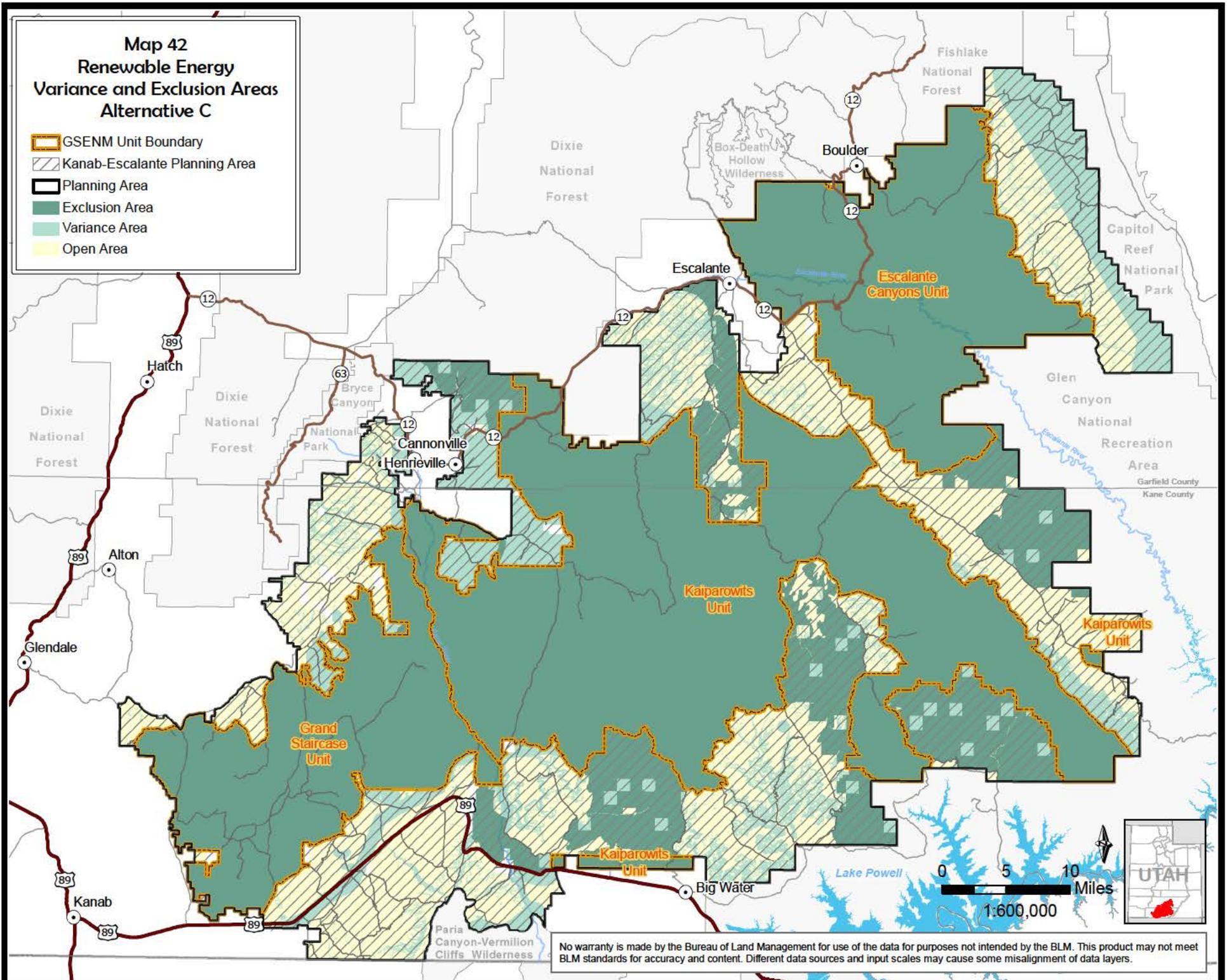


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**Map 42
Renewable Energy
Variance and Exclusion Areas
Alternative C**

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Exclusion Area
-  Variance Area
-  Open Area

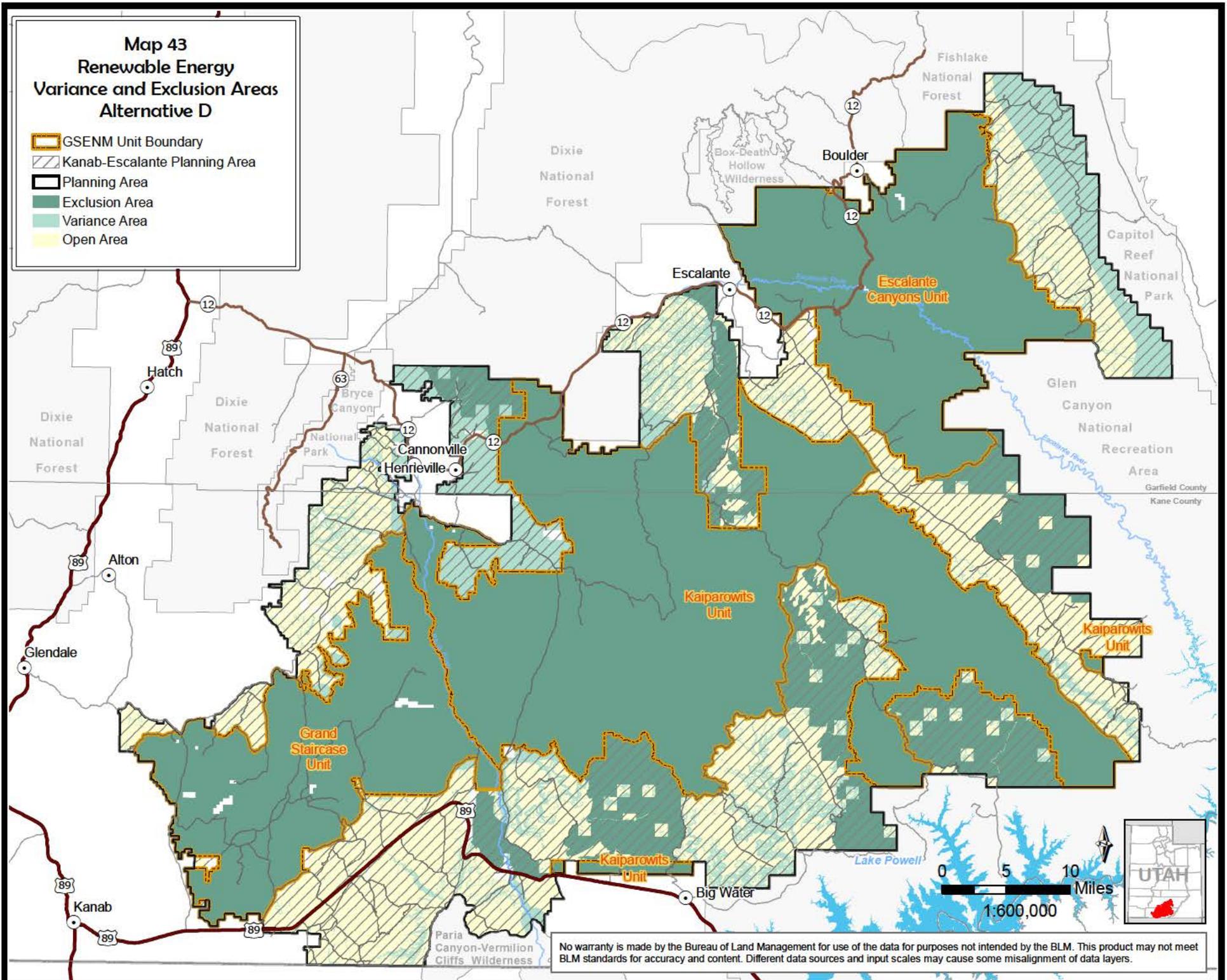


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**Map 43
Renewable Energy
Variance and Exclusion Areas
Alternative D**

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Exclusion Area
-  Variance Area
-  Open Area



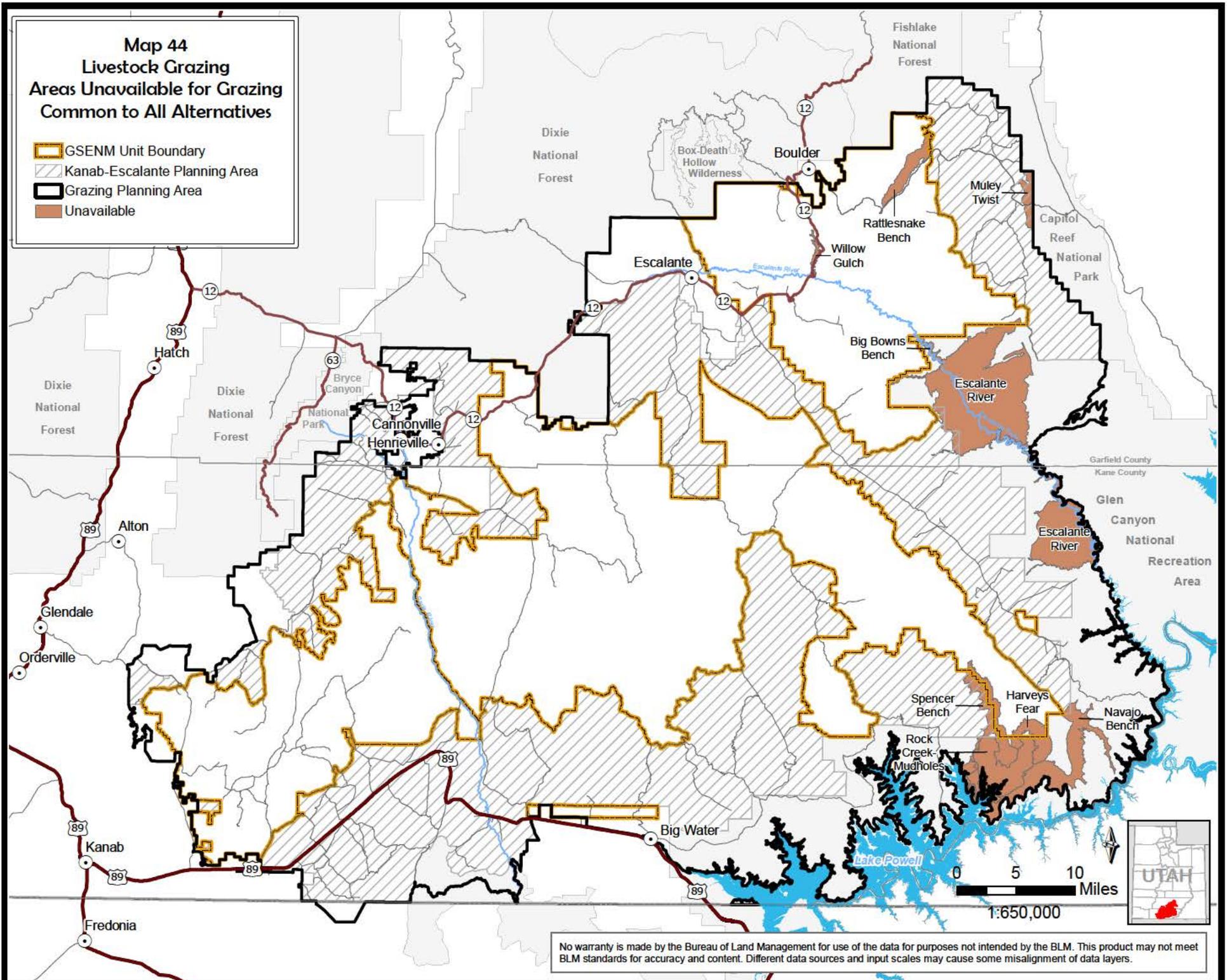
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Map 44 Livestock Grazing Areas Unavailable for Grazing Common to All Alternatives

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Grazing Planning Area
- Unavailable

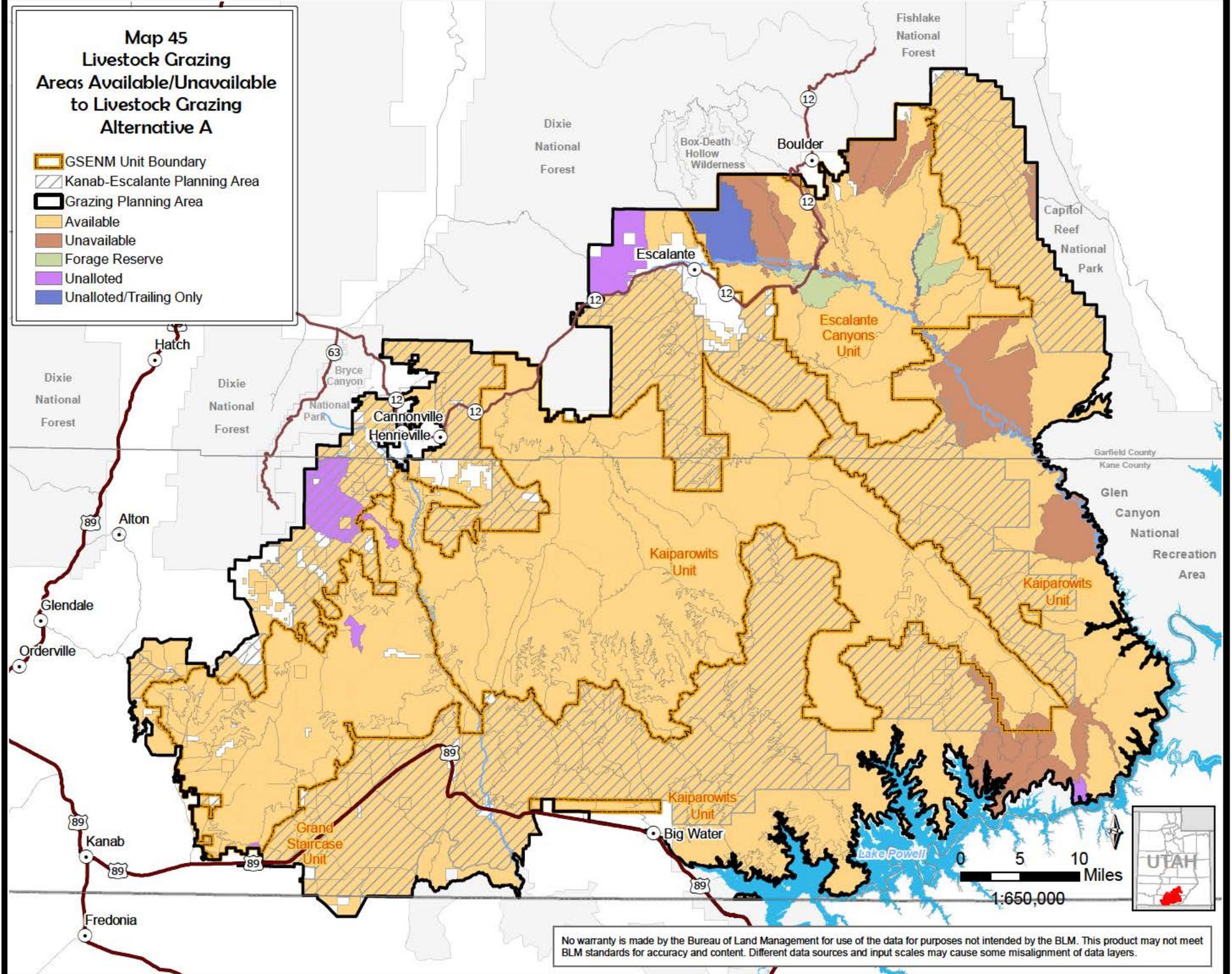


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Map 45 Livestock Grazing Areas Available/Unavailable to Livestock Grazing Alternative A

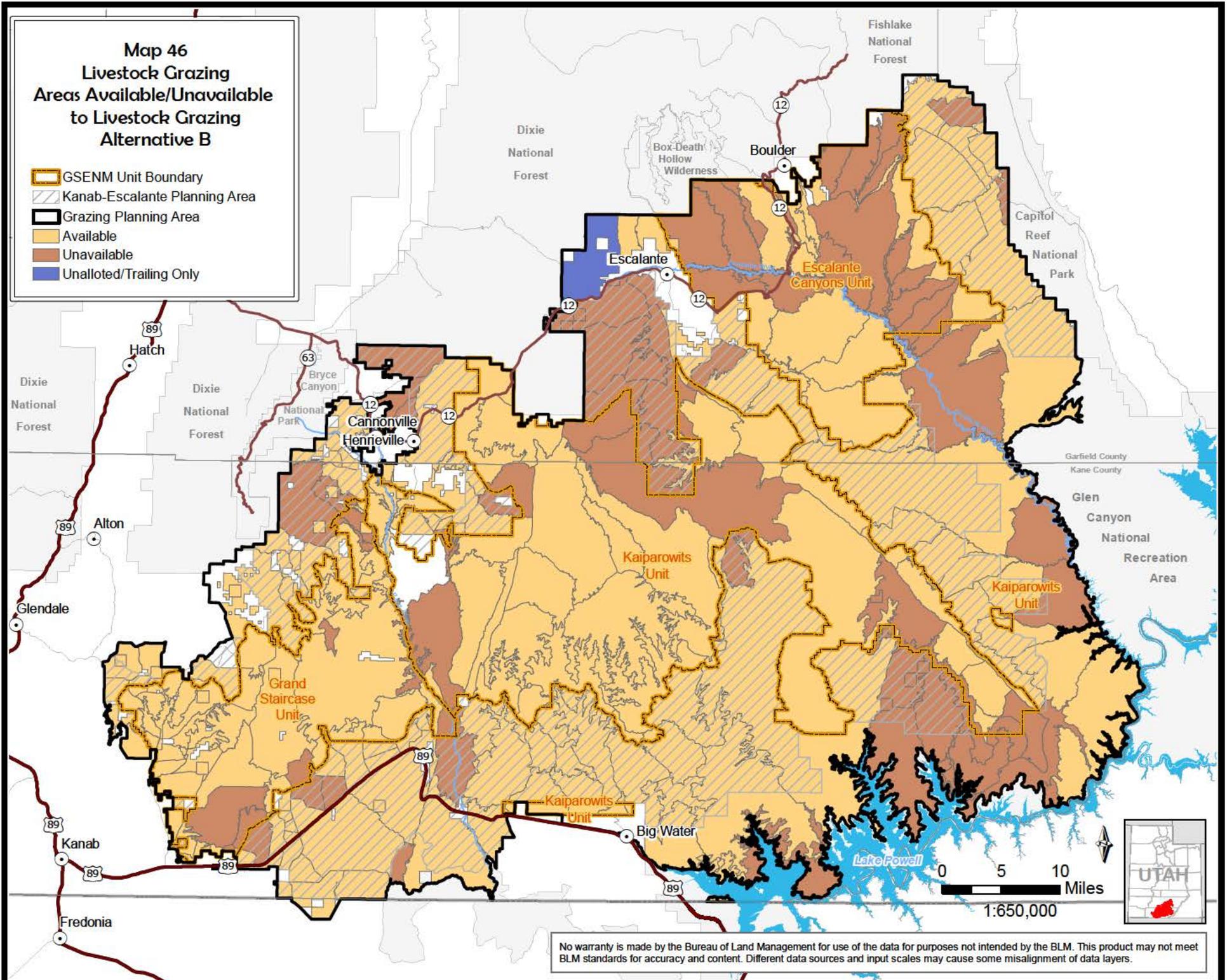
- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Grazing Planning Area
- Available
- Unavailable
- Forage Reserve
- Unalloted
- Unalloted/Trailing Only



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Map 46
Livestock Grazing
Areas Available/Unavailable
to Livestock Grazing
Alternative B

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Grazing Planning Area
-  Available
-  Unavailable
-  Unalloted/Trailing Only

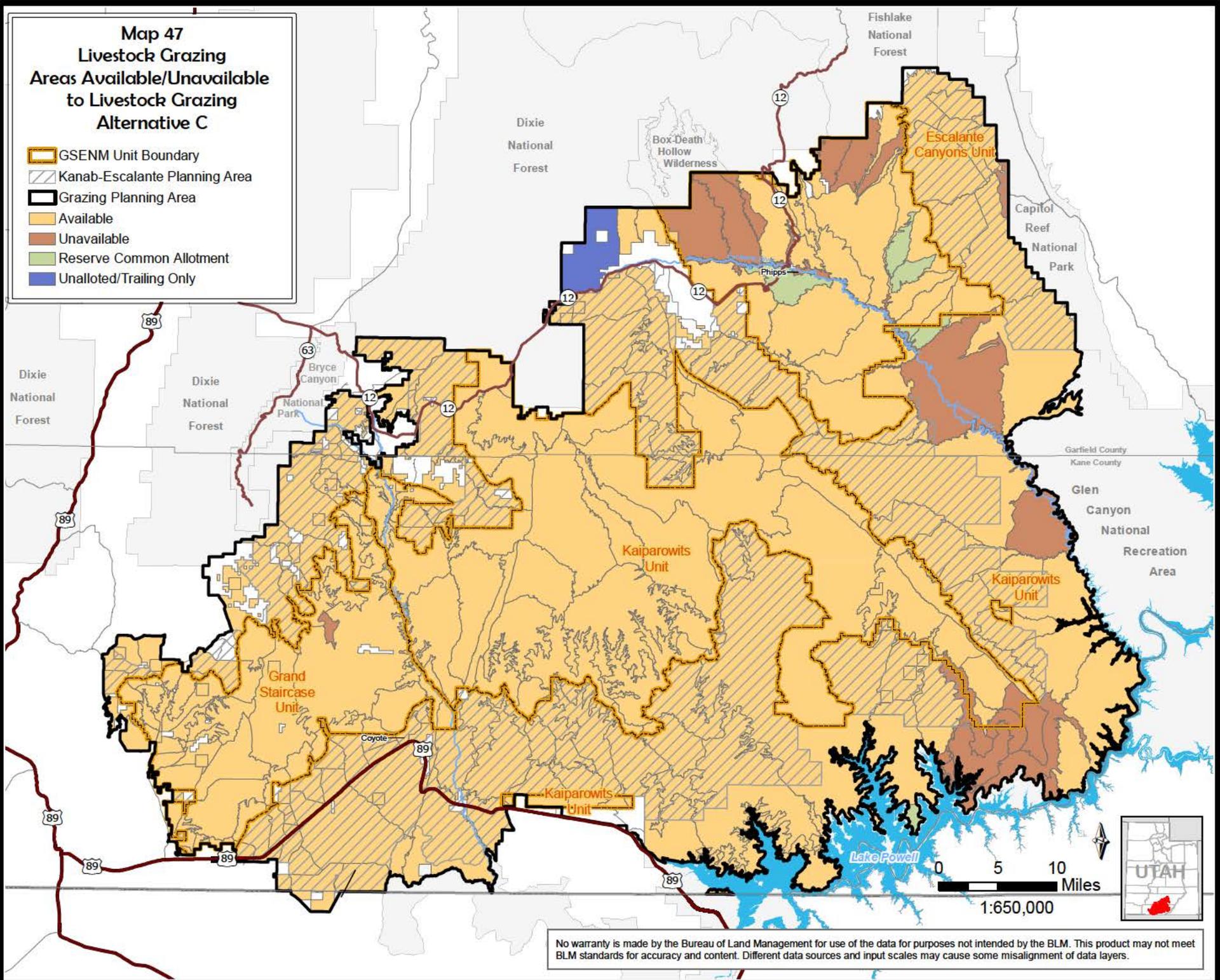


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Map 47
Livestock Grazing
Areas Available/Unavailable
to Livestock Grazing
Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Grazing Planning Area
-  Available
-  Unavailable
-  Reserve Common Allotment
-  Unallotted/Trailing Only



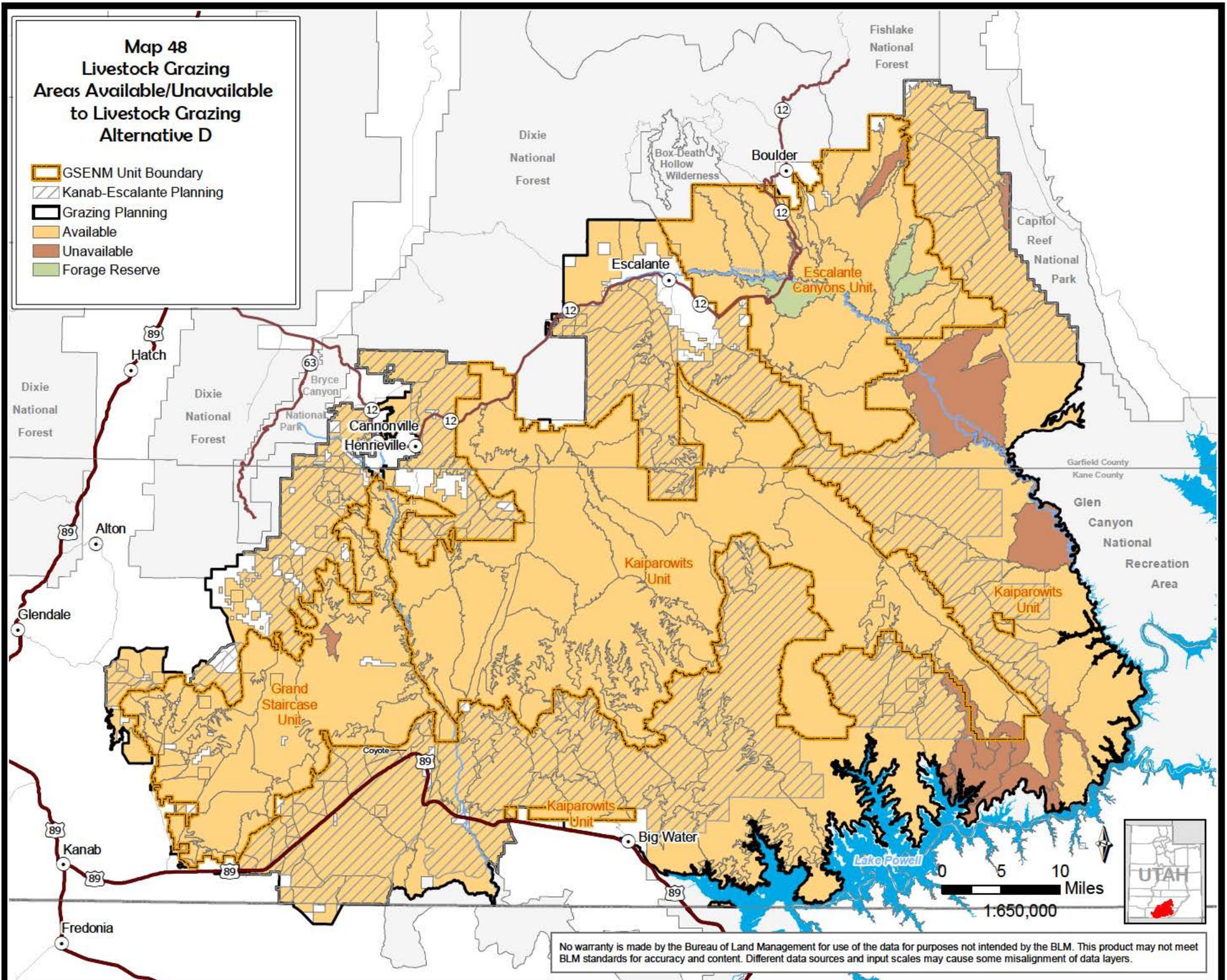
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Map 48 Livestock Grazing Areas Available/Unavailable to Livestock Grazing Alternative D

- GSENM Unit Boundary
- Kanab-Escalante Planning
- Grazing Planning
- Available
- Unavailable
- Forage Reserve

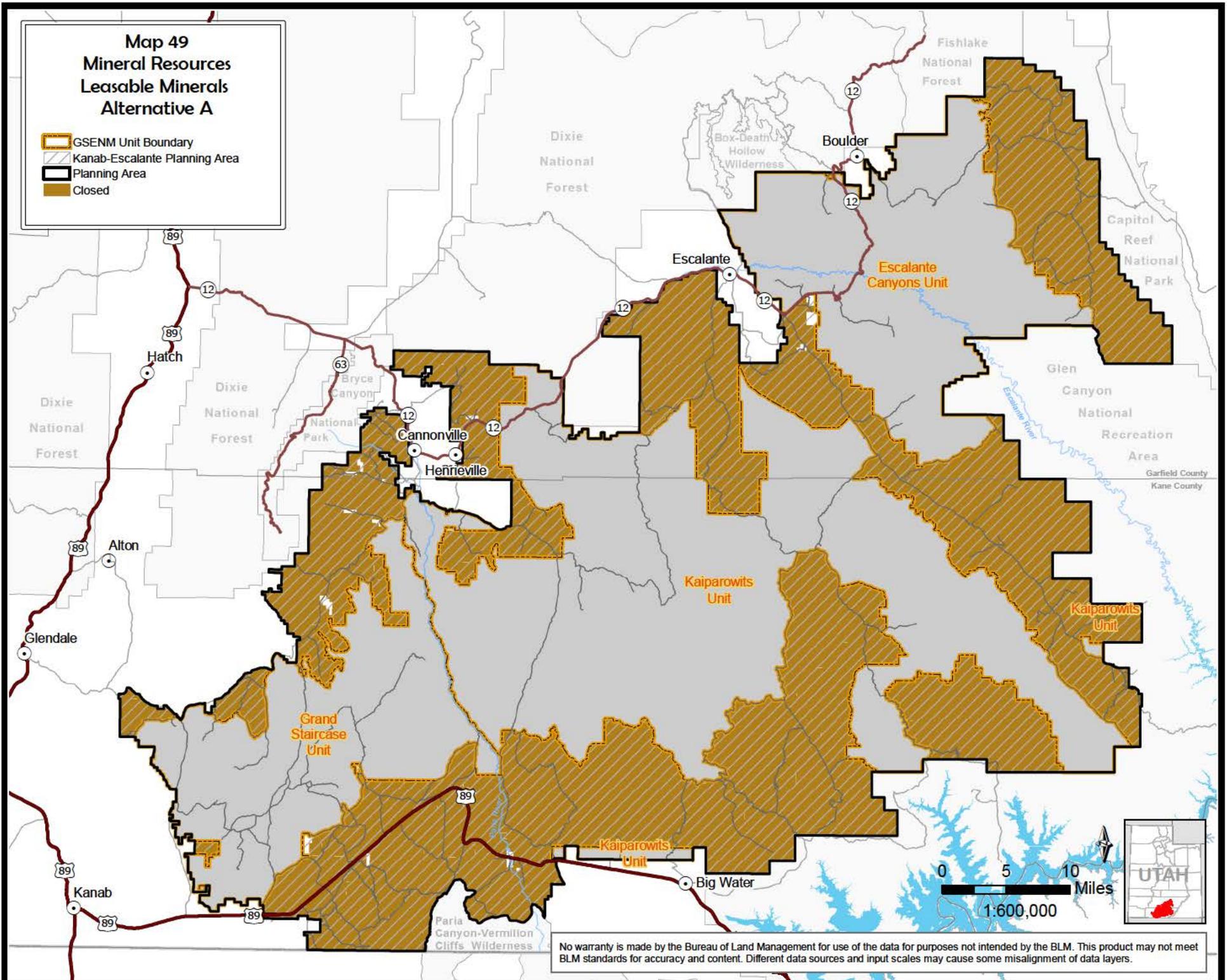


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Map 49
Mineral Resources
Leasable Minerals
Alternative A

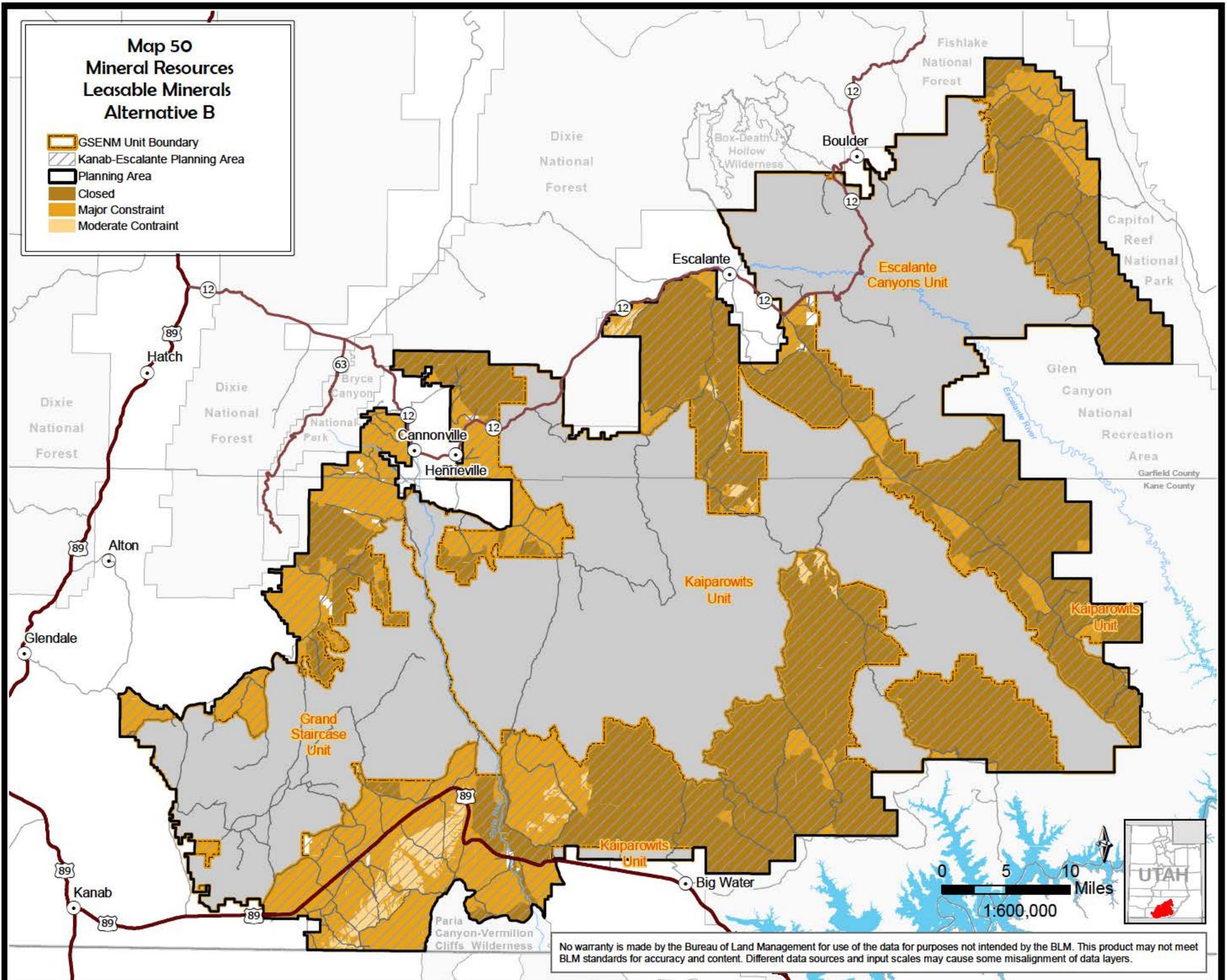
- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Closed



No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.

**Map 50
Mineral Resources
Leasable Minerals
Alternative B**

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed
-  Major Constraint
-  Moderate Constraint

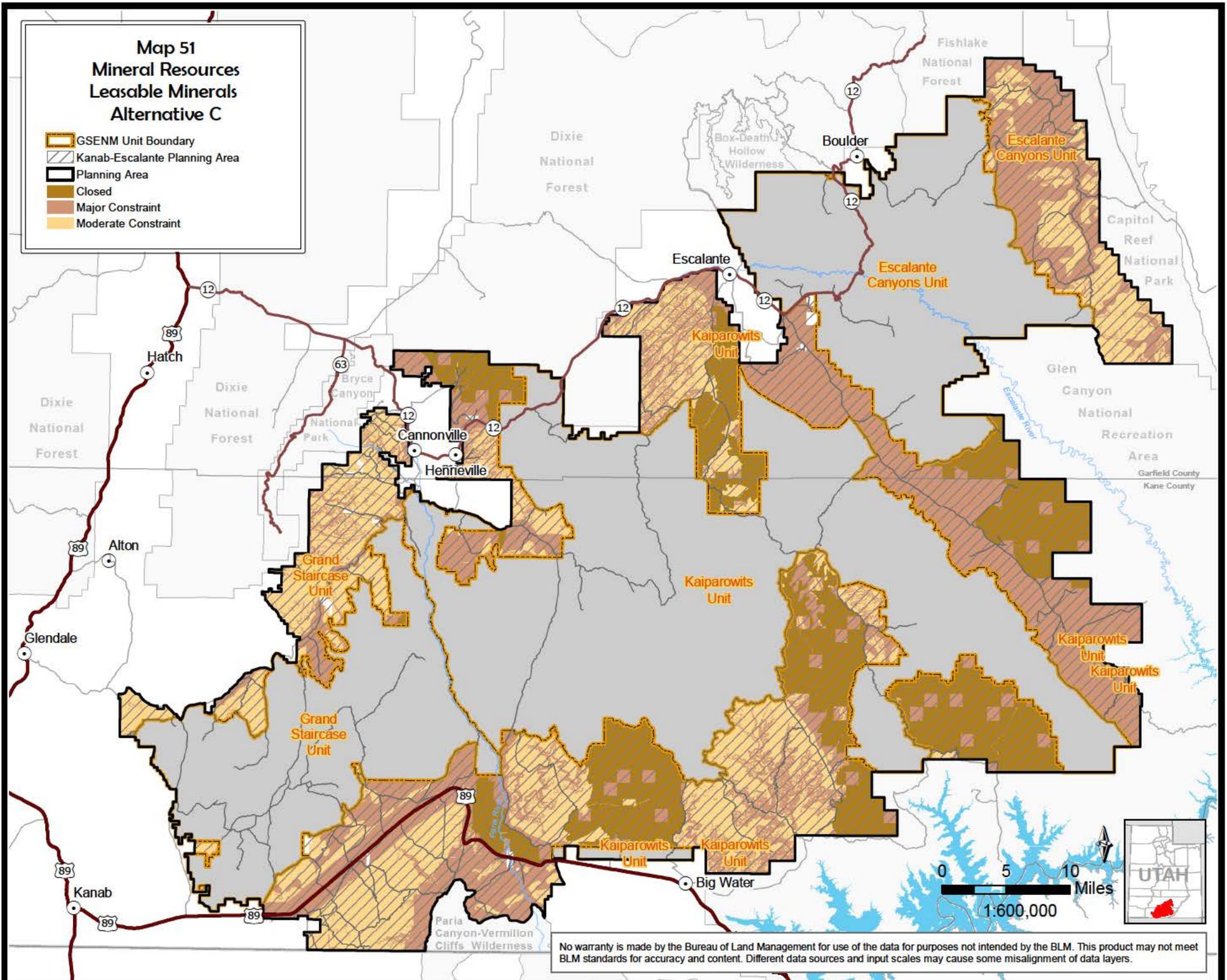


No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



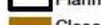
**Map 51
Mineral Resources
Leasable Minerals
Alternative C**

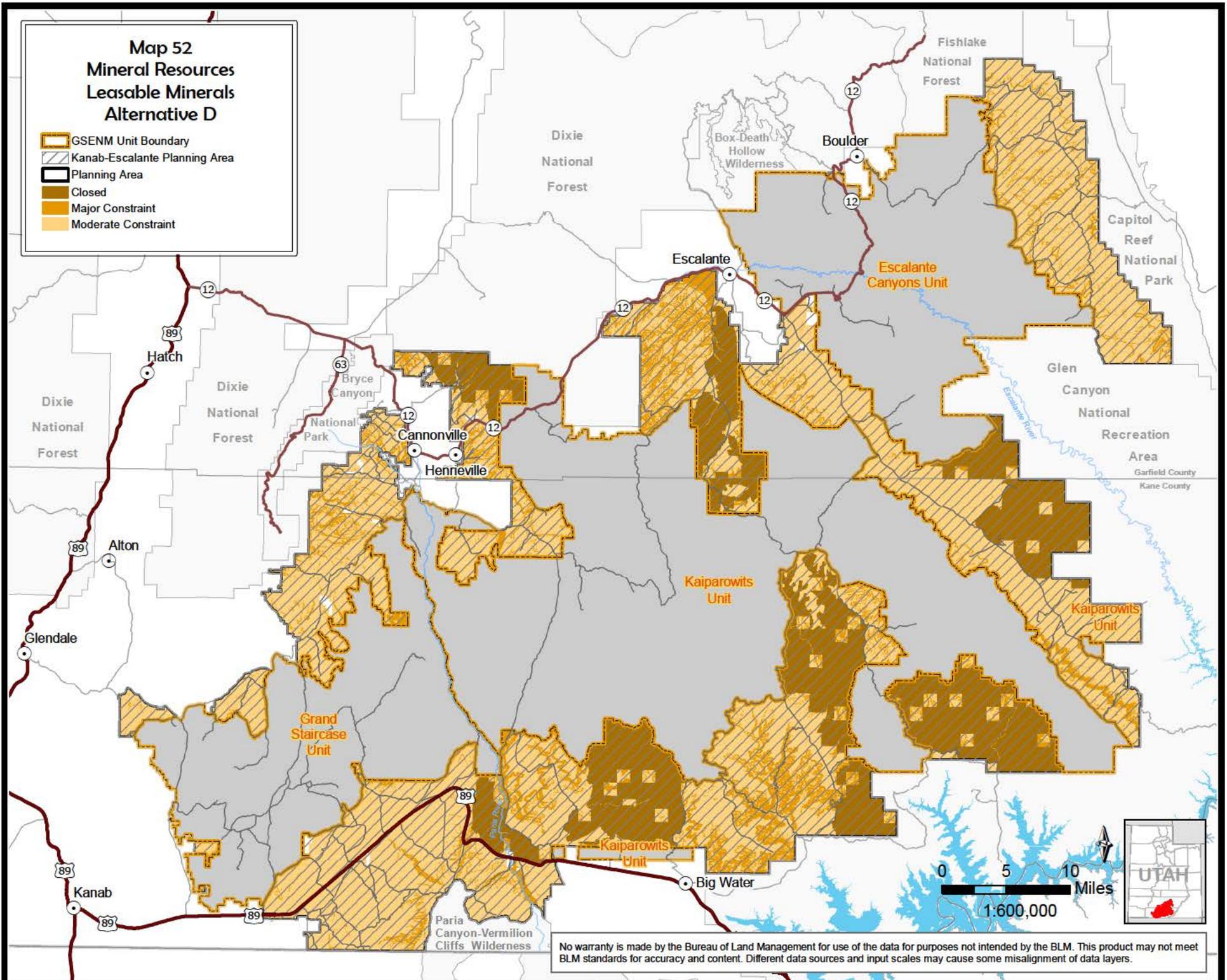
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed
-  Major Constraint
-  Moderate Constraint



No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.

Map 52 Mineral Resources Leasable Minerals Alternative D

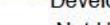
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed
-  Major Constraint
-  Moderate Constraint

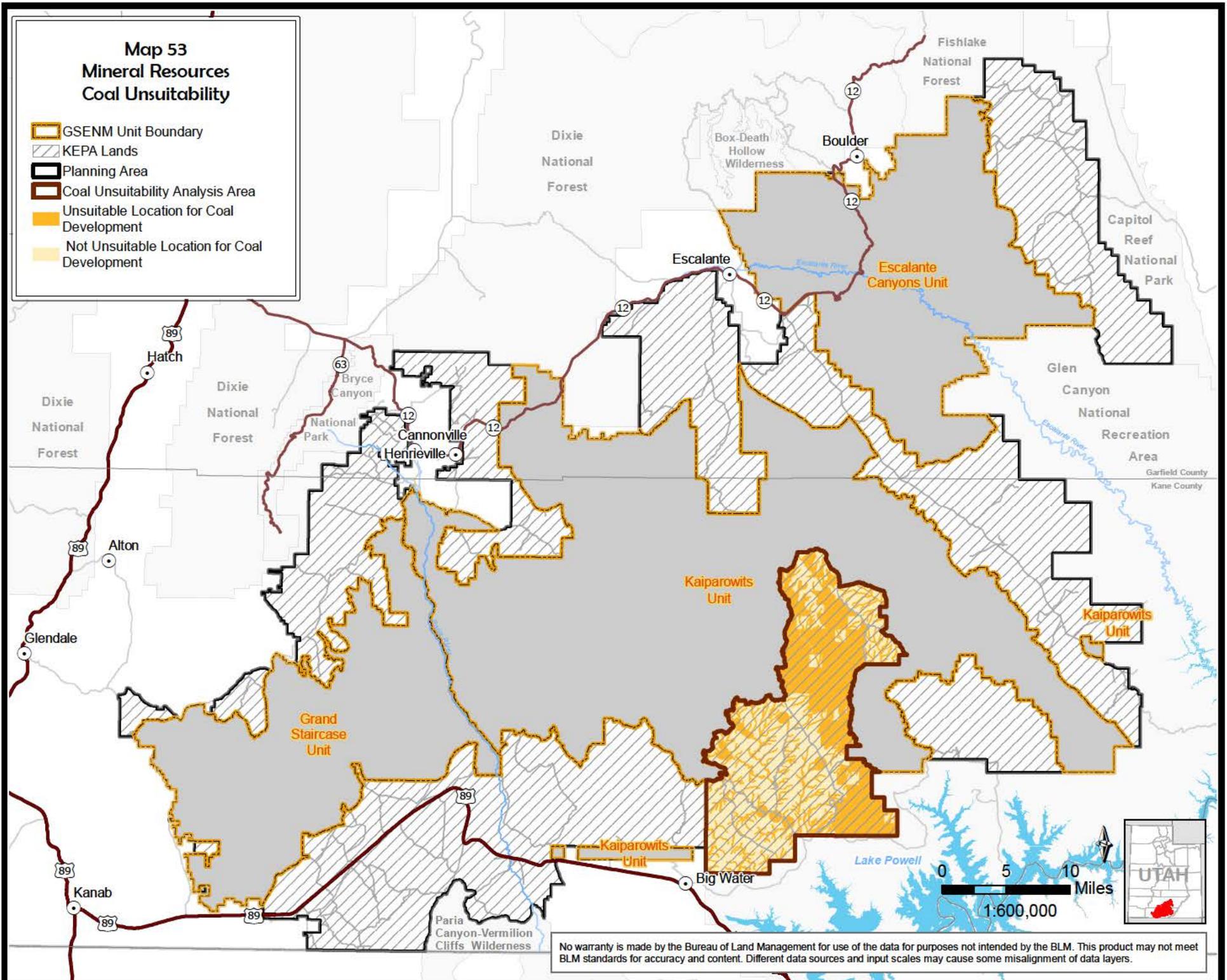


No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



Map 53 Mineral Resources Coal Unsuitability

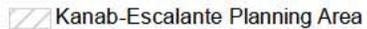
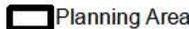
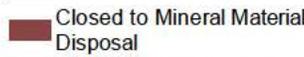
-  GSENM Unit Boundary
-  KEPA Lands
-  Planning Area
-  Coal Unsuitability Analysis Area
-  Unsuitable Location for Coal Development
-  Not Unsuitable Location for Coal Development

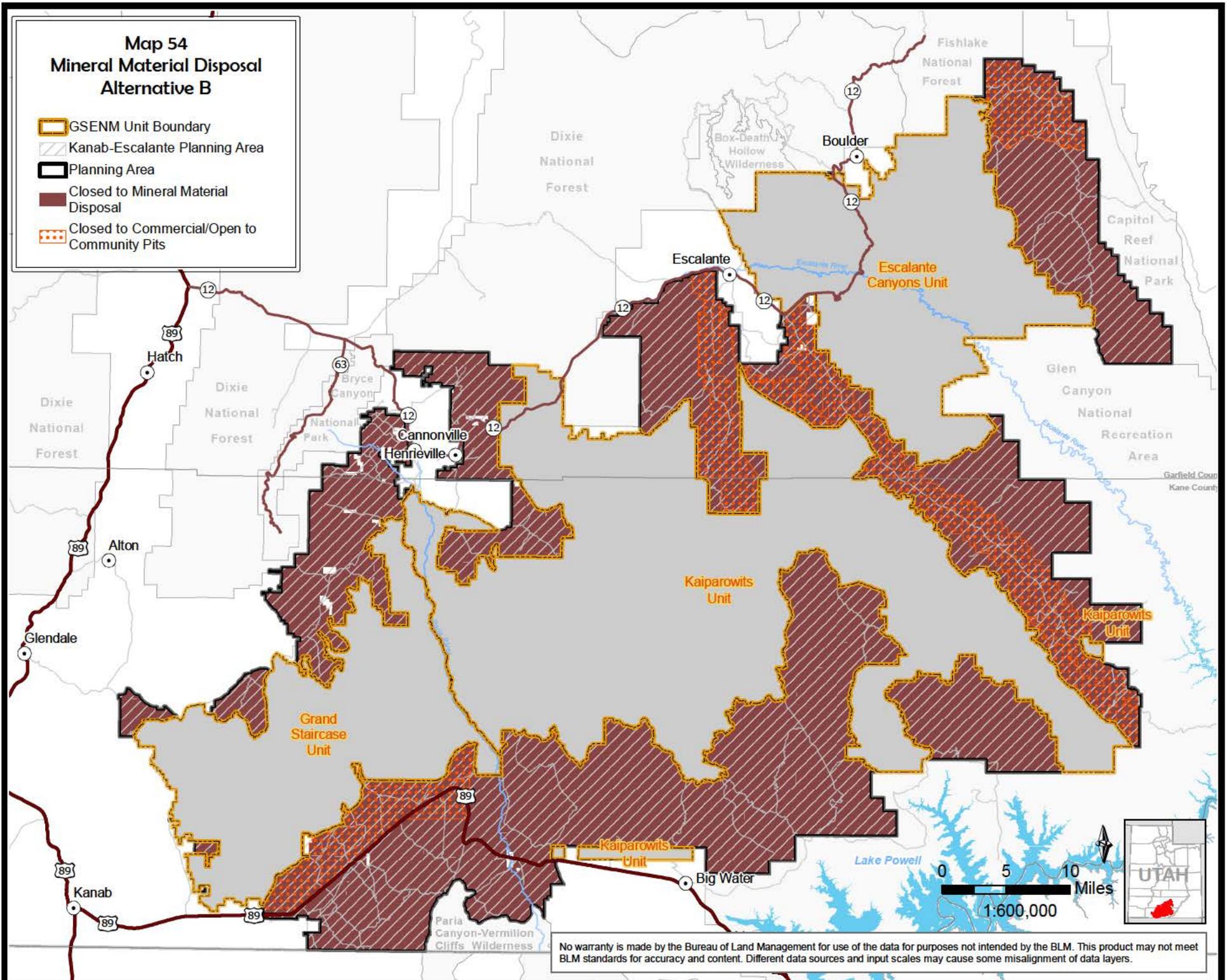


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Map 54 Mineral Material Disposal Alternative B

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed to Mineral Material Disposal
-  Closed to Commercial/Open to Community Pits

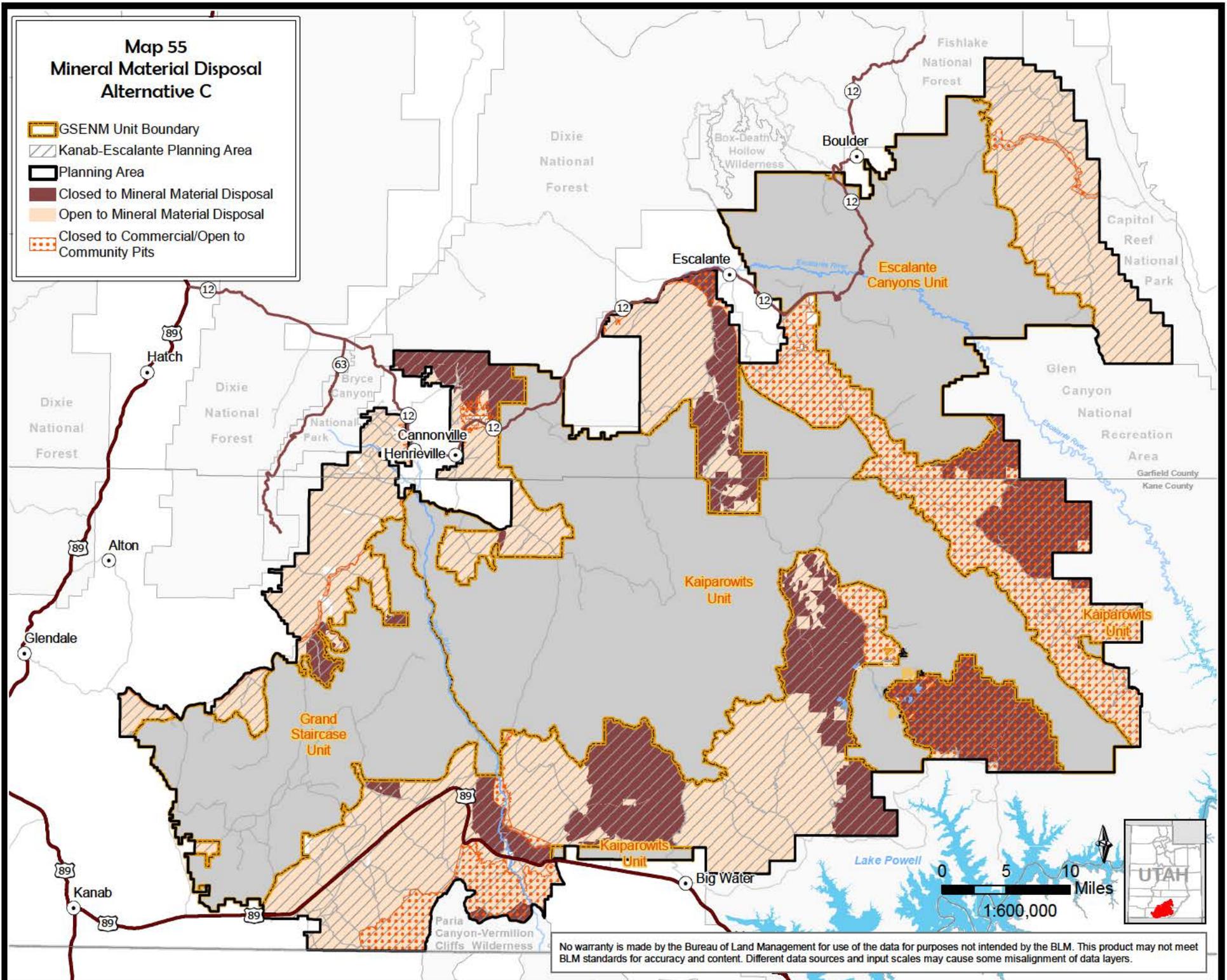


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Map 55 Mineral Material Disposal Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed to Mineral Material Disposal
-  Open to Mineral Material Disposal
-  Closed to Commercial/Open to Community Pits

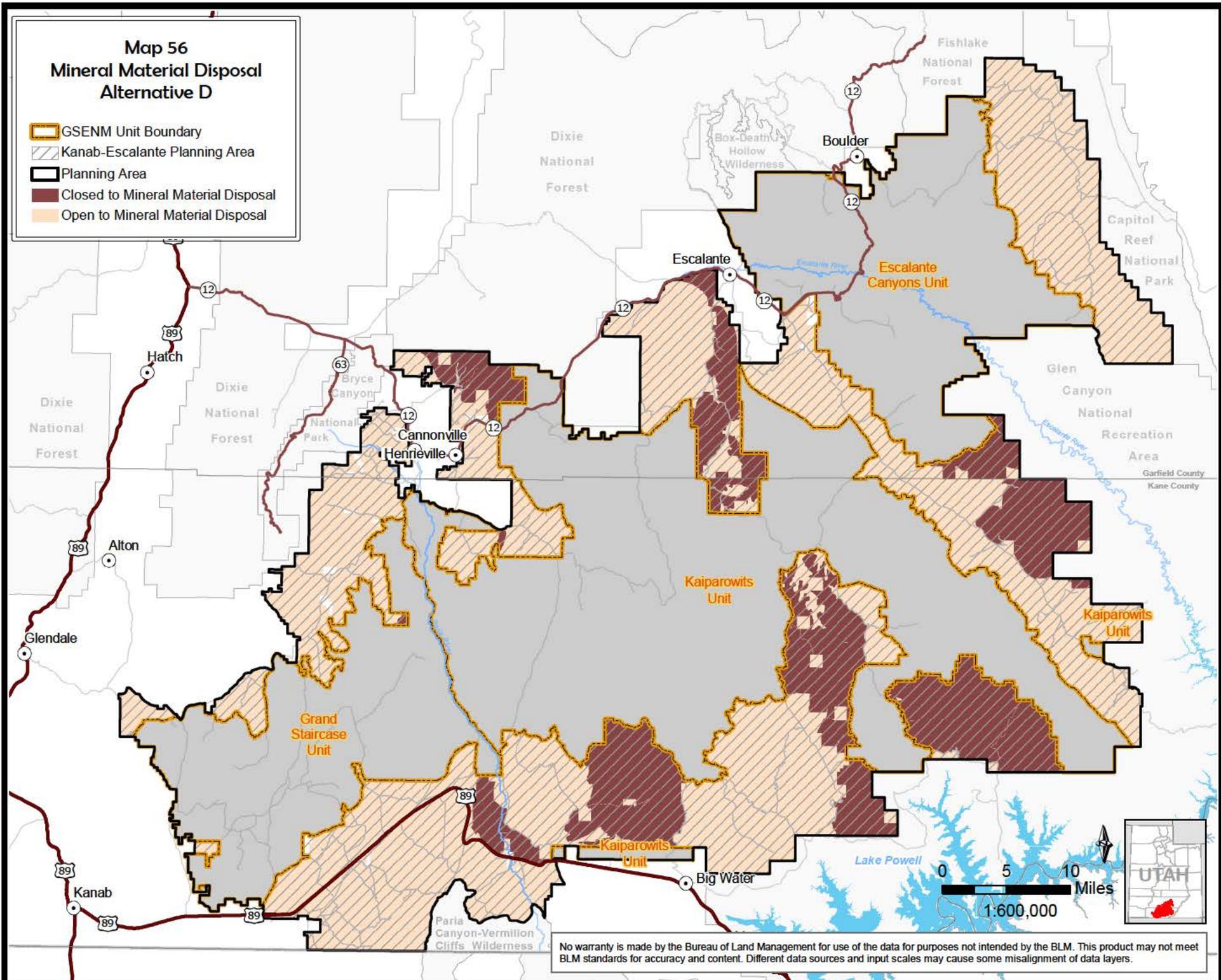


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Map 56 Mineral Material Disposal Alternative D

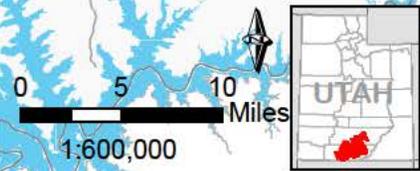
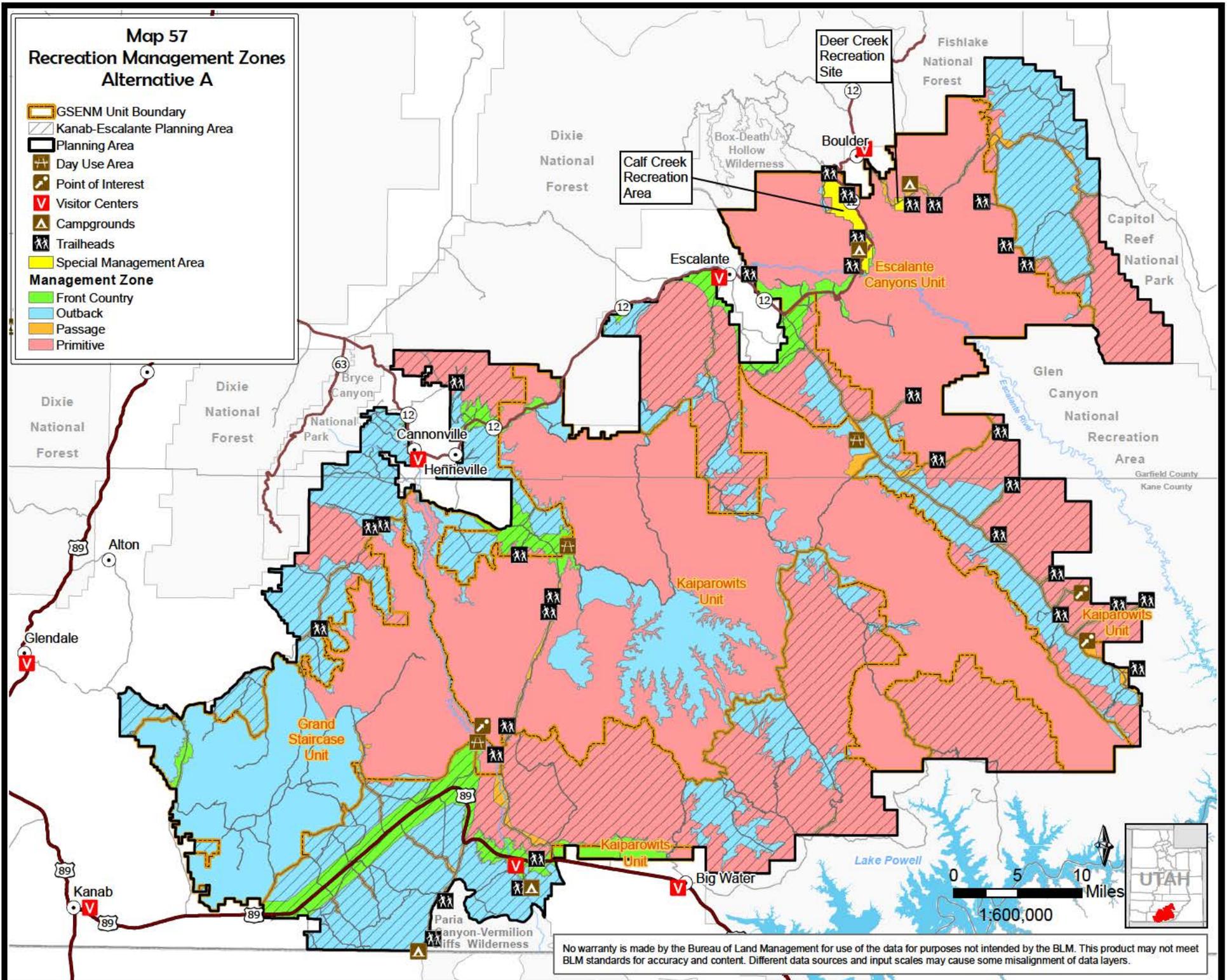
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Closed to Mineral Material Disposal
-  Open to Mineral Material Disposal



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Map 57 Recreation Management Zones Alternative A

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Day Use Area
-  Point of Interest
-  Visitor Centers
-  Campgrounds
-  Trailheads
-  Special Management Area
- Management Zone**
-  Front Country
-  Outback
-  Passage
-  Primitive

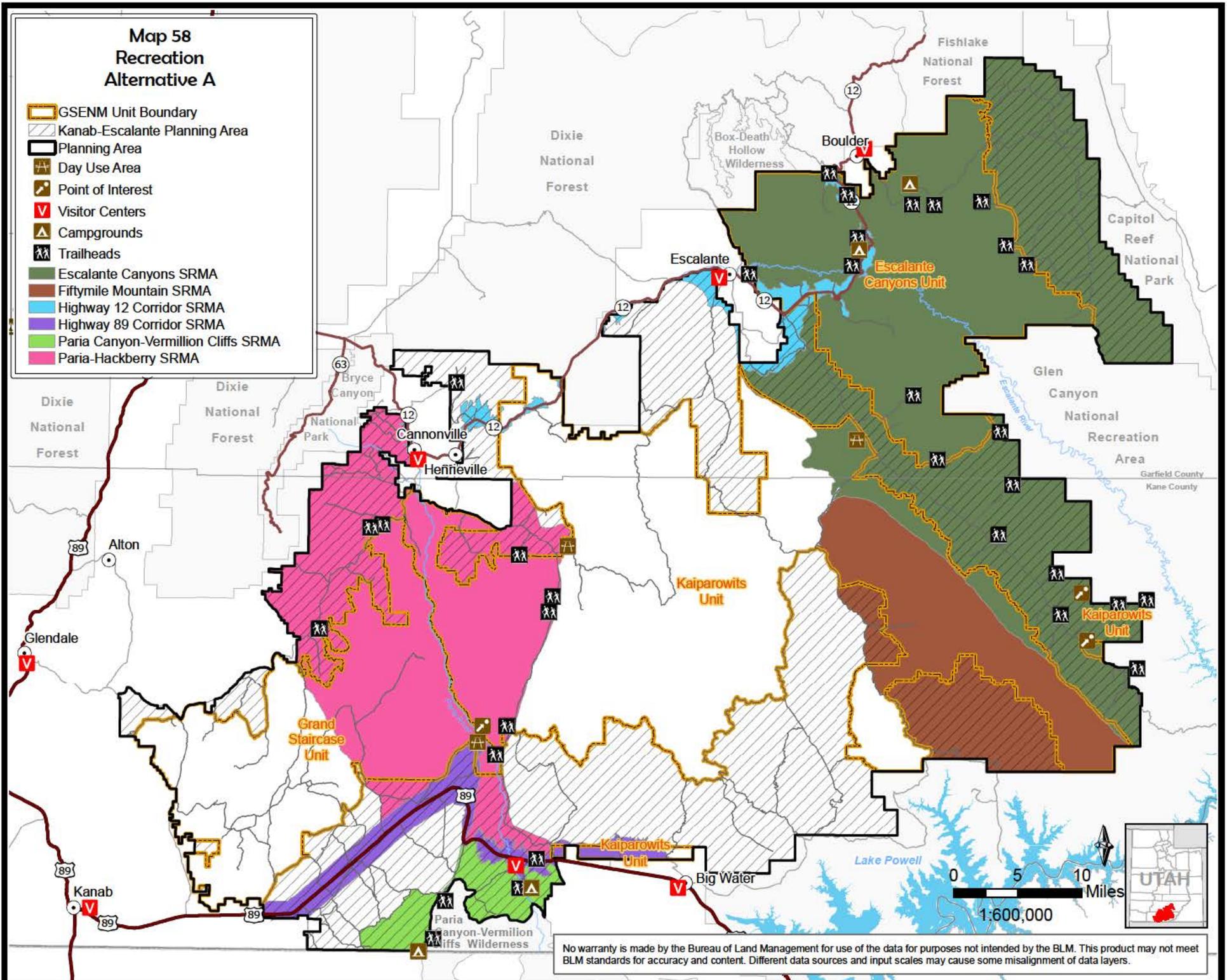


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Map 58 Recreation Alternative A

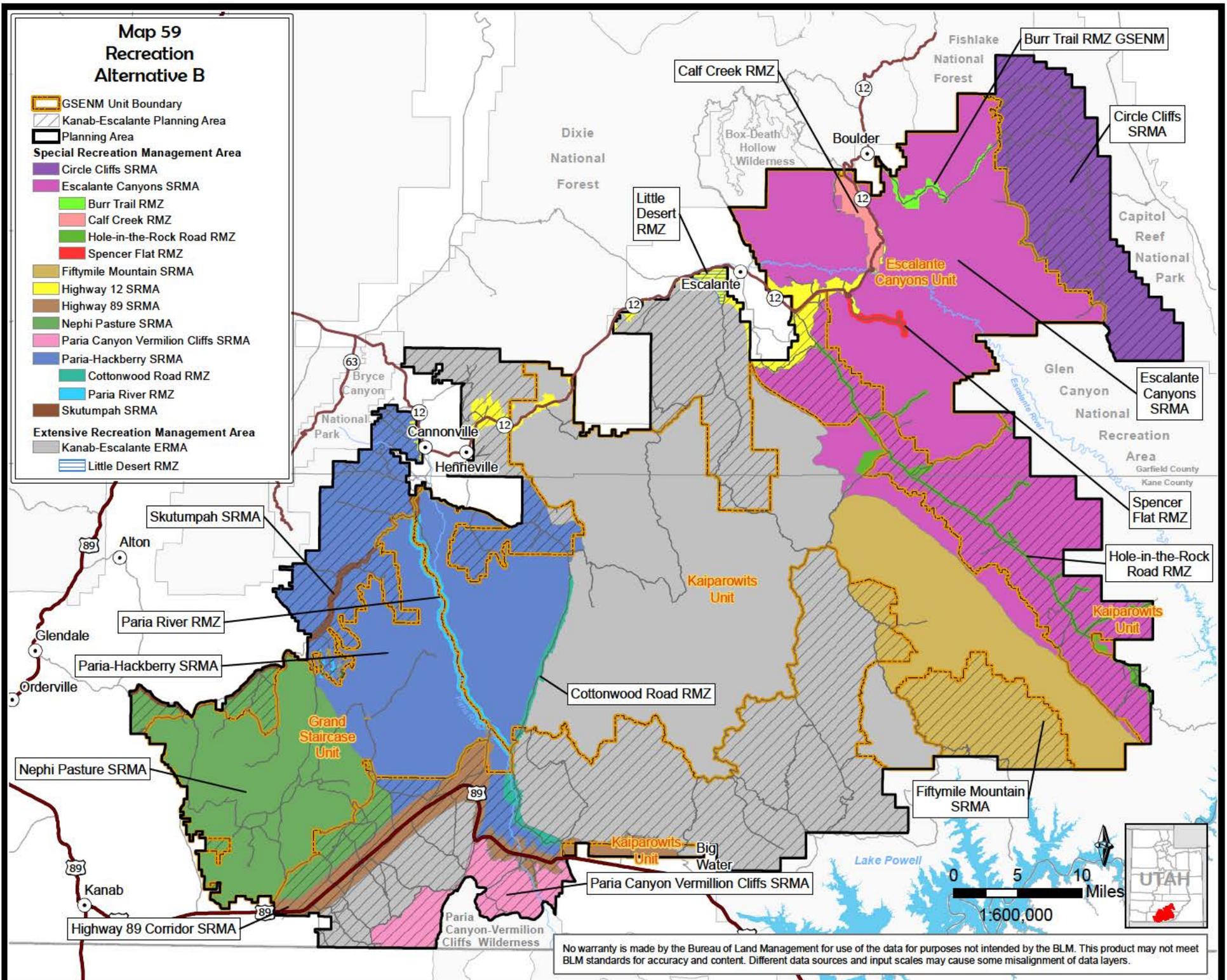
- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Day Use Area
- Point of Interest
- Visitor Centers
- Campgrounds
- Trailheads
- Escalante Canyons SRMA
- Fifty-mile Mountain SRMA
- Highway 12 Corridor SRMA
- Highway 89 Corridor SRMA
- Paria Canyon-Vermilion Cliffs SRMA
- Paria-Hackberry SRMA



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Map 59 Recreation Alternative B

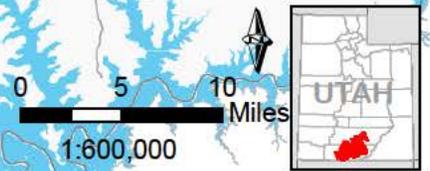
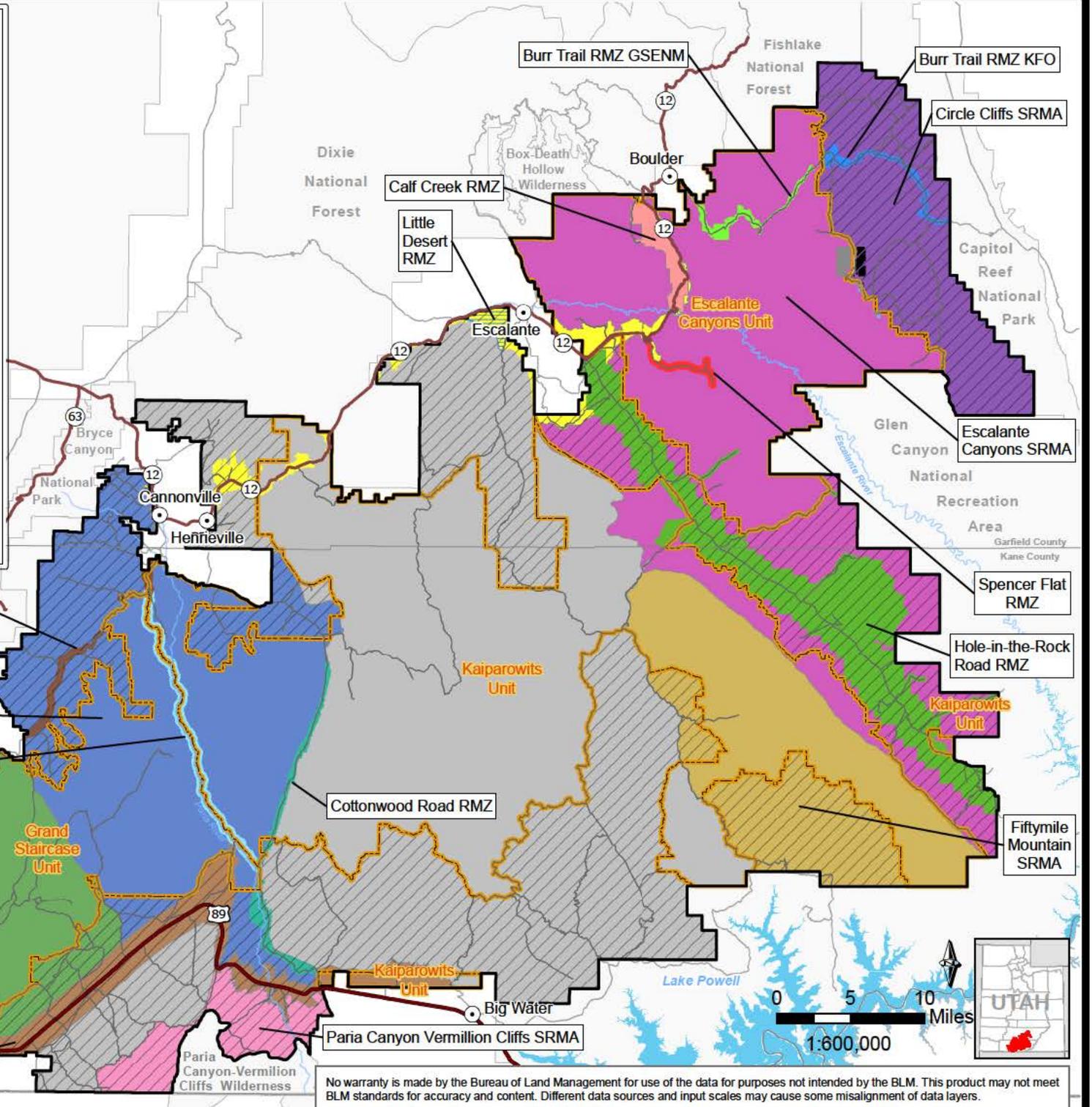
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Special Recreation Management Area**
-  Circle Cliffs SRMA
-  Escalante Canyons SRMA
-  Burr Trail RMZ
-  Calf Creek RMZ
-  Hole-in-the-Rock Road RMZ
-  Spencer Flat RMZ
-  Fiftymile Mountain SRMA
-  Highway 12 SRMA
-  Highway 89 SRMA
-  Nephi Pasture SRMA
-  Paria Canyon Vermilion Cliffs SRMA
-  Paria-Hackberry SRMA
-  Cottonwood Road RMZ
-  Paria River RMZ
-  Skutumpah SRMA
- Extensive Recreation Management Area**
-  Kanab-Escalante ERMA
-  Little Desert RMZ



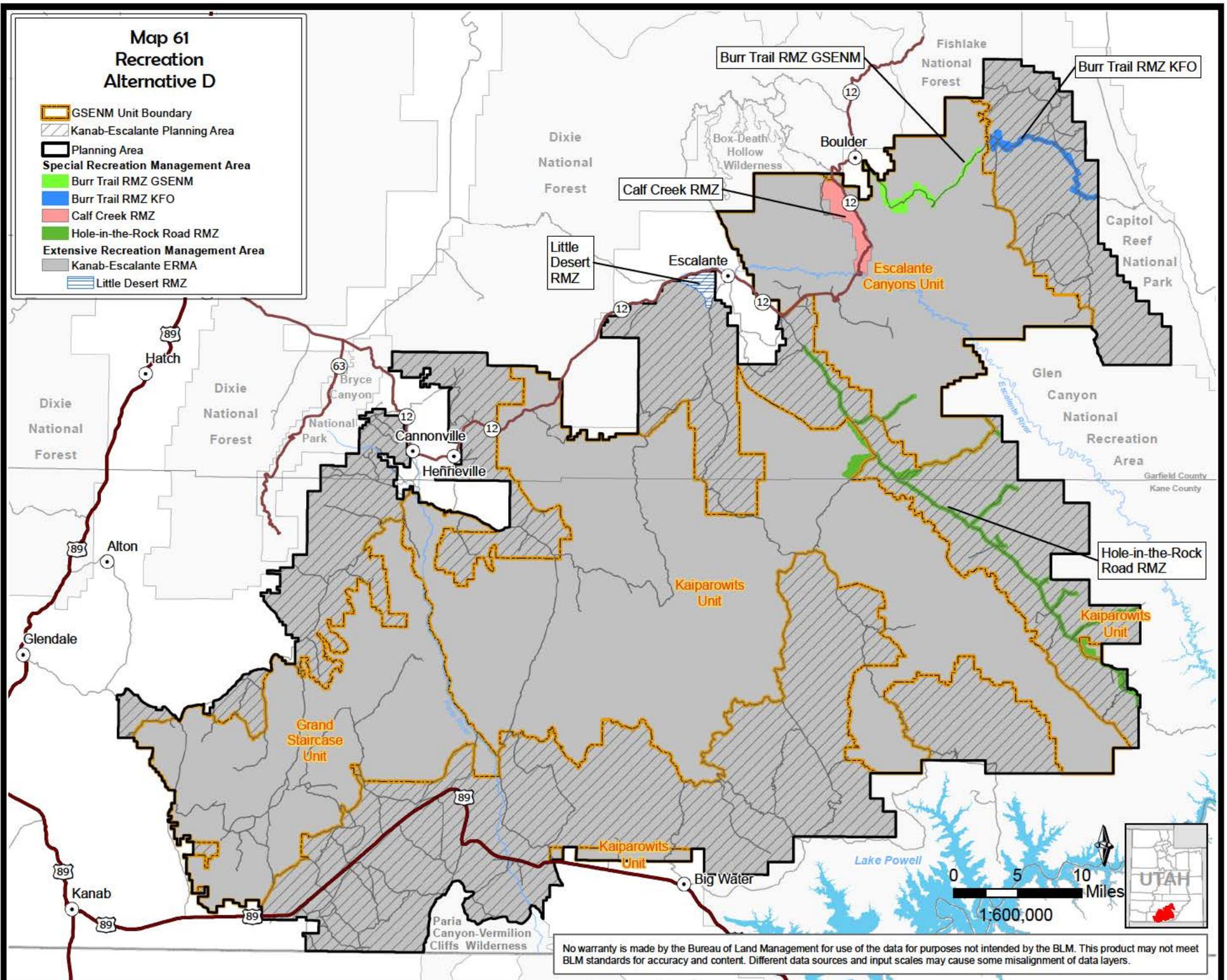
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Map 60 Recreation Alternative C

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Special Recreation Management Area**
- Circle Cliffs SRMA
- Burr Trail RMZ KFO
- Escalante Canyons SRMA
- Burr Trail RMZ GSENM
- Calf Creek RMZ
- Hole-in-the-Rock Road RMZ
- Spencer Flat RMZ
- Fiftymile Mountain SRMA
- Highway 12 SRMA
- Highway 89 SRMA
- Nephi Pasture SRMA
- Paria Canyon Vermilion Cliffs SRMA
- Paria-Hackberry SRMA
- Cottonwood Road RMZ
- Paria River RMZ
- Skutumpah SRMA
- Extensive Recreation Management Area**
- Kanab-Escalante ERMA
- Little Desert RMZ



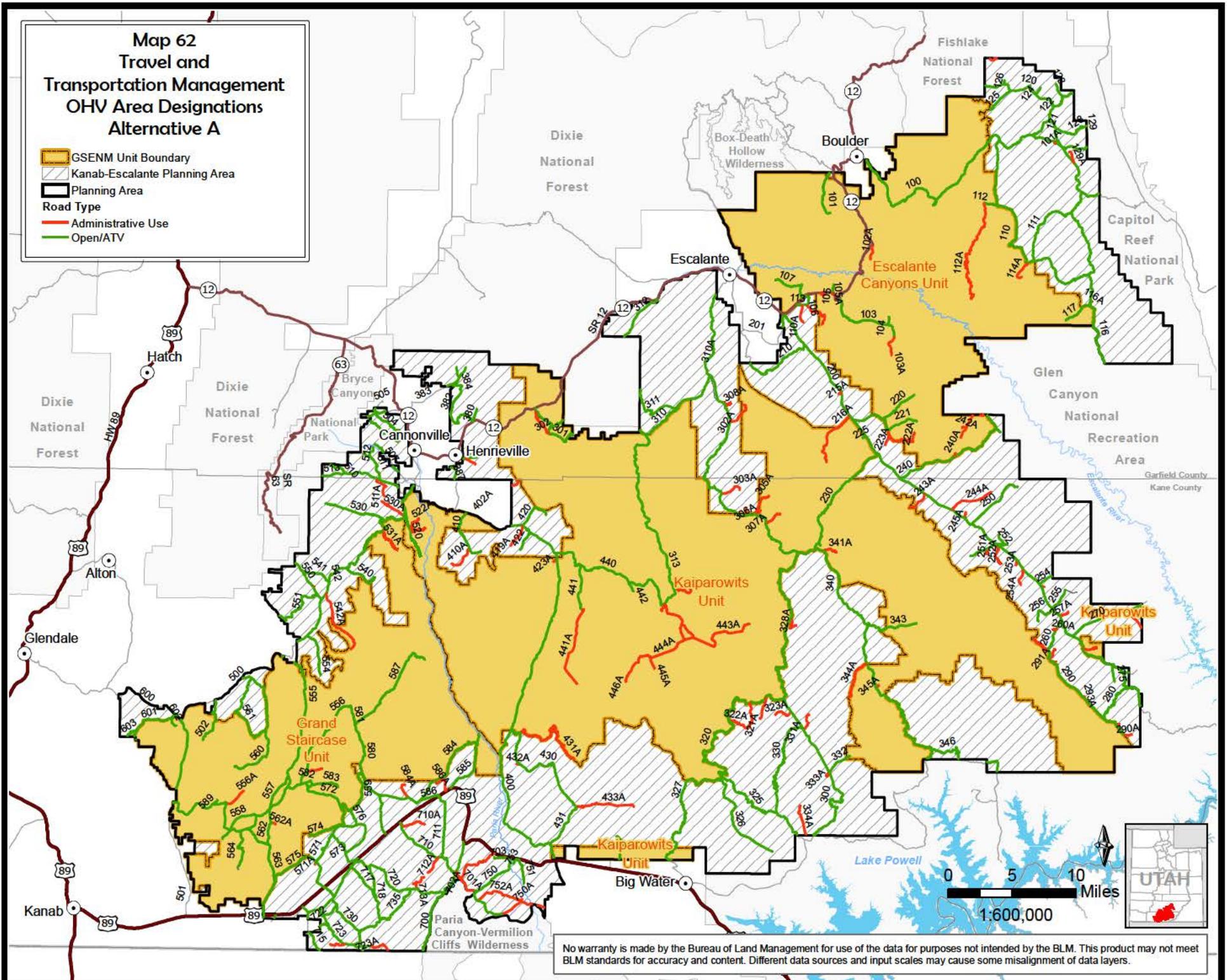
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No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the BLM. This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.

Map 62 Travel and Transportation Management OHV Area Designations Alternative A

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Road Type**
-  Administrative Use
-  Open/ATV

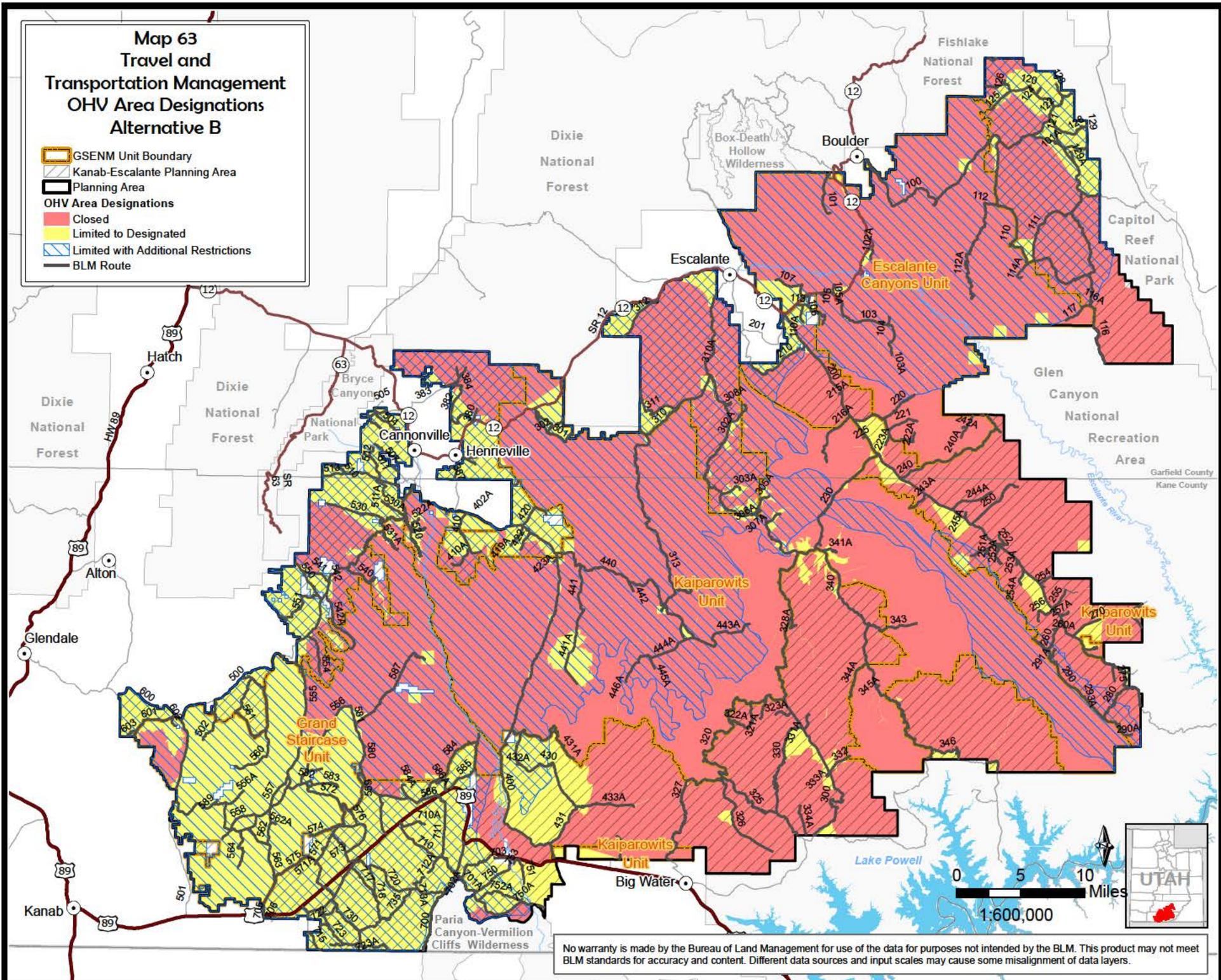


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Map 63 Travel and Transportation Management OHV Area Designations Alternative B

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- OHV Area Designations**
-  Closed
-  Limited to Designated
-  Limited with Additional Restrictions
-  BLM Route

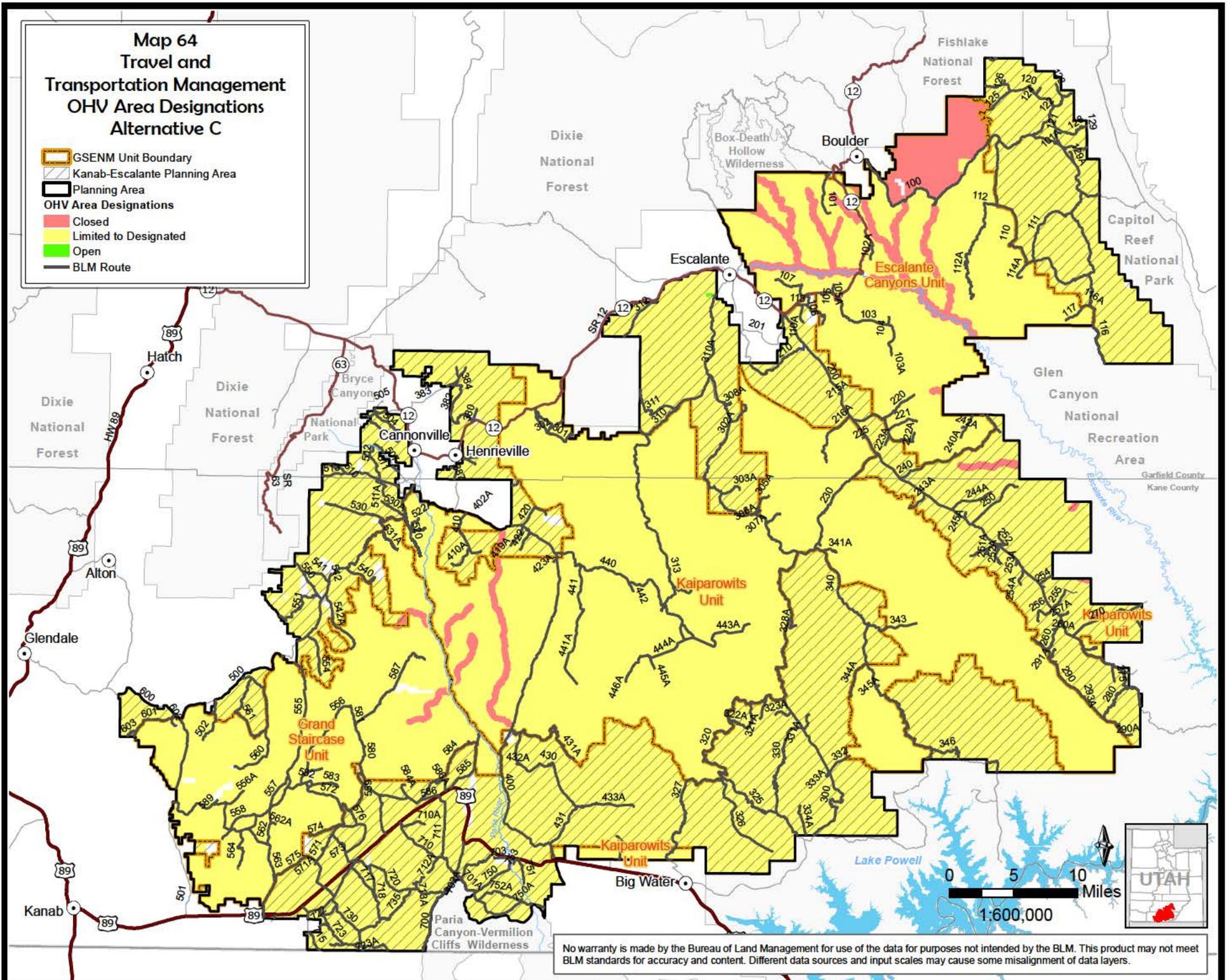


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Map 64 Travel and Transportation Management OHV Area Designations Alternative C

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- OHV Area Designations**
- Closed
- Limited to Designated
- Open
- BLM Route

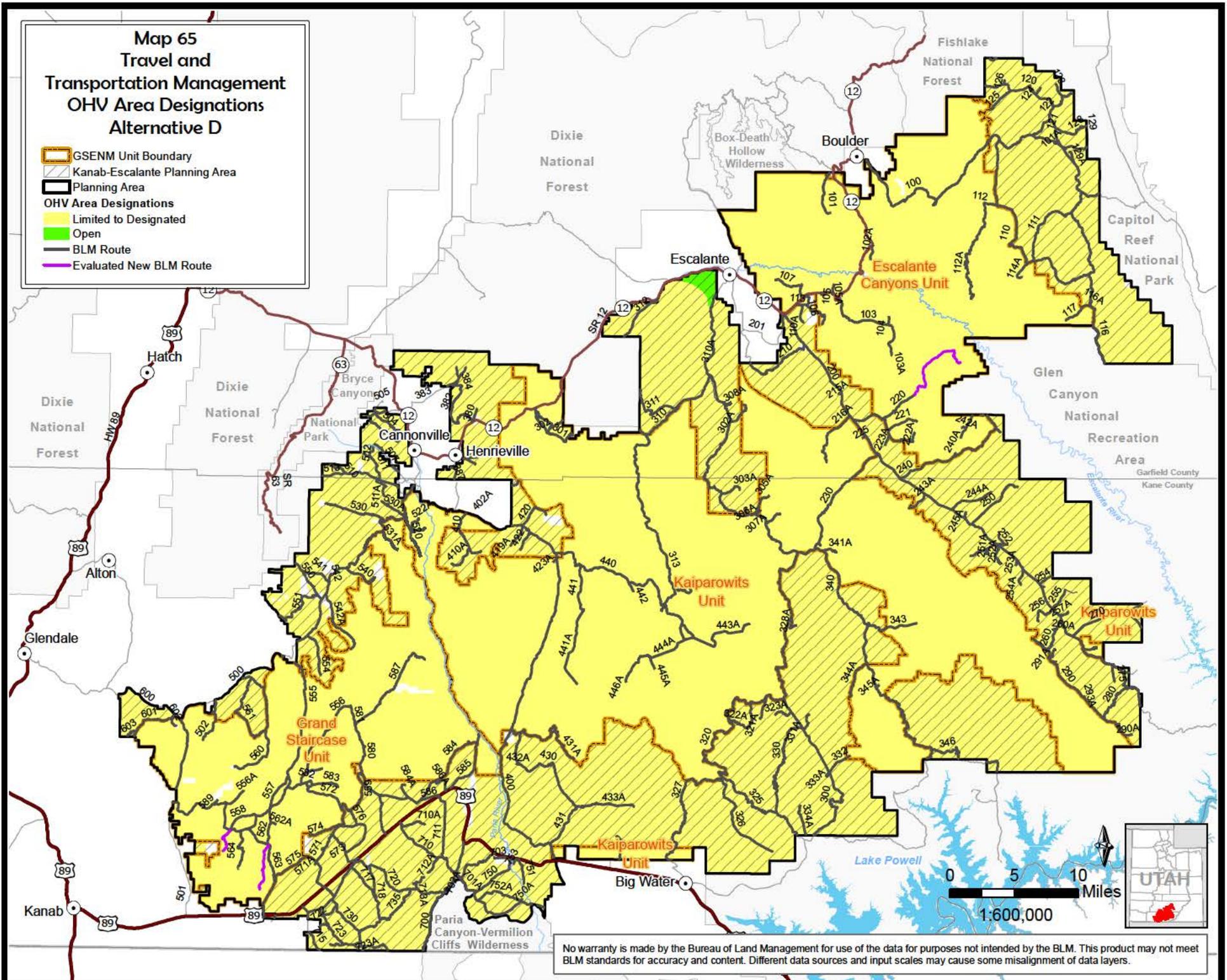


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Map 65 Travel and Transportation Management OHV Area Designations Alternative D

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- OHV Area Designations**
-  Limited to Designated
-  Open
-  BLM Route
-  Evaluated New BLM Route

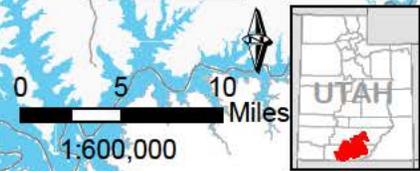
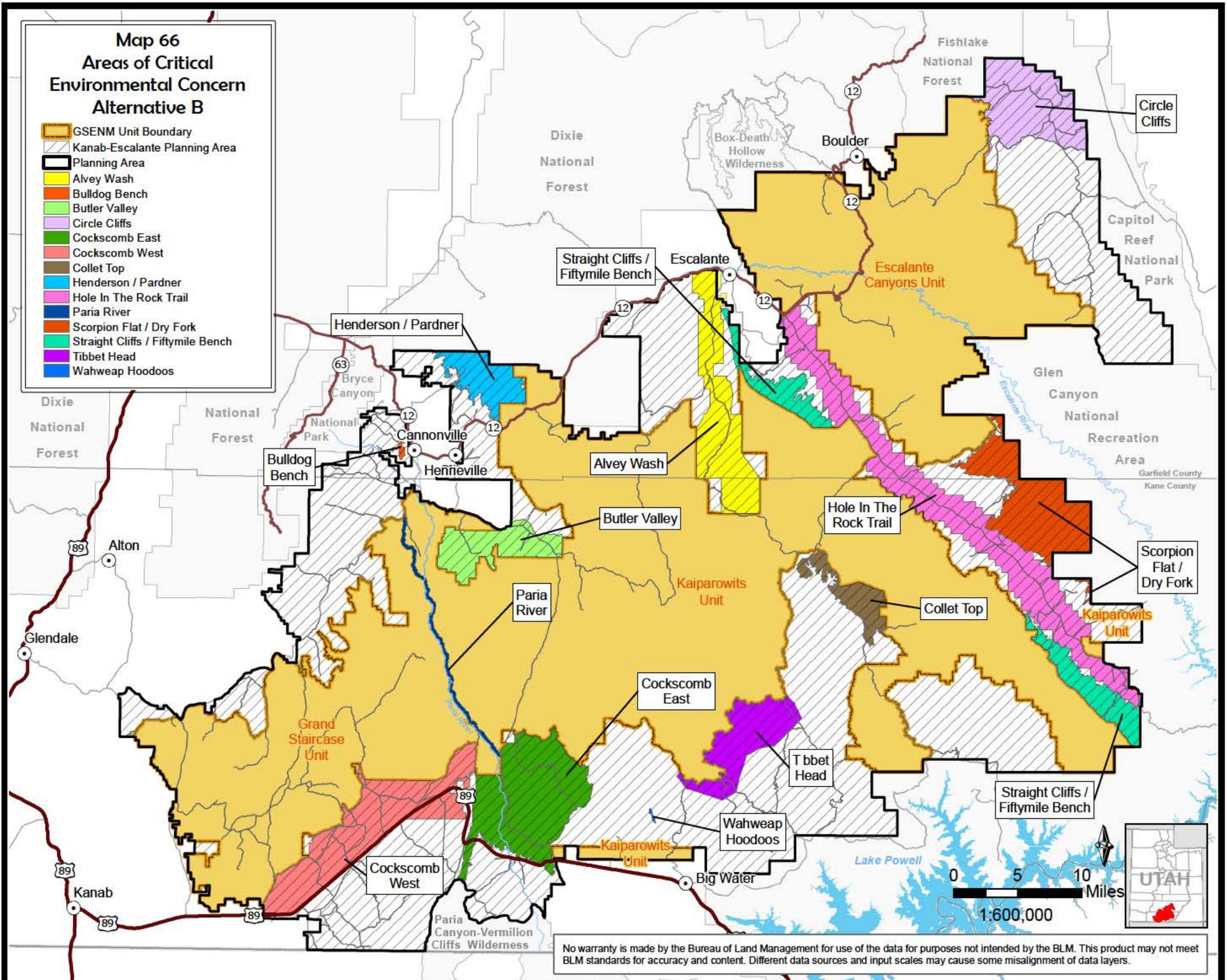


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Map 66
Areas of Critical
Environmental Concern
Alternative B

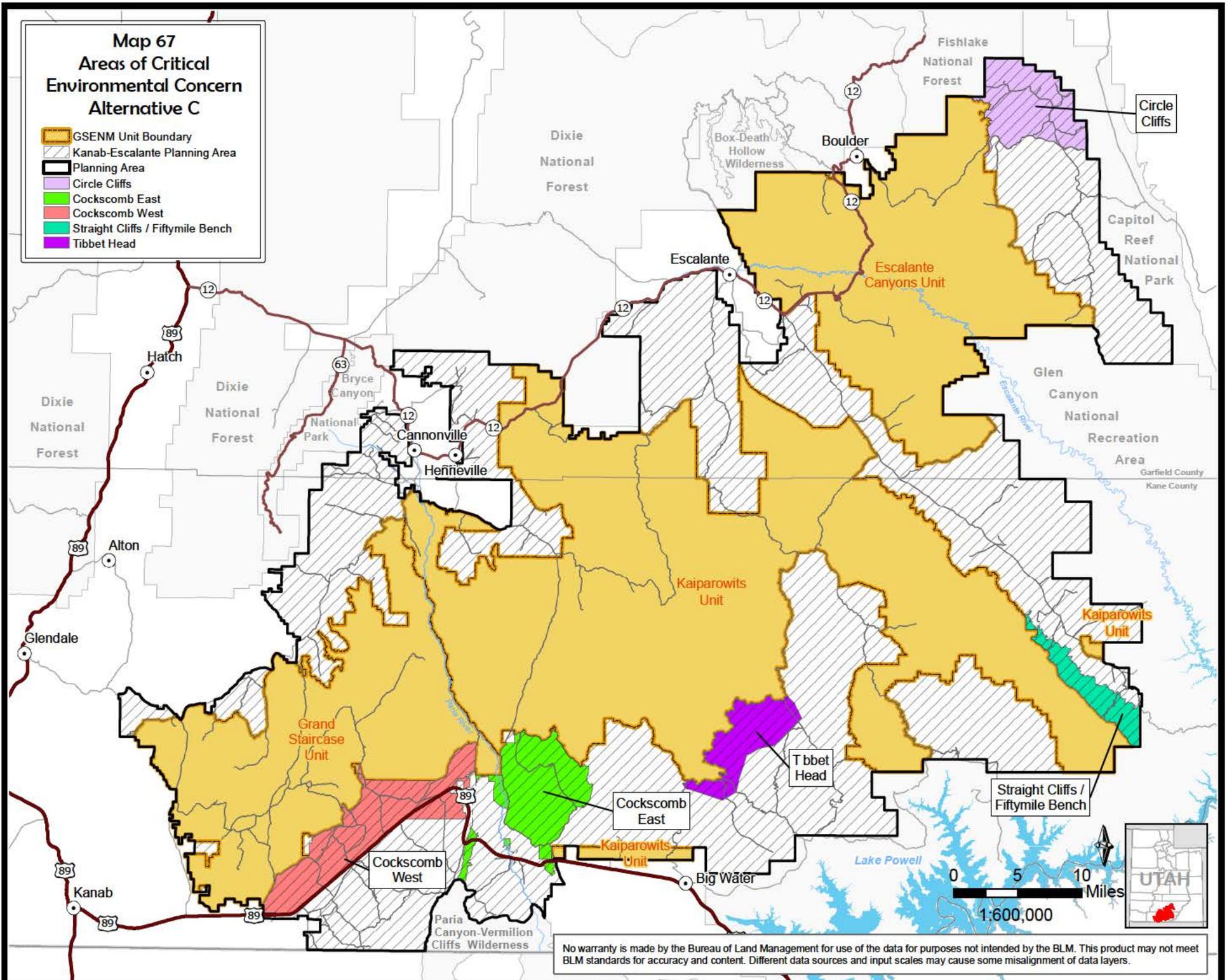
-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Alvey Wash
-  Bulldog Bench
-  Butler Valley
-  Circle Cliffs
-  Cockscomb East
-  Cockscomb West
-  Collet Top
-  Henderson / Pardner
-  Hole In The Rock Trail
-  Paria River
-  Scorpion Flat / Dry Fork
-  Straight Cliffs / Fiftymile Bench
-  Tibbet Head
-  Wahweap Hoodoos



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Map 67
Areas of Critical Environmental Concern
Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Circle Cliffs
-  Cockscomb East
-  Cockscomb West
-  Straight Cliffs / Fiftymile Bench
-  Tibbet Head

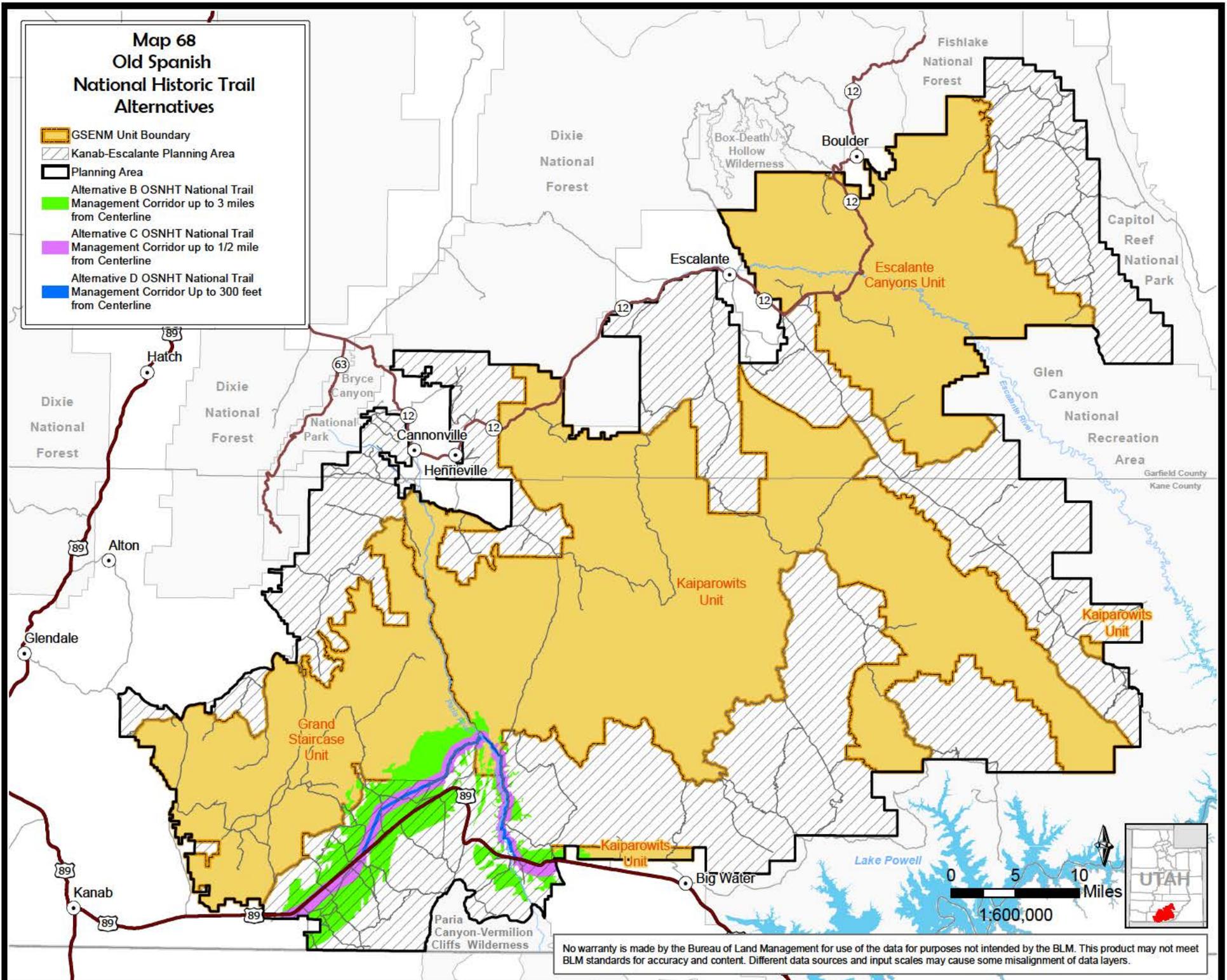


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Map 68 Old Spanish National Historic Trail Alternatives

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Alternative B OSNHT National Trail Management Corridor up to 3 miles from Centerline
-  Alternative C OSNHT National Trail Management Corridor up to 1/2 mile from Centerline
-  Alternative D OSNHT National Trail Management Corridor Up to 300 feet from Centerline

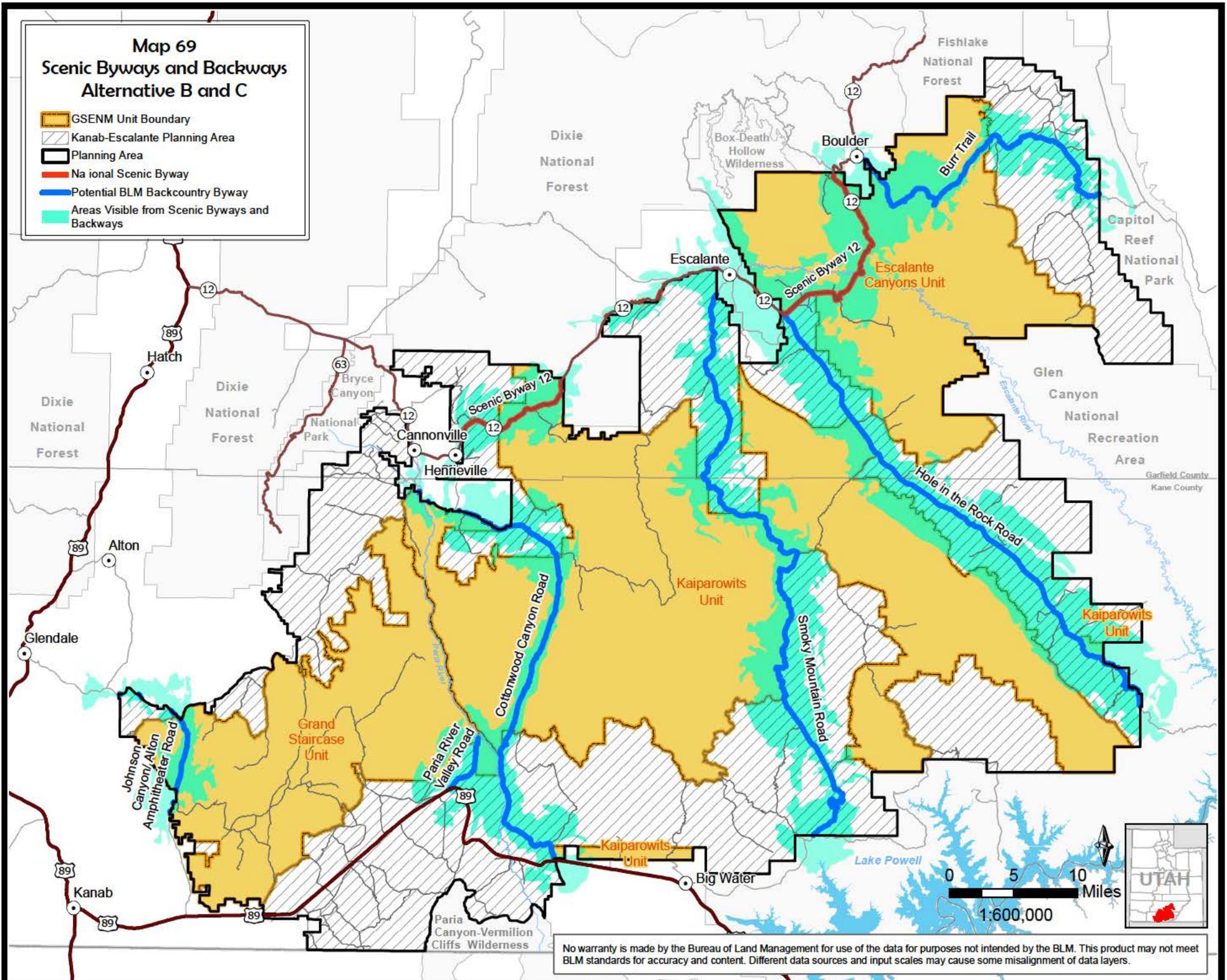


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Map 69
Scenic Byways and Backways
Alternative B and C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  National Scenic Byway
-  Potential BLM Backcountry Byway
-  Areas Visible from Scenic Byways and Backways

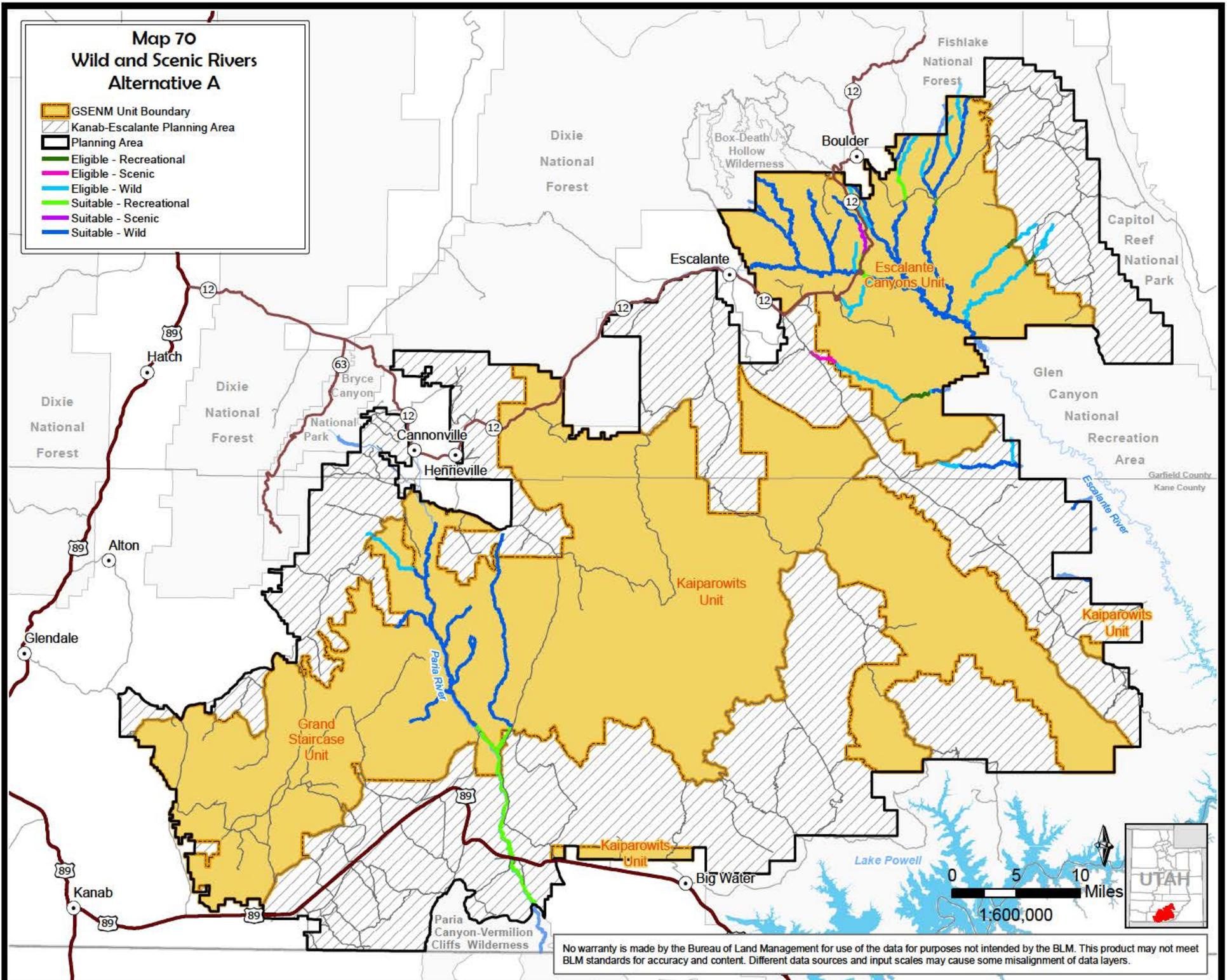


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Map 70 Wild and Scenic Rivers Alternative A

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Eligible - Recreational
-  Eligible - Scenic
-  Eligible - Wild
-  Suitable - Recreational
-  Suitable - Scenic
-  Suitable - Wild

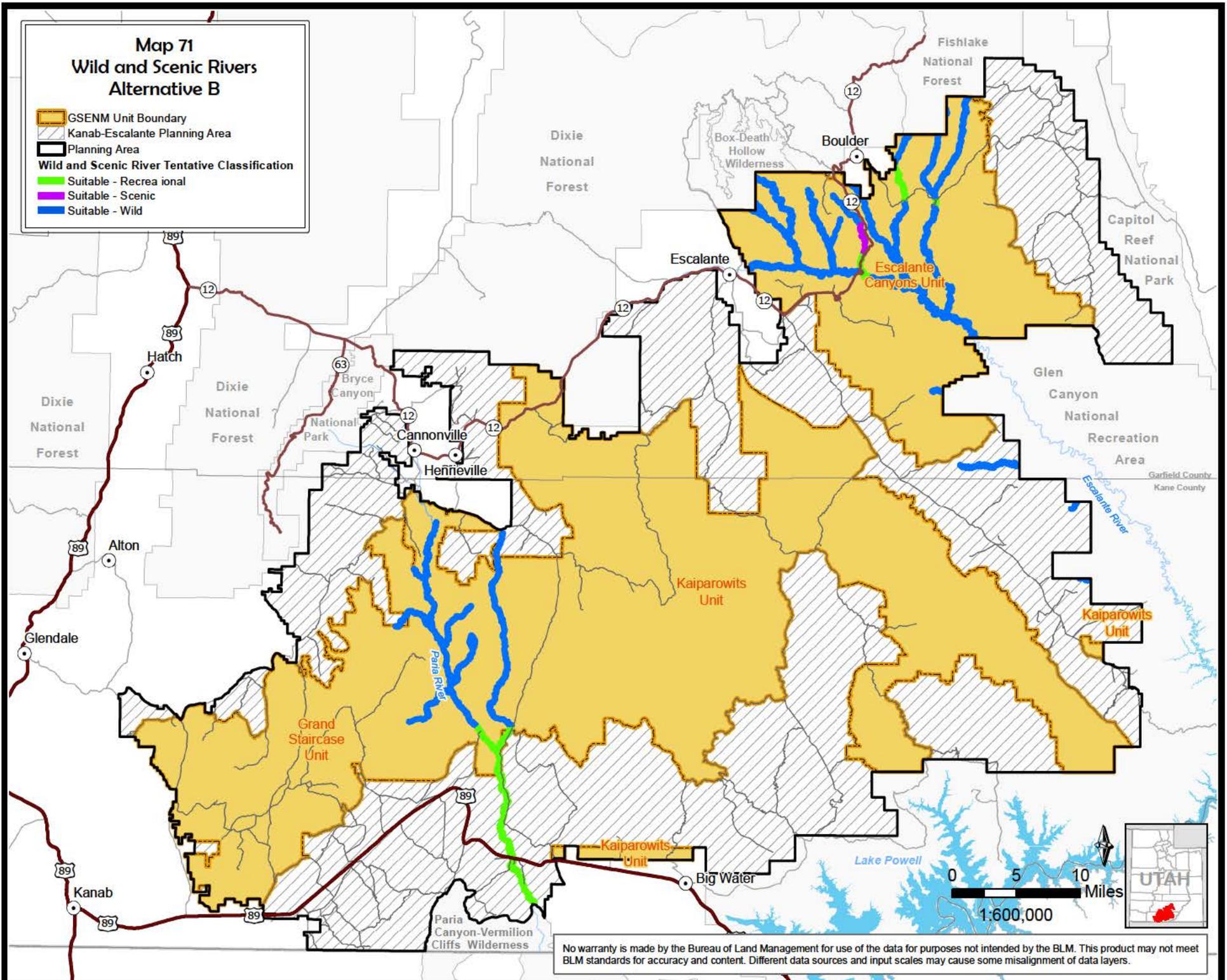


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Map 71 Wild and Scenic Rivers Alternative B

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Wild and Scenic River Tentative Classification**
-  Suitable - Recreational
-  Suitable - Scenic
-  Suitable - Wild

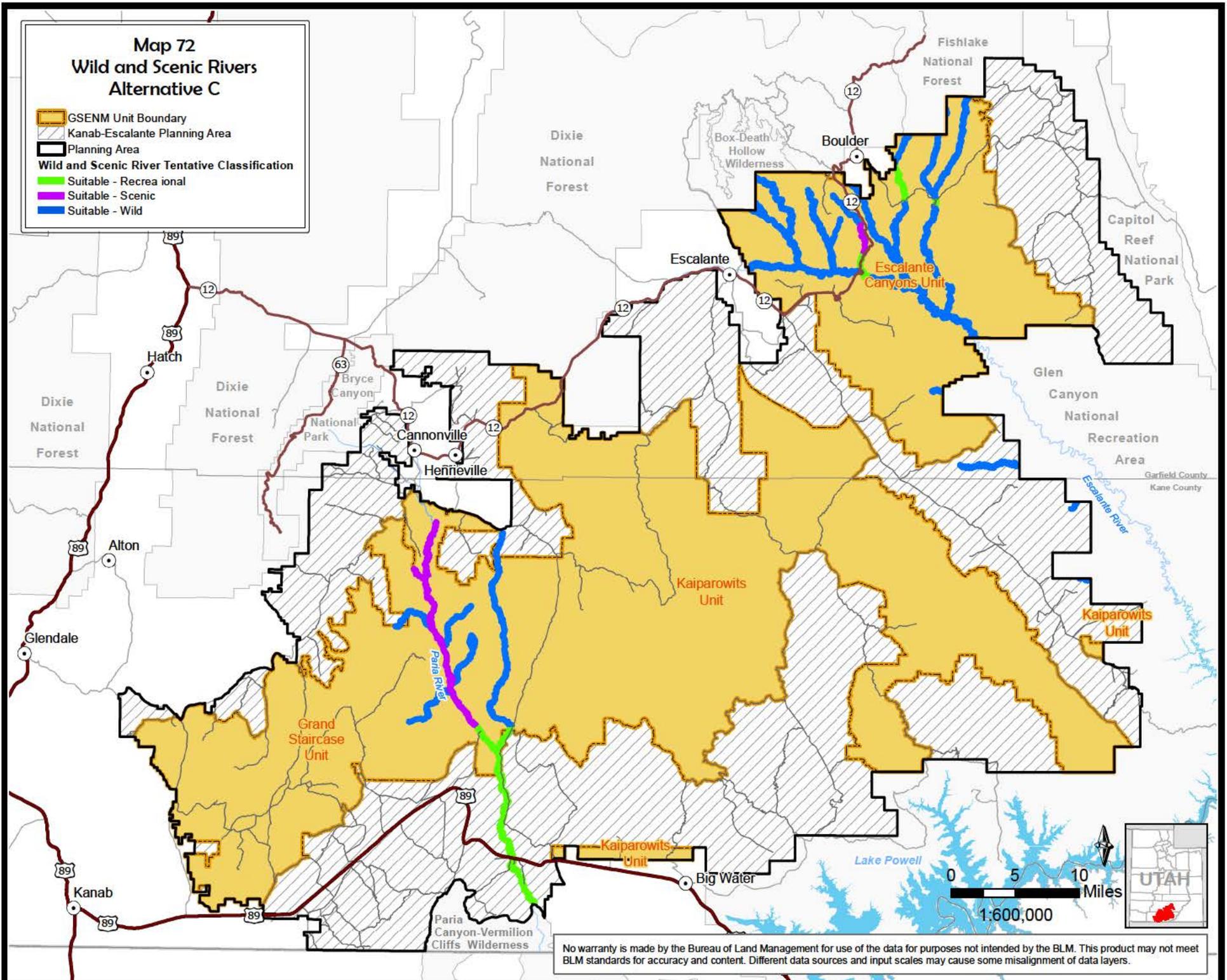


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Map 72 Wild and Scenic Rivers Alternative C

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Wild and Scenic River Tentative Classification**
-  Suitable - Recreational
-  Suitable - Scenic
-  Suitable - Wild

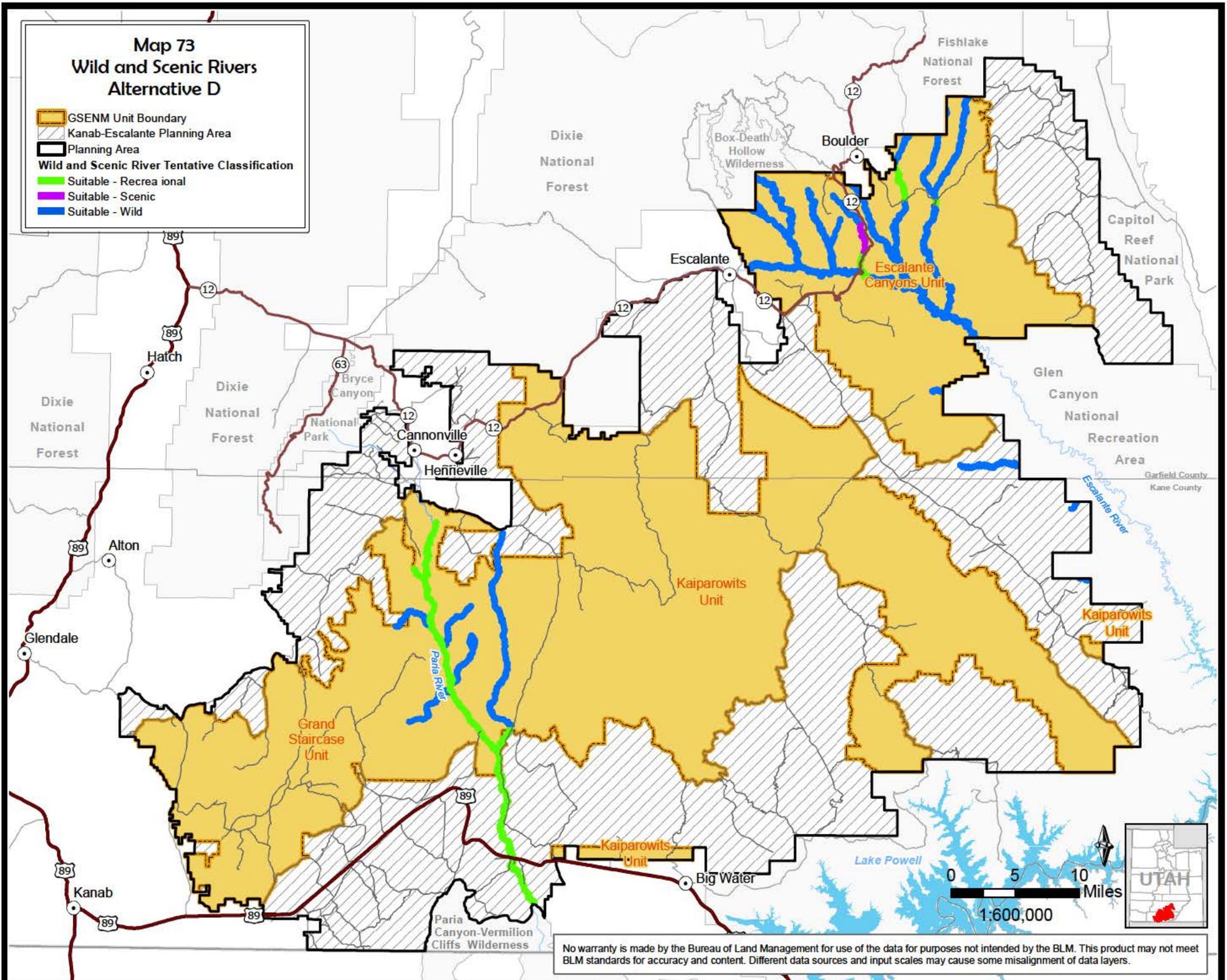


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Map 73 Wild and Scenic Rivers Alternative D

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
- Wild and Scenic River Tentative Classification**
-  Suitable - Recreational
-  Suitable - Scenic
-  Suitable - Wild

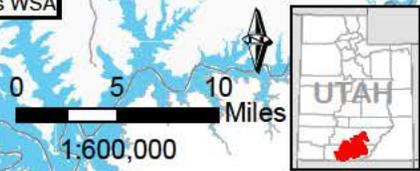
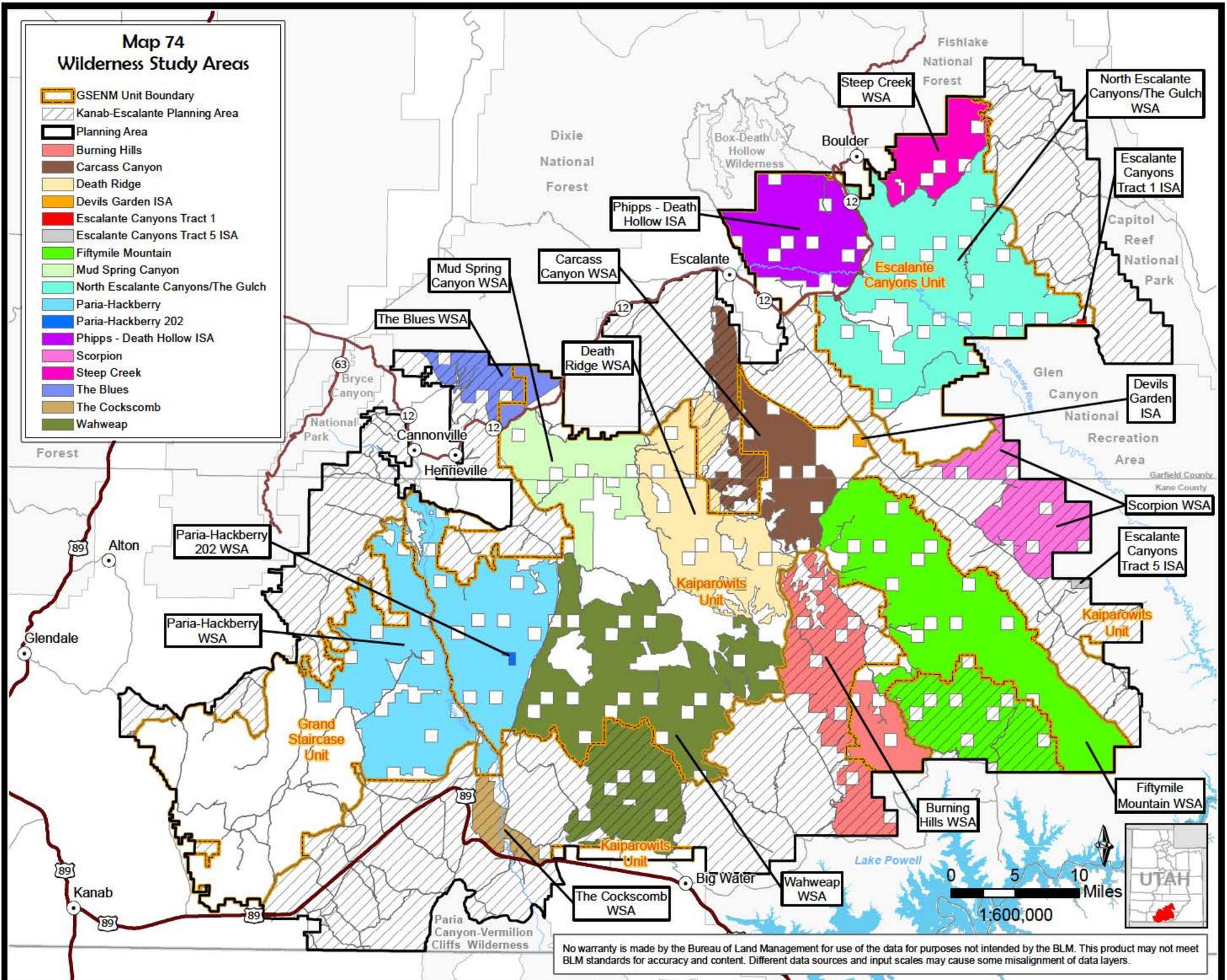


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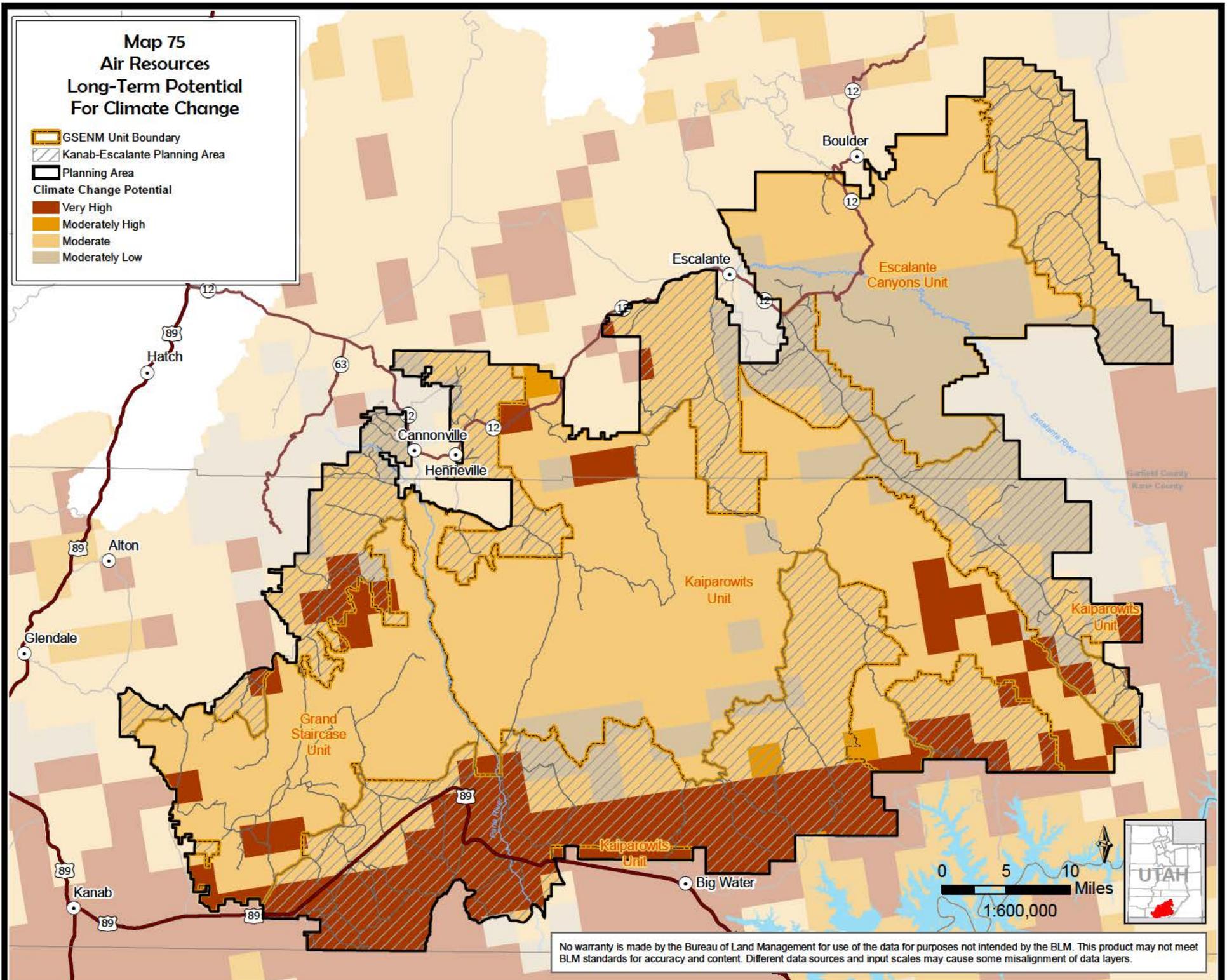


Map 74 Wilderness Study Areas

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Burning Hills
-  Carcass Canyon
-  Death Ridge
-  Devils Garden ISA
-  Escalante Canyons Tract 1
-  Escalante Canyons Tract 5 ISA
-  Fiftymile Mountain
-  Mud Spring Canyon
-  North Escalante Canyons/The Gulch
-  Paria-Hackberry
-  Paria-Hackberry 202
-  Phipps - Death Hollow ISA
-  Scorpion
-  Steep Creek
-  The Blues
-  The Cockscomb
-  Wahweap



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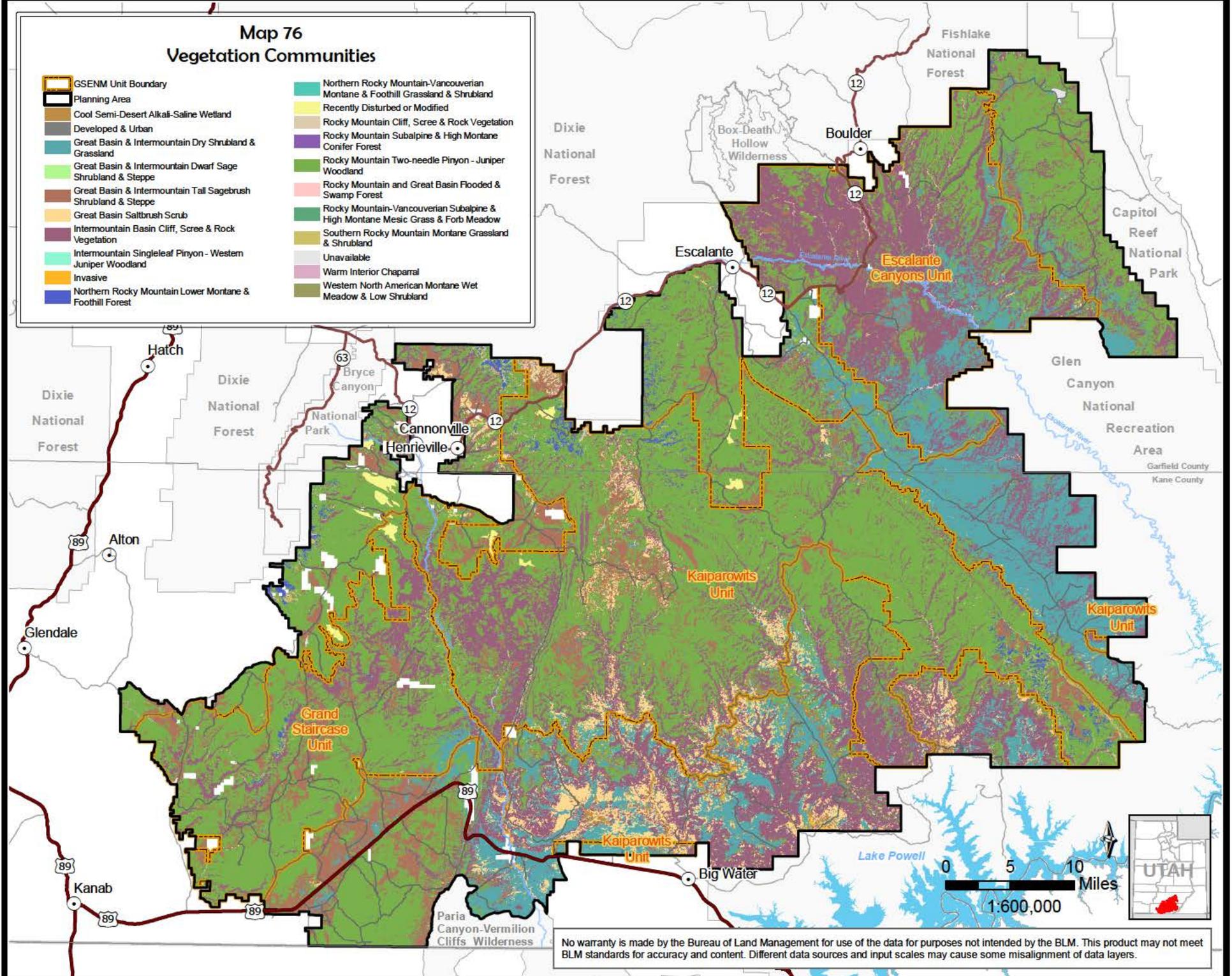
Map 75
Air Resources
Long-Term Potential
For Climate Change

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Climate Change Potential
 - Very High
 - Moderately High
 - Moderate
 - Moderately Low

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Map 76 Vegetation Communities

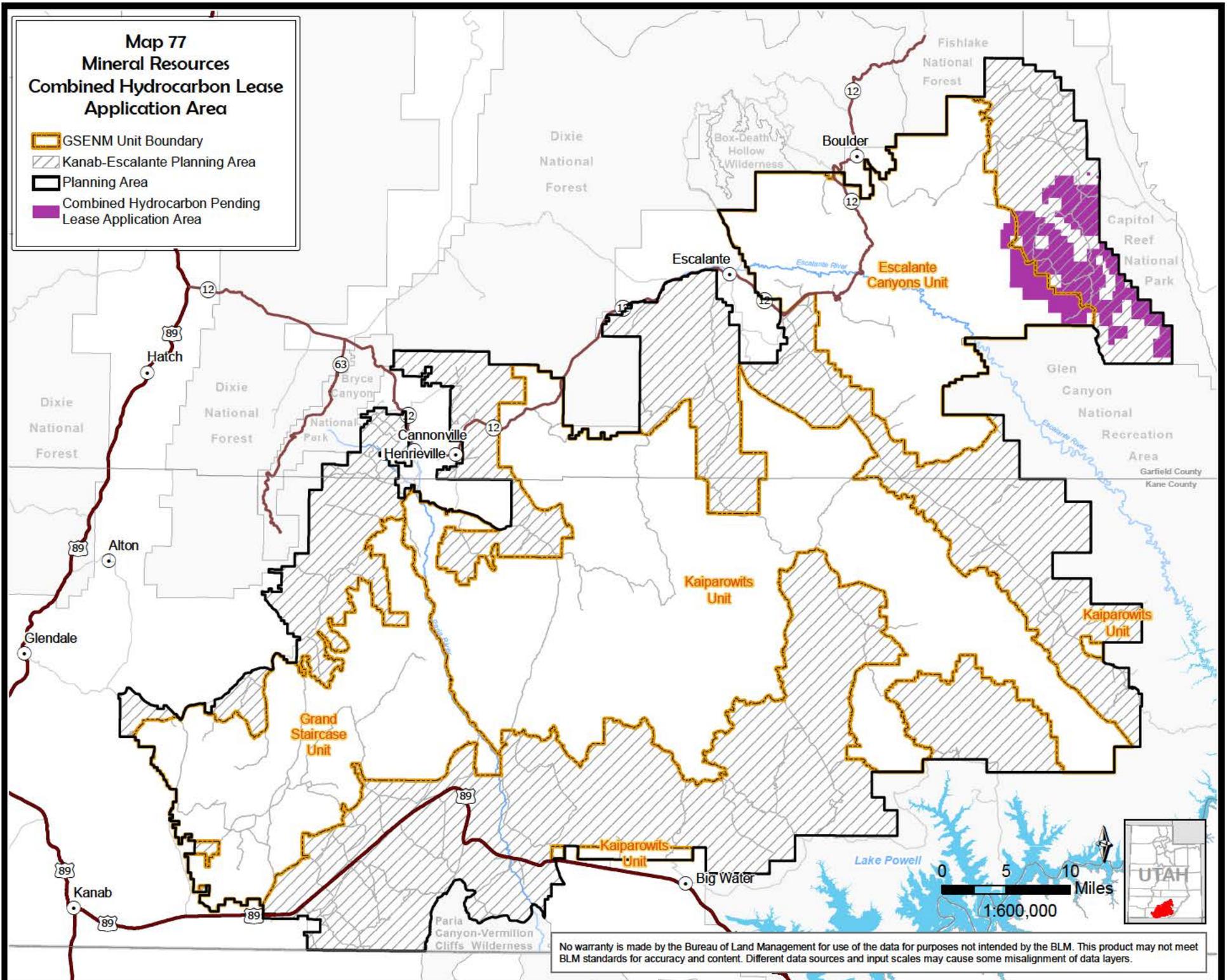
- | | |
|---|--|
| GSENM Unit Boundary | Northern Rocky Mountain-Vancouverian Montane & Foothill Grassland & Shrubland |
| Planning Area | Recently Disturbed or Modified |
| Cool Semi-Desert Alkal-Saline Wetland | Rocky Mountain Cliff, Scree & Rock Vegetation |
| Developed & Urban | Rocky Mountain Subalpine & High Montane Conifer Forest |
| Great Basin & Intermountain Dry Shrubland & Grassland | Rocky Mountain Two-needle Pinyon - Juniper Woodland |
| Great Basin & Intermountain Dwarf Sage Shrubland & Steppe | Rocky Mountain and Great Basin Flooded & Swamp Forest |
| Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe | Rocky Mountain-Vancouverian Subalpine & High Montane Mesic Grass & Forb Meadow |
| Great Basin Saltbrush Scrub | Southern Rocky Mountain Montane Grassland & Shrubland |
| Intermountain Basin Cliff, Scree & Rock Vegetation | Unavailable |
| Intermountain Singleleaf Pinyon - Western Juniper Woodland | Warm Interior Chaparral |
| Invasive | Western North American Montane Wet Meadow & Low Shrubland |
| Northern Rocky Mountain Lower Montane & Foothill Forest | |



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Map 77
Mineral Resources
Combined Hydrocarbon Lease
Application Area

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Combined Hydrocarbon Pending Lease Application Area

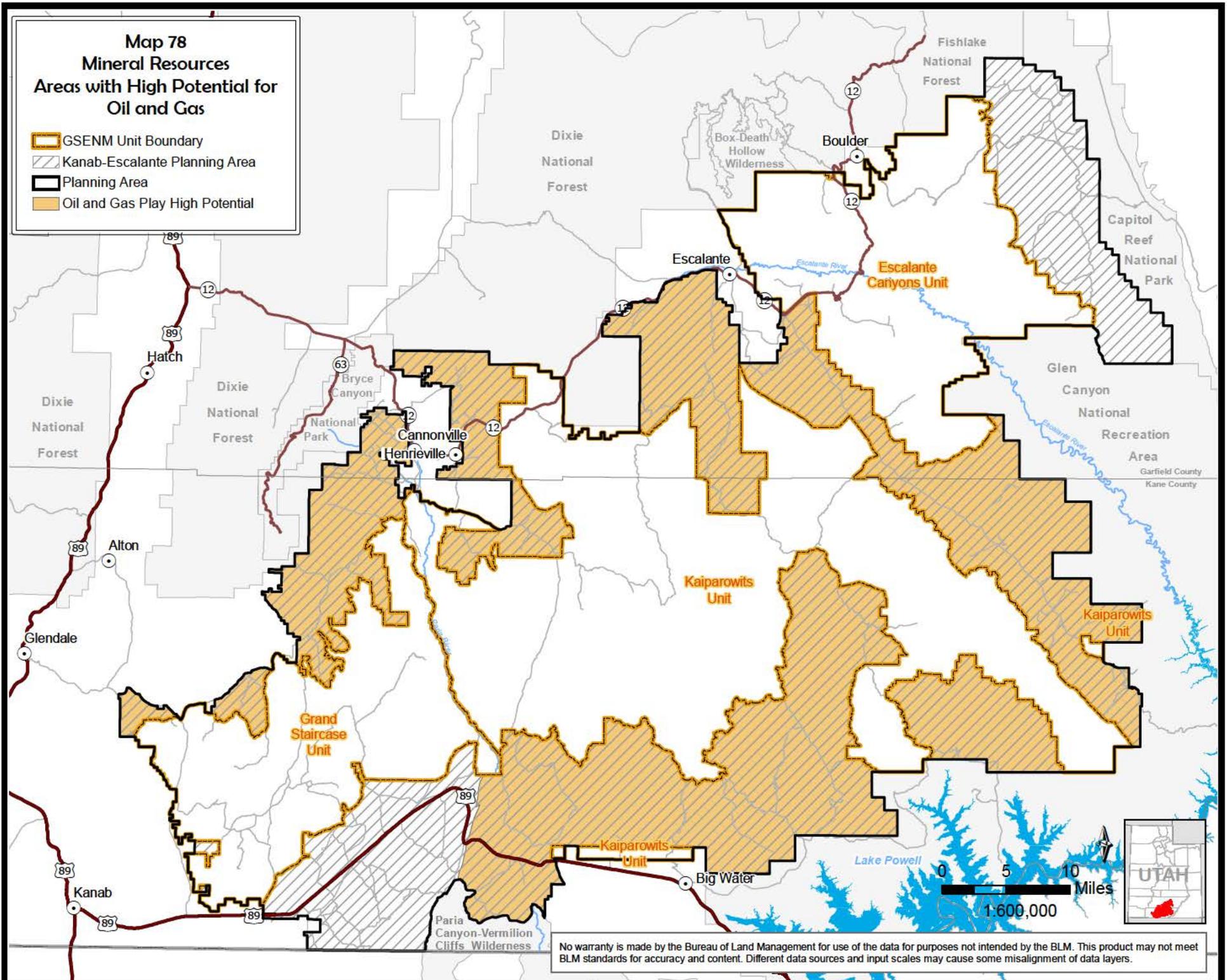


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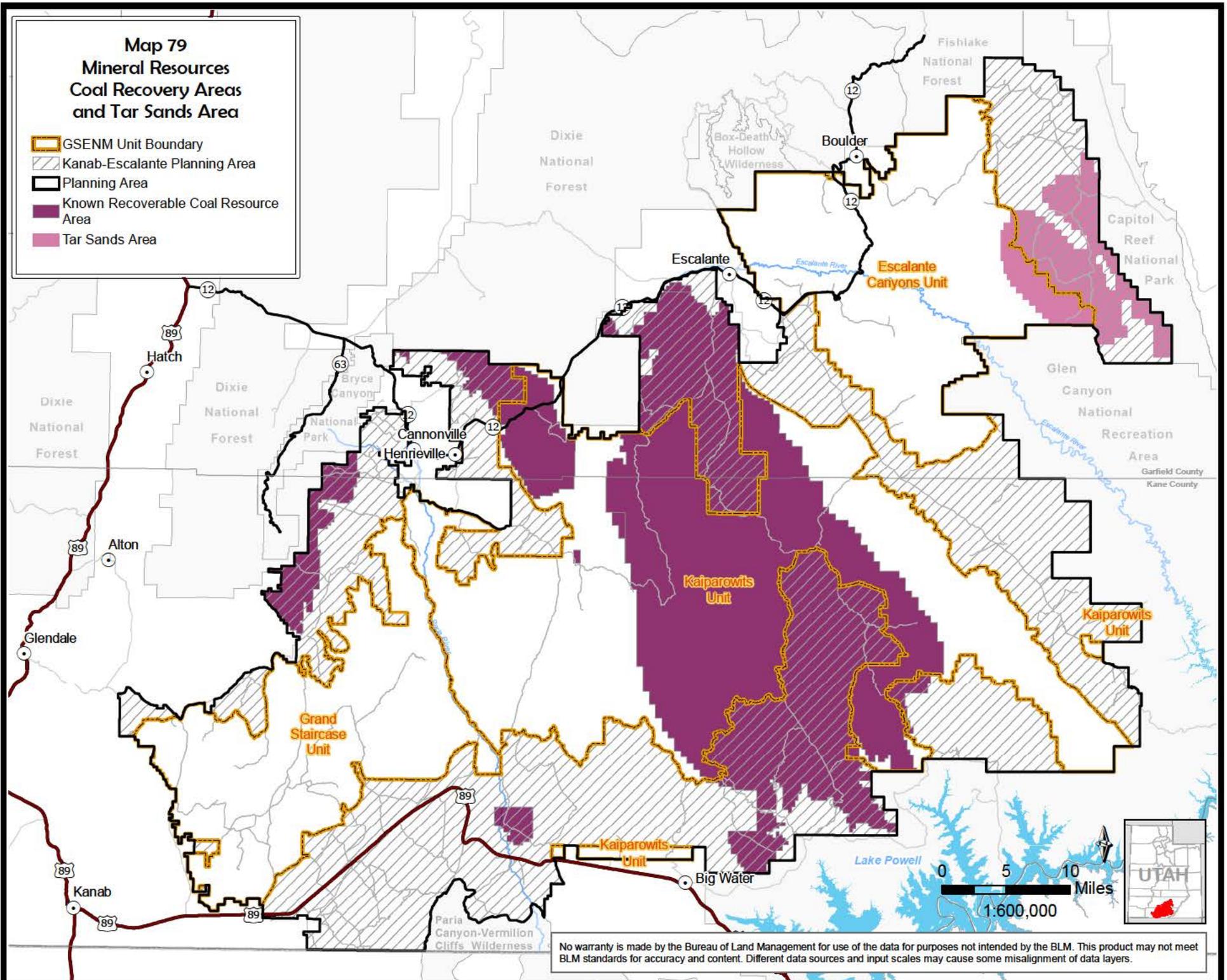


Map 78
Mineral Resources
Areas with High Potential for
Oil and Gas

-  GSENM Unit Boundary
-  Kanab-Escalante Planning Area
-  Planning Area
-  Oil and Gas Play High Potential



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Map 79
Mineral Resources
Coal Recovery Areas
and Tar Sands Area

- GSENM Unit Boundary
- Kanab-Escalante Planning Area
- Planning Area
- Known Recoverable Coal Resource Area
- Tar Sands Area

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***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix B

References

August 2018

Appendix B: References

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Map 09

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Map 28

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Map 29

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***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix C

Glossary

August 2018

Appendix C: Glossary

A

ACQUISITION: The BLM acquires land, easements, and other real property rights when it is in the public interest and consistent with approved land use plans. The BLM's land acquisition program is designed to (1) improve management of natural resources through consolidation of federal, state, and private lands; (2) increase recreational opportunities, preserve open space, and/or ensure accessibility of public lands; (3) secure key property necessary to protect habitat for threatened and endangered species, promote high-quality riparian areas, and promote biological diversity; (4) preserve archaeological and historical resources; and (5) implement specific acquisitions authorized by Acts of Congress.

ACTIVITY PLAN: A type of implementation plan (see **IMPLEMENTATION PLAN**); an activity plan usually describes multiple projects and applies best management practices to meet land use plan objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans, recreation area management plans, and allotment management plans (from H-1601-1, BLM Land Use Planning Handbook).

ACTUAL USE: Where, how many, what kind or class of livestock, and how long livestock graze on an allotment, or on a portion or pasture of an allotment (from 43 CFR 4100.0-5).

AIR QUALITY: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances. Refers to standards for various classes of land as designated by the Air Pollution Control Act of 1955, the Clean Air Act of 1963, as amended, and the Air Quality Act of 1967.

AIR QUALITY CLASS I AND II AREAS: Regions in attainment areas where maintenance of existing good air quality is of high priority. Class I areas are those that have the most stringent degree of protection from future degradation of air quality. Class II areas permit moderate deterioration of existing air quality.

ALL-TERRAIN VEHICLE (ATV): A wheeled or tracked vehicle, other than a snowmobile or work vehicle, designed primarily for recreational use or for the transportation of property or equipment exclusively on undeveloped roads, trails, marshland, open country, or other unprepared surfaces (from BLM National Management Strategy for OHV Use on Public Lands).

ALLOCATION: Process to specifically assign use between and ration among competing users for a particular area of public land or related waters.

ALLOTMENT: An area of land designated and managed for grazing of livestock (43 CFR 4100.0-5).

ALLOTMENT MANAGEMENT PLAN: A documented program developed as an activity plan, consistent with the definition at 43 U.S.C. 1702(k), that focuses on, and contains the necessary instructions for, the management of livestock grazing on specified public lands to meet resource condition, sustained yield, multiple use, economic, and other objectives (from 43 CFR 4100.0-5).

ALTERNATIVE: One of at least two proposed means of accomplishing planning objectives.

ANALYSIS: The examination of existing and/or recommended management needs and their relationships to discover and display the outputs, benefits, effects, and consequences of initiating a proposed action.

ANALYSIS AREA: Any lands, regardless of jurisdiction, that the BLM uses to analyze impacts on a particular resource.

ANALYSIS OF THE MANAGEMENT SITUATION (AMS): Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

ANIMAL UNIT MONTH (AUM): The amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month (from 43 CFR 4100.0-5).

AQUATIC: Living or growing in or on the water.

AQUIFER: Stratum or zone below the surface of the Earth capable of producing water, as from a well. A saturated bed, formation, or group of formations that yield water in sufficient quantity to be of consequence as a source of supply. An aquifer acts as a transmission conduit and storage reservoir.

ARCH: A natural opening through a narrow wall or plate of rock.

ARCHAEOLOGY: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

ARCHAEOLOGICAL SITE: A location that contains the physical evidence of past human behavior that allows for its interpretation (from the Advisory Council on Historic Preservation's Section 106 Archaeology Guidance).

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC): Area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards (from FLPMA, Title 43 Chapter 35 Subchapter I 1702(a)).

ASSESSMENT: The act of evaluating and interpreting data and information for a defined purpose (from H-1601-1, BLM Land Use Planning Handbook).

AUTHORIZED OFFICER: The Federal employee who has the delegated authority to make a specific decision.

AVOIDANCE AREA: Areas with sensitive resource values where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not be otherwise feasible on lands outside the avoidance area.

B

BACK COUNTRY BYWAYS: Vehicle routes that traverse scenic corridors utilizing secondary or backcountry road systems. National Back Country Byways are designated by the type of road and vehicle needed to travel the byway.

BENEFITS-BASED RECREATION: A management framework, philosophy, or approach to providing recreation and trail resources, facilities, and programs that focuses on identifying the economic, environmental, and social benefits to target recreation users. This management approach builds upon existing activity, facility, or demographic group orientations, but focuses on the outcomes or changes in the target groups.

BEST MANAGEMENT PRACTICE (BMP): A technique that guides, or may be applied to, management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory (from H-1601-1, BLM Land Use Planning Handbook).

BIG GAME: Indigenous ungulate wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn.

BIODIVERSITY: The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

BIOLOGICAL SOIL CRUST OR CRYPTOBOTIC CRUST: Biological communities that form a surface layer or crust on some soils. These communities consist of cyanobacteria (blue-green bacteria), micro fungi, mosses, lichens, and green algae and perform many important functions, including fixing nitrogen and carbon, maintaining soil surface stability, and preventing erosion. Cryptobiotic crusts also influence the nutrient levels of soils and the status and germination of plants in the desert. These crusts are slow to recover after severe disturbance.

BITUMEN: Any of various mixtures of hydrocarbons such as asphalt, tar, or petroleum.

C

CANDIDATE SPECIES: Taxa for which the U.S. Fish and Wildlife Service has sufficient information on their status and threats to support proposing the species for listing as endangered or threatened under the Endangered Species Act but for which issuance of a proposed rule is currently precluded by higher-priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the *Federal Register* (from M-6840, Special Status Species Manual).

CASUAL COLLECTING: The collecting of a reasonable amount of common invertebrate and plant paleontological resources for non-commercial personal use, either by surface collection or the use of non-powered hand tools resulting in only negligible disturbance to the Earth's surface and other resources.

CENOMANIAN-SANTONIAN AGES: Span of geologic ages including Cenomanian, Turanian, Coniacian, and Santonian during Late Cretaceous time, 98 to 84 million years ago.

CLOSED: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 Code of Federal Regulations (CFR) 8340.0-5 sets forth the specific meaning of "closed" as it relates to off-highway vehicle use, and 43 CFR 8364 defines "closed"

as it relates to closure and restriction orders (from H-1601-1, BLM Land Use Planning Handbook).

CODE OF FEDERAL REGULATIONS (CFR): The official codification of the current, general, and permanent regulations of Federal government activities.

COLLABORATION: A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands (from H-1601-1, BLM Land Use Planning Handbook).

COLLABORATIVE PARTNERSHIPS OR COLLABORATIVE STEWARDSHIP: Refers to people working together, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks (from H-1601-1, BLM Land Use Planning Handbook).

CONCESSIONAIRE: Someone who holds a long term authorization to possess and use public lands to provide recreation facilities and services for a fixed period of time authorized under BLM regulations.

CONFORMANCE: Means that a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan (from H-1601-1, BLM Land Use Planning Handbook).

CONSERVATION AGREEMENT: A formal written document agreed to by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service and another Federal agency, State agency, local government, or the private sector to achieve the conservation of candidate species or other special status species through voluntary cooperation. It documents the specific actions and responsibilities for which each party agrees to be accountable. The objective of a conservation agreement is to reduce threats to a special status species or its habitat. An effective conservation agreement may lower species' listing priority or eliminate the need for listing (from M-6840, Special Status Species Manual).

CONSERVATION STRATEGY: A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as BLM sensitive species or that have been determined by the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration Fisheries to be Federal candidates under the Endangered Species Act (from H-1601-1, BLM Land Use Planning Handbook).

CONSISTENCY: Means that the proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other Federal agencies, and State and local governments (to the extent practical within Federal law, regulation, and policy) (from H-1601-1, BLM Land Use Planning Handbook).

CONSULTATION: A meeting to discuss, decide, or plan something.

COOPERATING AGENCY: Assists the lead Federal agency in developing an environmental assessment or environmental impact statement. The Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 Code of Federal Regulations 1501.6). Any Federal, State, or local government

jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency (from H-1601-1, BLM Land Use Planning Handbook).

COUNCIL ON ENVIRONMENTAL QUALITY: An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

CRITICAL HABITAT: (1) The specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Endangered Species Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed upon determination by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service that such areas are essential for the conservation of the species. Critical habitats are designated in 50 Code of Federal Regulations Parts 17 and 226. The constituent elements of critical habitat are those physical and biological features of designated or proposed critical habitat essential to the conservation of the species (from M-6840, Special Status Species Manual).

CRUCIAL VALUE HABITAT: Any particular range or habitat component that directly limits a community, population, or subpopulation to reproduce and maintain itself at a certain level over the long term. Those sensitive use areas that, because of limited abundance and/or unique qualities, constitute irreplaceable critical requirements for high-interest wildlife. This may also include highly sensitive habitats, including fragile soils that have little or no reclamation potential. Restoration or replacement of these habitats may not be possible. Examples include: the most crucial summer and/or winter range or concentration areas; critical movement corridors; holdover and transitional corridors; breeding and rearing complexes; spawning areas; developed wetlands; Class 1 and 2 streams, lake, ponds or reservoirs; and riparian habitats critical to high-interest wildlife.

CRUCIAL WINTER RANGE: The portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

CRYPTOBIOTIC CRUST: See BIOLOGICAL SOIL CRUST.

CRYPTOGAM: A plant that bears no flowers or seeds but propagates by means of spores. Cryptogamic organisms make up a cryptogamic crust or surface on certain soils.

CUBIC FEET PER SECOND (cfs): As a rate of stream flow, a cubic foot of water passing a referenced section in 1 second of time. One cfs flowing for 24 hours will yield 1.983 acre-feet of water.

CULTURAL RESOURCE OR CULTURAL PROPERTY: A definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit (from M-8100-1, BLM Cultural Resources Management).

CULTURAL RESOURCE INVENTORY CLASSES: (See BLM Manual Section 8110.21.)

Class I: existing data inventory. A study of published and unpublished documents, records, files,

registers, and other sources resulting in analysis and synthesis of all reasonably available data. **Class I** inventories encompass prehistoric, historic, and ethnological/sociological elements, and are in large part chronicles of past land uses. They may have major relevance to current land use decisions. **Class II:** sampling field inventory. A statistically based sample survey designed to help characterize the probable density, diversity, and distribution of archaeological properties in a large area by interpreting the results of surveying limited and discontinuous portions of the target area. **Class III:** intensive field inventory. A continuous, intensive survey of an entire target area, aimed at locating and recording all archaeological properties that have surface indications, by walking close-interval parallel transects until the area has been thoroughly examined. Class III methods vary geographically, conforming to the prevailing standards for the region involved (from M-8100, BLM Cultural Resources Management).

CULTURAL RESOURCE MANAGEMENT PLAN: A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

CUMULATIVE EFFECT: The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (from H-1790-1, BLM NEPA Handbook).

D

DECISION AREA: The lands within the Planning Area for which the BLM has authority to make management decisions.

DESERT LAND ENTRY: The Desert Land Act (March 3, 1877) was passed by Congress to encourage and promote the economic development of the arid and semiarid public lands of the western United States. Through the act, individuals may apply for a desert-land entry to reclaim, irrigate, and cultivate arid and semiarid public lands.

DESIGNATED ROADS AND TRAILS: Specific roads and trails identified by the BLM (or other agencies) where some type of motorized vehicle use is appropriate and allowed either seasonally or year-long (from H-1601-1, BLM Land Use Planning Handbook).

DIRECT ECONOMIC IMPACTS: Impacts in the primary industries associated with activity on BLM-administered surface lands (e.g., restaurants frequented by visitors to BLM-administered surface lands in the analysis area).

DIRT BIKE: Non-street legal motorcycle.

DISPERSED OR EXTENSIVE RECREATION: Recreation activities of an unstructured type that are not confined to specific locations or dependent on recreation sites. Examples of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

DISPOSAL: Transfer of public land out of Federal ownership to another party through sale, exchange, Recreation and Public Purposes Act, Desert Land Entry, or other land law statutes.

E

EASEMENT: An interest in land entitling the owner or holder, as a matter or right, to enter upon land owned by another party for a particular purpose.

ECOLOGICAL SITE DESCRIPTION: Description of the soils, uses, and potential of a kind of land with specific physical characteristics to produce distinctive kinds and amounts of vegetation.

ECOLOGICAL SITE INVENTORY: The basic inventory of present and potential vegetation on BLM rangelands. Ecological sites are differentiated on the basis of significant differences in kind, proportion, or amount of plant species in the plant community. Ecological site inventory uses soils, the existing plant community, and ecological site data to determine the appropriate ecological site for a specific area of rangeland and to assign the appropriate ecological status.

ECOLOGICAL SUCCESSION: An ecosystem's gradual evolution to a stable state or climax. If through the ability of its populations and elements, an ecosystem can absorb changes, it tends to persist and become stable through time.

ECOSYSTEM: A system made up of a community of animals, plants, and bacteria and its interrelated physical and chemical environment.

ELIGIBILITY: Qualification of a river for inclusion into the National Wild and Scenic Rivers System through the determination (professional judgment) that it is free-flowing and, with its adjacent land area, possesses at least one river-related value considered to be outstandingly remarkable (from M-8351, BLM WSR Policy and Program).

ELIGIBLE RIVER SEGMENT: A section of a river that qualifies for inclusion into the National Wild and Scenic Rivers System through determination that it is free-flowing and with its adjacent land area possessing at least one river-related value considered to be outstandingly remarkable.

ENDANGERED SPECIES: Any animal or plant species in danger of extinction throughout all or a significant portion of its range. These species are listed by the U. S. Fish and Wildlife Service (from M-6840, Special Status Species Manual).

ENVIRONMENTAL ASSESSMENT (EA): (a) A concise public document for which a Federal agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary; (3) facilitate preparation of a statement when one is necessary. (b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted (from H-1790-1, BLM NEPA Handbook).

ENVIRONMENTAL IMPACT STATEMENT (EIS): A detailed statement prepared by the responsible official in which a major Federal action that would significantly affect the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed (from BLM National Management Strategy for OHV Use on Public Lands).

EPHEMERAL STREAM: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table. Ephemeral streams generally do not flow

continuously for more than 30 days and generally have more robust upland vegetation than found outside of the ephemeral riparian-wetland area.¹

EQUESTRIAN: Of horses, horsemen, or horseback riding.

EXECUTIVE ORDER (EO): An EO is a Presidential directive with the force of law. It does not need congressional approval. The Supreme Court has upheld EOs as valid either under the general constitutional grant of executive powers to the President or if authority for it was expressly granted to the President by Congress. Congress can repeal or modify an EO by passing a new law; however, it must be signed by the President or his veto overridden.

EXTENSIVE RECREATION MANAGEMENT AREA (ERMA): A public lands unit identified in land use plans containing all acreage not identified as a Special Recreation Management Area. Recreation management actions within an ERMA are limited to only those of a custodial nature.

F

FACIES: A lateral or vertical variation in the lithologic or paleontologic characteristics of a geologic formation that differs as a group from that elsewhere in the same formation. It is caused by or reflects a change in the depositional environments.²

FAUNA: The animals of a specified region or time.

FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA) OF 1976: Public Law 94-579, October 21, 1976, often referred to as the BLM's "Organic Act," which provides the majority of the BLM's legislated authority, direction policy, and basic management guidance (from BLM National Management Strategy for OHV Use on Public Lands).

FEDERAL LANDS: As used in this document, lands owned by the United States, without reference to how the lands were acquired or what Federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos (see also PUBLIC LAND).

FEDERAL PROTECTION COMPONENT (IN RELATION TO NATIONAL HISTORIC TRAILS): Segments of a trail that afford high-quality recreation experiences along a portion of the route having greater-than-average scenic values or affording an opportunity to share vicariously the experience of the original users of a historic route.

FEDERAL REGISTER: A daily publication that reports Presidential and Federal agency documents (from BLM National Management Strategy for OHV Use on Public Lands).

¹ United States Department of the Interior (DOI). 1998. *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas*. Technical Reference 1737-15. Bureau of Land Management, Forest Service, Natural Resources Conservation Service. Written by: Prichard, D., J. Anderson, C. Correll, J. Fogg, K. Gebhardt, R. Krapf, S. Leonard, B. Mitchell, and J. Staats. Denver:CO. BLM/RS/ST-98/001+1737. 127 pp.

² Stokes, W. L. 1986. *Geology of Utah*. Utah Museum of Natural History, University of Utah and Utah Geological and Mineral Survey, Department of Natural Resources, State of Utah. Salt Lake City, Utah; Skinner, B. J., and S. C. Porter. 1992. *The Dynamic Earth: An Introduction to Physical Geology*. John Wiley and Sons, Inc. New York: New York.

FIRE MANAGEMENT PLAN (FMP): A strategic implementation-level plan that defines a program to manage wildland fire, fuel reduction, and fire rehabilitation based on an area's approved Resource Management Plan. FMPs must address a full range of fire management activities that support ecosystem sustainability, values to be protected, protection of firefighter and public safety, public health, and environmental issues. They must be consistent with resource management objectives and activities of the area.

FLOODPLAIN: A plain along a river, formed from sediment deposited by floods.

FLORA: The plants of a specified region or time.

FLUID MINERALS: Oil, gas, coal bed natural gas, and geothermal resources.

FORAGE: Vegetation of all forms available and of a type used for animal consumption.

FORESTRY PRODUCT AREAS: Forest lands stocked with other than timber species (e.g., pinon, juniper, mountain mahogany). Uses of the products are generally limited to firewood, posts, and harvest of pinon pine nuts.

FORMATION: The primary unit in stratigraphy consisting of a succession of strata useful for mapping or description. Most formations possess certain lithologic features that may indicate genetic relationships.

FOSSIL: The remains or traces of animals or plants that have been preserved by natural causes in the Earth's crust exclusive of organisms that have been buried since the beginning of historic times.

FOUR-WHEEL-DRIVE (4WD): Four-wheel-drive, differential transfer case disperses 50/50 front and rear displacement. Trucks, cars, buses, or sport utility vehicles with high clearance and the ability to operate off pavement as well as on highways.

FUNCTIONING AT RISK (FAR): (1) Condition in which vegetation and soil are susceptible to losing their ability to sustain naturally functioning biotic communities. Human activities, past or present, may increase the risks. (2) Uplands or riparian-wetland areas that are properly functioning, but a soil, water, or vegetation attribute makes them susceptible to degradation and lessens their ability to sustain natural biotic communities. Uplands are particularly at risk if their soils are susceptible to degradation. Human activities, past or present, may increase the risks. See also PROPERLY FUNCTIONING CONDITION (from H-4180-1, BLM Rangeland Health Standards Manual).

G

GEOGRAPHIC INFORMATION SYSTEM (GIS): A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information (from H-1601-1, BLM Land Use Planning Handbook).

GEOLOGY: The science that studies the Earth, the rocks of which it is composed, and the changes it has undergone or is undergoing.

GOAL: A broad statement of a desired outcome; usually not quantifiable and may not have established time frames for achievement (from H-1601-1, BLM Land Use Planning Handbook).

GRAZING ALLOTMENT CATEGORIES: Direction under which all grazing allotments are categorized for management purposes into three groups. The overall objectives are:

M: maintain the current resource conditions; **I:** improve the current resource conditions; and **C:** custodial manage the existing resource values.

GRAZING PERMIT: A document authorizing use of the public lands within an established grazing district. Grazing permits specify all authorized use including livestock grazing, suspended use, and conservation use. Permits specify the total number of animal unit months apportioned, the area authorized for grazing use, or both (from 43 CFR 4100.0-5).

GRAZING PREFERENCE OR PREFERENCE: A superior or priority position against others for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee (from 43 CFR 4100.0-5).

GRAZING SYSTEM: A prescribed method of grazing a range allotment having two or more pastures or management units to provide periodic rest for each unit.

GUIDELINE: A practice, method, or technique determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. Guidelines are tools such as grazing systems, vegetative treatments, or improvement projects that help managers and permittees achieve standards. Guidelines may be adapted or modified when monitoring or other information indicates the guideline is not effective, or a better means of achieving the applicable standard becomes appropriate (from H-4180-1, BLM Rangeland Health Standards Manual).

H

HABITAT: The place where an organism (plant or animal) lives. There are four major divisions of habitat: terrestrial, freshwater, estuarine, and marine (from M-6840, Special Status Species Manual).

HABITAT MANAGEMENT PLAN (HMP): An officially approved activity plan for a specific geographic area of public land. An HMP identifies wildlife habitat and related objectives, defines the sequence of actions to be implemented to achieve the objectives, and outlines procedures for evaluating accomplishments.

HANGING GARDEN: Small pockets of vegetative associations surrounding “canyon-wall” springs that often contain a wide variety of unique plant and insect species. Hanging gardens are characteristic of flat-lying strata with deeply incised canyons of the Colorado Plateau.

HIGH-VALUE HABITAT: Any particular habitat that sustains a community, population, or subpopulation. Intensive use areas that because of relatively wide distribution do not constitute crucial values but are highly important to high-interest wildlife. This may also include moderately sensitive habitats of high-interest species that have low reclamation potential. Includes Class 3 streams, lakes, ponds, or reservoirs. Reconstruction or enhancement of these areas may be possible, but should be avoided if not possible. Examples include: less crucial (critical) but more widely distributed summer and/or winter ranges; important feeding areas; areas of high wildlife diversity and/or density of high-interest species; natural wetlands; and all other riparian areas.

HYDROCARBON: An organic compound containing only hydrogen and carbon, such as petroleum or crude oil.

HYDROLOGY: The science dealing with the properties, distribution, and circulation of water.

I

IMPACTS (OR EFFECTS): Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative (from BLM National Management Strategy for OHV Use on Public Lands).

IMPLEMENTATION DECISIONS: Decisions that take action to implement land use plan decisions; generally appealable to the Interior Board of Land Appeals under 43 Code of Federal Regulations 4.410 (from H-1601-1, BLM Land Use Planning Handbook).

IMPLEMENTATION PLAN: A sub-geographic or site-specific plan written to implement decisions made in a land use plan. Implementation plans include both activity plans and project plans (they are types of implementation plans) (from H-1601-1, BLM Land Use Planning Handbook).

INDIAN TRIBE (OR TRIBE): Any Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994 (from H-1780-1, G2).

INDICATORS: Components of a system whose characteristics (presence or absence, quantity, distribution) are used as an index of an attribute (e.g., rangeland health attribute) that are too difficult, inconvenient, or expensive to measure (Interagency Technical Reference 1734-8, 2000) (from H-4180-1, BLM Rangeland Health Standards Manual).

INDIRECT ECONOMIC IMPACTS: Impacts in the industries that supply or interact with the primary industries. For example, when a restaurant expands and purchases new materials, the industry sectors supplying the materials experience indirect impacts.

INDUCED ECONOMIC IMPACTS: Impacts that represent increased spending by workers who earn money due to increased economic activity, such as when restaurant employees use their wages to purchase goods from local shops.

INHOLDING: A non-Federal parcel of land that is completely surrounded by Federal land.

INSTANT STUDY AREA (ISA): A designation of all primitive or natural areas formally identified prior to November 1, 1975, that were to be studied for wilderness suitability and recommended to the President by July 1, 1980 as mandated under Section 603 of the Federal Land Policy and Management Act.

INTERDISCIPLINARY TEAM: Staff specialists representing identified skill and knowledge needs working together to resolve issues and provide recommendations to an authorized officer (from H-4180-1, BLM Rangeland Health Standards Manual).

INTERIM MANAGEMENT POLICY (IMP): An interim measure governing lands under wilderness review. This policy protects Wilderness Study Areas from impairment of their suitability as wilderness.

INTERIOR BOARD OF LAND APPEALS: The Department of the Interior, Office of Hearings and Appeals board that acts for the Secretary of the Interior in responding to appeals of decisions on the use and disposition of public lands and resources. Because the Interior Board of Land

Appeals acts for and on behalf of the Secretary of the Interior, its decisions usually represent the Department of the Interior's final decision but are subject to the courts.

INTERMITTENT OR SEASONAL STREAM: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. Generally, intermittent streams flow continuously for periods of at least 30 days and usually have visible vegetation or physical characteristics reflective of permanent water influences, such as the presence of cottonwoods.³

INTERRUPTED STREAMS: Streams with discontinuities in surface flow along a streambed. These streams may have obligate wetland vegetation, hydric soils, and indicators of permanent water influences. Ephemeral streams generally lack obligate wetland vegetation and hydric soils.

INVASIVE PLANT: Plants that have been introduced into an environment where they did not evolve. As a result, invasive plants usually have no natural enemies to limit their reproduction and spread.

INVERTEBRATE SPECIES: Any animal without a backbone or spinal column.

K

KIND OR CLASS OF LIVESTOCK:

- Kind: The species of domestic livestock-cattle and sheep
- Class: The age class (i.e., yearling or cows) of a species of livestock

KNOWN GEOLOGIC STRUCTURES: Technically, the known geologic structure of a producing oil or gas field is construed by the U.S. Geological Survey to be the trap, whether structural or stratigraphic, in which an accumulation of oil or gas has taken place, and the limits of said trap, irrespective of the degree to which it may be occupied by oil or gas. Known geologic structures are frequently much more extensive than the pools of oil or gas they may contain, and the extent and place of any oil or gas accumulation therein, though influenced by structure, is finally determined by such factors as stratigraphy, hydrocarbon supply, sand conditions, and hydrostatic pressure. The U.S. Geological Survey seeks to evaluate the net effect of these several factors in terms of reasonably presumptive productive acreage and, as far as practicable, to conform the results, modified to include a fair safety margin, to the subsurface contours of the dominant structural feature involved.

L

LAND TENURE ADJUSTMENTS: Ownership or jurisdictional changes are referred as "Land Tenure Adjustments." To improve the manageability of BLM-administered surface land and improve their usefulness to the public, the BLM has numerous authorities for "repositioning" lands into a more consolidated pattern, disposing of lands, acquiring lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through

³ United States Department of the Interior (DOI). 1998. *Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas*. Technical Reference 1737-15. Bureau of Land Management, Forest Service, Natural Resources Conservation Service. Written by: Prichard, D., J. Anderson, C. Correll, J. Fogg, K. Gebhardt, R. Krapf, S. Leonard, B. Mitchell, and J. Staats. Denver:CO. BLM/RS/ST-98/001+1737. 127 pp.

the use of land exchanges, but also through land sales, land acquisitions, jurisdictional transfers to other agencies, and use of cooperative management agreements and leases.

LAND USE ALLOCATION: The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the Decision Area, based on desired future conditions (from H-1601-1, BLM Land Use Planning Handbook).

LAND USE PLAN (LUP): A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of the Federal Land Policy and Management Act; an assimilation of LUP-level decisions developed through the planning process outlined in 43 Code of Federal Regulations 1600, regardless of the scale at which the decisions were developed. The term includes both Resource Management Plans and Management Framework Plans (from H-1601-1, BLM Land Use Planning Handbook).

LAND USE PLAN AMENDMENT: The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or Management Framework Plans. Usually only one or two issues are considered that involve only a portion of the Decision Area (from H-1601-1, BLM Land Use Planning Handbook).

LAND USE PLAN DECISION: Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 Code of Federal Regulations 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to the Interior Board of Land Appeals (from H-1601-1, BLM Land Use Planning Handbook).

LEASE: An authorization or contract by which one party conveys the use of property to another party in return for rental payments. Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM's authority to issue leases for the use, occupancy, and development of the public lands. Leases are issued for purposes such as communication sites, parks, and other recreational facilities. The regulations establishing procedures for the processing of these leases are found in 43 Code of Federal Regulations 2920 and 2740.

LEASE STIPULATION: A modification of the terms and conditions on a lease form at the time of the lease sale.

LEASABLE MINERALS: Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920, as amended. They include coal, phosphate, asphalt, sulfur, potassium, sodium minerals, oil, and gas.

LEK: An assembly area where birds, especially sage-grouse, carry on display and courtship behavior.

LIGHT POLLUTION: The brightening of the night sky caused by street lights and other man-made sources.

LIMITED: An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions (from BLM National Management Strategy for OHV Use on Public Lands).

LIMITED VALUE HABITAT: Habitat that is abundant and not essential to sustain a community, population, or subpopulation. Occasional use areas that are either sparsely populated or that show sporadic or unpredictable use by high-interest wildlife. These areas have limited reclamation potential. Wildlife may be displaced due to the common occurrence of these habitats. Examples include: year-long deer range of low habitat quality; Class 5 and 6 streams, lakes, ponds or reservoirs; and low-quality habitat in juxtaposition to areas of higher wildlife values.

LIMITS OF ACCEPTABLE CHANGE: A framework for establishing acceptable and appropriate resource and social conditions in recreation settings. A system of management planning.

LOCATABLE MINERALS: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

LOW-VALUE HABITAT: Habitat that is abundant and not essential to sustain a community, population, or subpopulation.

M

MANAGEMENT DECISION: A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions (from H-1601-1, BLM Land Use Planning Handbook).

MANAGEMENT-IGNITED FIRE: Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and, at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives to wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

MANAGEMENT OPPORTUNITIES: A component of the analysis of the management situation; actions or management directions that could be taken to resolve issues or management concerns.

MECHANICAL TRANSPORT: Any vehicle, device, or contrivance for moving people or material in or over land, water, snow, ice, or air that has moving parts as essential components of the transport and that has wheels or otherwise applies a mechanical advantage, regardless of power source. "Mechanical transport" includes, but is not limited to: bicycles, game carts, wagons, and wheelbarrows. It does not include devices that may provide mechanical advantage but are not used for transporting material over great distances (e.g., pulleys, pry bars, or winches), or methods of transport where the mechanical advantage is from non-moving parts (e.g., travois) or is incidental to primary means of transport (e.g., ski bindings, horse bits, or oarlocks). Wheelchairs, or other mobility devices that meet the definition of "wheelchair" in the Americans with Disabilities Act, Section 508(c), are not prohibited in Wilderness Study Areas.

MIGRATORY: A group of people or of birds, fishes, or plants that move from one region to another with the change of seasons or climate.

MINERAL: A naturally formed chemical element or compound having a definite chemical composition and, usually, a characteristic crystal form. A mineral is generally considered to be

inorganic, though organic compounds are classified as minerals by some.⁴ The term is also sometimes informally used to refer to resources such as oil, gas, coal, and stone that are derived from the Earth.

MINERAL ENTRY: The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

MINERAL MATERIALS: Materials such as sand and gravel and common varieties of stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but that can be acquired under the Materials Act of 1947, as amended.

MINERAL POTENTIAL:

- **High:** those lands currently producing oil or gas or having high current industry interest
- **Moderate:** those lands that have had oil and gas shows in favorable geologic environments
- **Low:** those lands where either the geologic environment appears to be favorable for the accumulation of oil and gas, or where little or no information is available to evaluate the oil and gas potential

MINERAL WITHDRAWAL: A withdrawal of public lands that are potentially valuable for leasable minerals. This precludes the disposal of the lands except with a mineral reservation, unless the lands are found to not be valuable for minerals.

MINIMUM IMPACT FILMING: A filming activity that does not involve:

- Impact on sensitive habitat or species
- Impact on Native American Indian sacred rites
- Use of explosives or major use of pyrotechnics
- More than minimum impacts on land, air, or water
- Use of exotic species with danger of introduction into the area
- Adverse impacts on sensitive resources including historic, cultural, or paleontological sites; sensitive soils; relict environments; or wetlands or riparian areas
- Use of heavy equipment
- Use of vehicles off designated routes
- Set construction
- Significant restriction of public access
- Significant use of domestic livestock
- Aircraft taking off, landing, or flying lower than 1,000 feet above the site
- 15 or more production vehicles, or 75 or more people
- In excess of 10 days of production

MINING CLAIM: A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

MITIGATION: A method or process by which impacts from actions may be made less injurious to the environment through appropriate protective measures. 40 Code of Federal Regulations 1508.20 further defines mitigation as: (1) avoiding the impact altogether by not taking a

⁴ American Geological Institute. 1974. *Glossary of Geology*.

certain action or parts of an action; (2) minimizing an impact by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance; and/or (5) compensating for the impact by replacing or providing substitute resources or environments.

MITIGATION MEASURES: Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact on environmental, socioeconomic, or other resource values from a proposed land use. Committed mitigation measures are those measures the BLM is committed to enforce (i.e., all applicable laws and their implementing regulations).

MODERATE VALUE HABITAT: Any particular habitat that is common or of intermediate importance.

MONITORING (PLAN MONITORING): The process of tracking the implementation of land use plan decisions and collecting and assessing data/information necessary to evaluate the effectiveness of land use planning decisions (from H-1601-1, BLM Land Use Planning Handbook).

MOUNTAIN BICYCLE: Bicycle designed for off-pavement use. Generally are multi-g geared with fat, knobby tires. Frames and tire rims are stronger than road bicycles. Sometimes referred to in this document as a mechanized vehicle.

MULTIPLE USE: The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (from the Federal Land Policy and Management Act, Title 43 Chapter 35 Subchapter I 1702(c)).

N

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969: NEPA establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains “action-forcing” provisions to make sure that Federal agencies act according to the letter and spirit of the act. The President, Federal agencies, and the courts share responsibility for enforcing the act so as to achieve the substantive requirements of section 101.

NATIONAL REGISTER OF HISTORIC PLACES (NRHP): The NRHP, expanded and maintained by the Secretary of the Interior, as authorized by section 2(b) of the Historic Sites Act and section 101(a)(1)(A) of the National Historic Preservation Act. The NRHP lists cultural properties found to qualify for inclusion because of their local, State, or national significance. Eligibility criteria

and nomination procedures are found in 36 Code of Federal Regulations Part 60. The Secretary's administrative responsibility for the NRHP is delegated to the National Park Service (from M-8100, BLM Cultural Resources Management).

NATIONAL WILD AND SCENIC RIVERS SYSTEM: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past; (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads; and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

NATURALNESS: Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature and where the imprint of human activity is substantially unnoticeable. The BLM has authority to inventory, assess, and/or monitor the attributes of the lands and resources on public lands, which, taken together, are an indication of an area's naturalness. These attributes may include the presence or absence of roads and trails, fences, and other improvements; the nature and extent of landscape modifications.

NO SURFACE OCCUPANCY: A fluid minerals leasing constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the fluid mineral resources under the leases restricted by this constraint through use of directional drilling from sites outside the area.

NON-FUNCTIONING: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows.

NONNATIVE PLANT: An introduced plant species living outside its native distributional range that has arrived there by human activity, either deliberate or accidental.

NOXIOUS WEED: A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States. A noxious weed is also commonly defined as a plant that grows out of place and is "competitive, persistent, and pernicious."

O

OBJECTIVE: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement (from H-1601-1, BLM Land Use Planning Handbook).

OFF-HIGHWAY VEHICLE (OHV): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) any non-amphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any

combat or combat support vehicle when used for national defense (from H-1601-1, BLM Land Use Planning Handbook).

OFF-HIGHWAY VEHICLE DESIGNATIONS:

- **Open:** designated areas where OHVs may be operated.
- **Limited:** designated areas and trails where the use of an OHV is subject to restrictions, such as limiting the dates and times of use (seasonal restrictions); limiting use to designated roads and trails; or limiting use to existing roads and trails. Combinations of restrictions are possible.
- **Closed:** designated areas, roads, and trails where the use of an OHV is permanently or temporarily prohibited. Emergency use of vehicles is allowed.

OFFICIAL USE: Use by an employee, agent, or designated representative of the Federal government or one of its contractors, in the course of his employment, agency, or representation (from BLM National Management Strategy for OHV Use on Public Lands).

OPEN: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 Code of Federal Regulations 8340.0-5 defines the specific meaning of “open” as it relates to off-highway vehicle use (from H-1601-1, BLM Land Use Planning Handbook).

OUTSTANDING: Standing out among others of its kind; distinguished; excellent.

OUTSTANDING NATURAL AREA (ONA): These are established to preserve scenic values and areas of natural wonder. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas, and public use facilities are normally located on the periphery of the area. The public is encouraged to walk into the area for recreation purposes wherever feasible.

OUTSTANDINGLY REMARKABLE VALUES: Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: “scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values.” Other similar values that may be considered include ecological, biological or botanical, paleontological, hydrological, scientific, or research values (from M-8351, BLM WSR Policy and Program).

P

PALEONTOLOGICAL RESOURCE: Any fossilized remains, traces, or imprints of organisms, preserved in or on the Earth’s crust, that are of paleontological interest and that provide information about the history of life on Earth.

PALEONTOLOGY: The branch of geology that deals with life forms from the past, especially prehistoric life forms, through the study of plant and animal fossils.

PERCHED WATER TABLE: Water table above an impermeable bed underlain by unsaturated rocks of sufficient permeability to allow movement of ground water.

PERENNIAL STREAM: A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

PERMIT: A short-term, revocable authorization to use public lands for specific purposes, Section 302 of the Federal Land Policy and Management Act provides the BLM's authority to issue permits for the use, occupancy, and development of the public lands. Permits are issued for purposes such as commercial or non-commercial filming, advertising displays, commercial or non-commercial croplands, apiaries, harvesting of native or introduced species, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for the processing of these permits are found in 43 Code of Federal Regulations 2920.

PERMITTED USE: The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease, expressed in animal unit months (43 Code of Federal Regulations 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

PERMITTEE: (Livestock Operator) A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.

PETRIFIED WOOD: Fossilization of wood through introduction or replacement by silica (silicified wood) in such a manner that the original form and structure of the wood is preserved.

PHYSIOGRAPHIC REGION: Region of similar geologic structure and climate with a unified history of land formation.

PLACER DEPOSIT: A mass of gravel, sand, or similar material derived from weathering and erosion of bedrock. These masses often contain heavy mineral grains concentrated due to the action of water.

PLAN OF DEVELOPMENT: A mandatory plan, developed by an applicant of a mining operation, rights-of-way, or construction project that specifies the techniques and measures to be used during construction and operation of all project facilities on public land. The plan is submitted for approval to the appropriate Federal agency before any construction begins.

PLAN OF OPERATIONS: A plan for mining exploration and development that an operation must submit to the BLM for approval when more than 5 acres a year will be disturbed or when an operator plans to work in an area of critical environmental concern or a wilderness area. A Plan of Operations must be submitted for any new operation that began after January 20, 2001 and has production, regardless of acreage disturbed. A Plan of Operations must document in detail all actions that the operator plans to take from exploration through reclamation.

PLANNING AREA: All lands within the boundaries of Grand Staircase-Escalante National Monument units and the Kanab-Escalante Planning Area, regardless of jurisdiction.

PLANNING CRITERIA: The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decisionmaking, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions (from H-1601-1, BLM Land Use Planning Handbook).

PRESCRIBED FIRE: Any fire ignited by management action to meet specific objectives. A written, approved prescribed fire plan must exist, and National Environmental Policy Act requirements must be met, prior to ignition (from H-9214-1, BLM Prescribed Fire Management Handbook).

PREY SPECIES: An animal taken by a predator as food.

PRIMITIVE AND UNCONFINED RECREATION: Visitors may have opportunities for primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

PROJECT PLAN: A type of implementation plan (see IMPLEMENTATION PLAN). A project plan typically addresses individual projects or several related projects. Examples of project plans include prescribed burn plans, trail plans, and recreation site plans (from H-1601-1, BLM Land Use Planning Handbook).

PROPERLY FUNCTIONING CONDITION (PFC): (1) An element of the Fundamentals of Rangeland Health for watersheds, and therefore a required element of State or regional standards and guidelines under 43 Code of Federal Regulations 4180.2(b). (2) Condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. For riparian areas, the process of determining function is described in BLM Technical Reference TR 1737-9. (3) Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bed load, and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is influenced by geomorphic features, soil, water, and vegetation. (4) Uplands function properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation. See also FUNCTIONING AT RISK (from H-4180-1, BLM Rangeland Health Standards Manual).

PROPOSED SPECIES: Species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the *Federal Register* (from M-6840, Special Status Species Manual).

PUBLIC LAND: Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos (from H-1601-1, BLM Land Use Planning Handbook).

R

RANGE IMPROVEMENT: An authorized physical modification or treatment designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; and restore, protect, and improve the condition of rangeland

ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 Code of Federal Regulations 4100.0-5) (from H-4180-1, BLM Rangeland Health Standards Manual).

RANGELAND: A kind of land on which the native vegetation, climax, or natural potential consists predominantly of grasses, grass-like plants, forbs, or shrubs. Rangeland includes lands revegetated naturally or artificially to provide a non-crop plant cover that is managed like native vegetation. Rangeland may consist of natural grasslands, savannahs, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows (from H-4180-1, BLM Rangeland Health Standards Manual).

RANGELAND HEALTH STANDARDS: The four standards of physical and biological condition or degree of function required for healthy sustainable rangeland in Utah are the following (from BLM's 1997 *Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah*):

1. Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian/wetland, and aquatic components; soil and plant conditions support water infiltration, soil moisture storage, and release of water that are in balance with climate and landform, and maintain or improve water quality, water quantity, and timing and duration of flow.
2. Ecological processes, including the hydrologic cycle, nutrient cycles, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
3. Water quality complies with State water quality standards and achieves, or is making progress toward achieving, established BLM management objectives such as meeting wildlife needs.
4. Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Federal Candidate, other special status species, native species, and for economically valuable game species and livestock.

RAPTORS: Birds of prey, such as the eagle, falcon, hawk, owl, or vulture.

RECREATION AND PUBLIC PURPOSES (R&PP) ACT: The R&PP Act provided for the lease and sale of public lands determined valuable for public purposes. The objective of the R&PP Act is to meet the needs of State and local government agencies and non-profit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost-benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

RECREATION OPPORTUNITY SPECTRUM: A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. The spectrum covers a range of recreation opportunities from primitive to urban. With respect to river management planning, Recreation Opportunity Spectrum represents one possible method for delineating management units or zones. See BLM Manual Section 8320 for more detailed discussion (from M-8351, BLM WSR Policy and Program).

RECREATIONAL RIVER AREAS: Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have

undergone some impoundment or diversion in the past (from Section 2(b) of the Wild and Scenic Rivers Act).

RELICT PLANT COMMUNITY: A remnant or fragment of the vegetation of an area that remains from a former period when the vegetation was more widely distributed.

RESEARCH NATURAL AREA (RNA): An area where natural processes predominate and that is preserved for research and education. Research Natural Areas must meet the relevance and importance criteria of Areas of Critical Environmental Concern and are designated as Areas of Critical Environmental Concern. A natural area established and maintained for research and education, which may include:

- Typical or unusual plant or animal types, associations, or other biotic phenomena
- Characteristic or outstanding geologic, soil, or aquatic features or processes

The public may be excluded or restricted from such areas to protect studies.

RESOURCE ADVISORY COUNCIL: A council established by the Secretary of the Interior to provide advice or recommendations to BLM management. In some States, provincial advisory councils are functional equivalents of resource advisory councils (from H-1601-1, BLM Land Use Planning Handbook).

RESOURCE MANAGEMENT PLAN (RMP): A BLM planning document, prepared in accordance with Section 202 of the Federal Land Policy and Management Act, which presents systematic guidelines for making resource management decisions. An RMP is based on an analysis of an area's resources, its existing management, and its capability for alternative uses. RMPs are issue oriented and developed by an interdisciplinary team with public participation.

RESOURCE USE LEVEL: The level of use allowed within an area, based on the desired outcomes and land use allocations in the land use plan. Targets or goals for resource use levels are established on an area-wide or broad watershed level in the land use plan. Site-specific resource use levels are normally determined at the implementation level, based on site-specific resource conditions and needs as determined through resource monitoring and assessments (from H-1601-1, BLM Land Use Planning Handbook).

RIGHT-OF-WAY (ROW): The public lands authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

RIPARIAN AREA: A form of wetland transition between permanently saturated wetlands and upland areas. A riparian area is defined as an area of land directly influenced by permanent (surface or subsurface) water. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

RIPARIAN VEGETATION: Plants adapted to moist growing conditions along streams, waterways, ponds, etc.

ROUTE: A path, way, trail, road, or other established travel corridor.

S

SALABLE MINERALS: Common-variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed of by sales or special permits.

SCENIC BACKWAYS: Paved or unpaved routes that have roadsides or corridors of special aesthetic, cultural, or historic value in more remote, less-visited locations. The corridor may contain outstanding scenic vistas, unusual geologic features, or other intrinsic qualities such as cultural, historic, natural, recreational, and archaeological values. Scenic Backways can be designated at either the State level or by the BLM during the land use planning process.

SCENIC BYWAYS: Highway routes that have roadsides or corridors of special aesthetic, cultural, or historic value. The corridor may contain outstanding scenic vistas, unusual geologic features, or other intrinsic qualities such as cultural, historic, natural, recreational, and archaeological values. Scenic Byways can be designated at either the State or the Federal level.

SCENIC QUALITY: The relative worth of a landscape from a visual perception point of view.

SCENIC RIVER AREAS: Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads (from Section 2(b) of the Wild and Scenic Rivers Act).

SCOPING: An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This involves the participation of affected Federal, State, and local agencies, and any affected Indian tribe, the proponent of the action, and other interested persons, unless there is a limited exception under 40 Code of Federal Regulations 1507.3I.

SEASON OF USE: The timing of livestock grazing on a rangeland area.

SECTION 106 COMPLIANCE: The requirement of Section 106 of the National Historic Preservation Act that any project funded, licensed, permitted, or assisted by the Federal government be reviewed for impacts on significant historic properties and that the State Historic Preservation Officer and the Advisory Council on Historic Preservation be allowed to comment on a project.

SECTION 7 CONSULTATION: The requirement of Section 7 of the Endangered Species Act that all Federal agencies consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service if a proposed action may affect a federally listed species or its critical habitat.

SEED COLLECTION: Refers to the collection of vegetative seeds from BLM-administered surface land. There are four options that allow the public to collect vegetative materials such as seed from BLM-administered surface lands. These are: (1) Recreational use, (2) personal use, (3) commercial use, and (4) free use. The forms used and fees assessed depend on which option applies to the situation and the intended use of the seed. Seed collection on BLM-administered surface land is generally administered in accordance with Instruction Memorandum No. 2013-176.

SENSITIVE SPECIES: Those species designated by a State Director, usually in cooperation with the State agency responsible for managing the species and State natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a State, or within a significant portion of its distribution; (2) are under status review by the U.S.

Fish and Wildlife Service and/or National Marine Fisheries Service; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federally listed, proposed, candidate, or State-listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State-listed but may be better conserved through application of BLM sensitive species status (from M-6840, Special Status Species Manual).

SIGNIFICANT: An effect that is analyzed in the context of the proposed action to determine the degree or magnitude of importance of the effect, whether beneficial or adverse. The degree of significance can be related to other actions with individually insignificant but cumulatively significant impacts.

SOLITUDE: Visitors may have outstanding opportunities for solitude, or primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent, where visitors can be isolated, alone or secluded from others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in LUP, Attachment 1).

SPATIAL MANAGEMENT: As used in this document, intensive control of the location and level of surface disturbance that is allowed in a particular area.

SPECIAL RECREATION MANAGEMENT AREA (SRMA): A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities (i.e., activity, experience, and benefit opportunities). The BLM recognizes three distinct types of SRMAs: destination, community, and undeveloped (from H-1601-1, BLM Land Use Planning Handbook).

SPECIAL STATUS SPECIES: Includes proposed species, listed species, and candidate species under the Endangered Species Act; State-listed species; and BLM State director-designated sensitive species (see BLM Manual 6840, Special Status Species Policy) (from H-1601-1, BLM Land Use Planning Handbook).

STANDARD: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., Land Health Standards). To be expressed as a desired outcome (goal) (from H-1601-1, BLM Land Use Planning Handbook).

STATE-LISTED SPECIES: Species listed by a State in a category implying but not limited to potential endangerment or extinction. Listing is either by legislation or regulation (from M-6840, Special Status Species Manual).

STRATIGRAPHY: The branch of geology that treats the formation, composition, sequence, and correlation of stratified rocks as part of the Earth's crust.

STREET LEGAL MOTORCYCLE: Utah law defines this as a motorcycle that has a tail light, headlight, turn signal, and is registered.

STRUTTING GROUND: An area used by sage-grouse in early spring for elaborate, ritualized courtship displays. See also LEK.

SUBSTANTIAL VALUE HABITATS: Any particular habitat that is common or of intermediate importance. Existence areas used regularly by high-interest wildlife but have moderate levels with little or no concentrated use. These areas may also include moderately sensitive habitats of high-interest species with moderate reclamation potential. Wildlife uses may be displaced in response to development. Examples include: extensive summer and/or winter ranges receiving regular use well below carrying capacity having little potential for increase due to other limiting factors; Class 4 streams, lakes, ponds or reservoirs; and areas of moderate habitat quality.

SUPPRESSION: All the work of extinguishing or containing a fire, beginning with its discovery.

SURFACE DISTURBANCE: Suitable habitat is considered disturbed when it is removed and unavailable for immediate sage-grouse use. (A) Long-term removal occurs when habitat is physically removed through activities that replace suitable habitat with long-term occupancy of unsuitable habitat such as a road, powerline, well pad, or active mine. Long-term removal may also result from any activities that cause soil mixing, soil removal, and exposure of the soil to erosive processes. (B) Short-term removal occurs when vegetation is removed in small areas, but restored to suitable habitat within a few (fewer than 5) years of disturbance, such as a successfully reclaimed pipeline, or successfully reclaimed drill hole or pit. (C) Suitable habitat rendered unusable due to numerous anthropogenic disturbances. (D) Anthropogenic surface disturbances are surface disturbances meeting the above definitions that result from human activities.

SURFACE-DISTURBING ACTIVITIES: An action that alters the vegetation, surface/near-surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other public land values. Examples of surface-disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and powerlines; and intensive vegetation treatments (e.g., prescribed fire). Surface-disturbing activities may be either authorized or prohibited.

SURFACE OCCUPANCY: Placement or construction on the land surface (either temporary or permanent) for more than 14 days requiring continual service or maintenance. Casual use is not included.

SUSPENDED: Term used when describing an administrative state of mining operations or oil, gas, and mineral leases, whereby the operation or lease is “suspended” or on standby while an administrative action is contemplated. When mineral leases are suspended, the lessee cannot explore, develop, or otherwise enjoy the benefits of the lease. Also, the term (time period) of the lease is suspended.

T

TAKE: Harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The term applies only to fish and wildlife (from M-6840, Special Status Species Manual).

TAR SAND: A commonly used name to describe a sedimentary rock reservoir impregnated with a very heavy, viscous crude oil that cannot be produced by conventional production techniques. Tar sand implies a sandy sedimentary rock as the host, but this is not always the case, as other porous rocks such as siltstone and fractured carbonates have also been classified as tar sand.

THREATENED SPECIES: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (from M-6840, Special Status Species Manual).

TIMING LIMITATION (SEASONAL RESTRICTION): A fluid minerals leasing constraint that prohibits surface use during specified time periods to protect identified resource values. The constraint does not apply to the operation and maintenance of production facilities unless analysis demonstrates that such constraints are needed and that less stringent, project-specific constraints would be insufficient.

TINAJAS: Surface depressions in rock formations, particularly sandstone, that collect water and provide habitat for specialized plant and animal species.

TOPOGRAPHY: The accurate and detailed description of a place; the arrangement of the natural and artificial physical features of an area.

TOTAL DISSOLVED SOLIDS (TDS): The total quantity (reported in milligrams per liter) of dissolved materials in water.

TOTAL MAXIMUM DAILY LOAD: An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria (from H-1601-1, BLM Land Use Planning Handbook).

TREND IN RANGE CONDITION: An interpretation of the direction of change in range condition. These determinations may relate to ecological site or forage conditions. Also vegetation trend that is improving (upward), not changing (static), and declining (downward).

TWO-WHEEL-DRIVE (2WD): Vehicle clearance generally lower than with a four-wheel drive. Not designed to travel off pavement.

U

UNALLOTTED (GRAZING): An area that is available for livestock grazing under section 3 or section 15 permits but currently does not have a permit.

UNSUITABILITY CRITERIA: Criteria of the Federal coal management program by which lands may be assessed as unsuitable for all or certain stipulated methods of coal mining.

USER DAY: Any calendar day, or portion thereof, for each individual accompanied or serviced by an operator or permittee on the public lands or related waters; synonymous with passenger day or participant day.

UTILITY: A service provided by a public utility, such as electricity, telephone, or water.

V

VALID EXISTING RIGHTS (VER): Any authorization or right established. VER are established by various laws, leases, and filings made with the BLM.

VEGETATION MATERIALS: Refers generally to vegetative materials such as individual plants, wood products, flowers, seeds, etc.

VEGETATION RESTORATION/TREATMENT METHODS: Mechanical, chemical, biological, and fire vegetation treatments used to restore and promote a natural range of native plant associations. Treatments are designed for specific areas and differ according to the area's

suitability and potential. The most common land treatment methods alter the vegetation by spraying with pesticides, burning, or plowing, followed by seeding with native plant species. Intensive vegetation treatments include those that would fall under the definition of surface-disturbing activities (e.g., prescribed fire).

VERTEBRATE SPECIES: Any animal with a backbone or spinal column.

VISITOR DAY: Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

VISITOR USE: Visitor use of a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

VISUAL RESOURCE MANAGEMENT (VRM): The inventory and planning actions taken to identify visual values and to establish objectives for managing those values, and the management actions taken to achieve the visual management objectives.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES: VRM classes define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. There are four classes. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape, as described below:

Class I: The objective for VRM Class I is to preserve the existing character of the landscape. This class provides for natural ecological changes; it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective for VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective for VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Any changes should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class IV: The objective for VRM Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

VISUAL RESOURCES: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

VISUAL SENSITIVITY LEVELS: Measures of public concern (i.e., high, medium, low) for the maintenance of scenic quality.

W

WATER QUALITY: The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

WATERSHED: The fifth level of the hydrologic unit delineation system. A watershed is coded with 10 numerical digits, and watersheds range in size from 40,000 to 250,000 acres (from H-4180-1, BLM Rangeland Health Standards Manual).

WETLANDS: Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

WILD AND SCENIC RIVER (WSR): See NATIONAL WILD AND SCENIC RIVER SYSTEM.

WILD RIVER AREAS: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America (from Section 2(b) of the Wild and Scenic Rivers Act).

WILDERNESS: A congressionally designated area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

WILDERNESS AREA: An area officially designated as wilderness by Congress. Wilderness areas will be managed to preserve wilderness characteristics and shall be devoted to “the public purposes of recreation, scenic, scientific, educational, conservation, and historical use.”

WILDERNESS CHARACTERISTICS: Features of the land associated with the concept of wilderness that specifically deal with naturalness and opportunities for solitude and primitive unconfined recreation.

WILDERNESS STUDY AREA (WSA): Areas that have been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act and Section 2(c) of the Wilderness Act of 1964. These areas are under study for possible inclusion as a Wilderness Area in the National Wilderness Preservation System.

WILDFIRE: Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires (from 2009 Guidance for Implementation of Federal Wildland Fire Management Policy).

WILDLAND FIRE: Any fire, regardless of ignition source, that is burning outside of a prescribed fire and any fire burning on public lands or threatening public land resources, where no fire prescription standards have been prepared (from H-1742-1, BLM Emergency Fire Rehabilitation Handbook).

WILDLAND URBAN INTERFACE (WUI): The line, area, or zone in which structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

WITHDRAWAL: Removal or withholding an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program; or transferring jurisdiction over an area of Federal land, other than “property” governed by the Federal Property and Administrative Services Act, as amended (40 United States Code 472) from one department, bureau, or agency to another department, bureau, or agency (from the Federal Land Policy and Management Act, Title 43 Chapter 35 Subchapter I 1702(j)).

WOODLAND: A forest community occupied primarily by non-commercial species such as juniper, pinon pine, mountain mahogany, or quaking aspen groves; all western juniper forestlands are considered woodlands, because juniper is classified as a non-commercial species.

WOODLAND PRODUCTS: Woodland products generally refers to forest or woodland products that are found on public lands and may be harvested for recreation, personal use, or as a source of income such as harvesting and selling fence posts and poles.

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix D

List of Preparers

August 2018

Appendix D: List of Preparers

Table 1 lists those primarily responsible for preparing the Resource Management Plans/ Environmental Impact Statement.

Table 1 List of Preparers

Name	Project Role
Bureau of Land Management	
Allysia Angus	Project Inspector; Visual Resources
Tyler Ashcroft	State Office Planning
Dana Backer	Planning and National Environmental Policy Act; Science Program
Harry Barber	Management
Allan Bate	Woodland/Forestry
Jabe Beal	Recreation; Wild and Scenic Rivers; Wilderness/Wilderness Study Areas/Outstanding Natural Areas; Transportation/Access; Natural Areas; Lands with Wilderness Characteristics
Britt Betenson	Cultural Resources; Native American Religious Concerns; Tribal Liaison
Matt Betenson	Project Lead, Cooperating Agency Contact Management
Ken Bradshaw	Floodplains & Soils; Water Resources; Water Quality, Climate Change; Greenhouse Gases
Raymond Brinkerhoff	Biological Soil Crusts; Noxious & Invasive Plant Species; Threatened & Endangered or Candidate Plant Species; Riparian
Whit Bunting	Management
Lisa Church	Wildlife
Larry Crutchfield	Public Involvement
Julie Davenport	Areas of Critical Environmental Concern; State Office Planning
Mark Foley	Lands & Access
Allison Ginn	Contracting Officer's Representative; National Conservation Lands
Gina Ginouves	Analysis of the Management Situation Lead
Dan Gunn	Recreation; Wild and Scenic Rivers; Wilderness/Wilderness Study Areas/Outstanding Natural Areas; Transportation/Access; Natural Areas; Lands with Wilderness Characteristics
James Holland, (Alt)	Mineral Resources; Energy Production; Non-renewables
Paul Leatherbury	Geographic Information Systems
Cameron McQuivey	Fish and Wildlife; Threatened, Endangered or Candidate Animal Species
Sean Peterson	Fuels/Fire Management
John Reese	Livestock Grazing; Rangeland Health Standards; Wild Horses and Burros
Sean Stewart	Livestock Grazing; Rangeland Health Standards; Wild Horses and Burros
Julie Suhr-Pierce	Socioeconomics; Environmental Justice
Alan Titus	Geology; Paleontology
Vicki Tyler	Management; Fuels/Fire Management
Erik Vernon	Air Quality
Matt Zwiefel	Cultural Resources

Name	Project Role
ICF	
Lucas Bare	Forestry
Alex Bartlett	Task Manager; Soil Resources; Vegetation
Ed Carr	Air Quality
Chris Dunne	Wild Horses; Livestock Grazing
Laura Klewicki	Water Resources
Lissa Johnson	Geographic Information Systems
John Priecko	Assistant Project Manager
Alan Rabinoff	Minerals/Geology
Kristin Salamack	Task Manager
Katie Segal	Social and Economic
Saadia Byram	Senior Lead Technical Editor
Kenneth Cherry	Senior Technical Editor
Nate Wagoner	Project Director & Management Support
Jenna Wheaton	Project Coordinator
Mikenna Wolff	Lands and Realty; Renewable Energy; Air Quality
Laura Ziemke	Project Manager
Logan Simpson Design	
Holly Ayala	Resource Assistant
Roy Baker	Geographic Information Systems
Chris Bockey	Fire and Fuels; Visual Resources
Jeremy Call	Lands with Wilderness Characteristics; Areas of Critical Environmental Concern; National Trails; Scenic Routes; Wild and Scenic Rivers; Wilderness Study Areas
William M. Graves	Cultural Resources
Kristina Kachur	Recreation; Travel Management
Erik Laurila	Cultural Resources
Kay Nicholson	Fish and Wildlife; Special Status Species
Ian Tackett	Fish and Wildlife; Special Status Species
Michael Terlep	Cultural Resources
Paleo Solutions	
Paul Murphy	Paleontological Resources
Courtney Richards	Paleontological Resources

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix E

**Grand Staircase-Escalante National Monument Objects
and Resource Values**

August 2018

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Appendix E: Grand Staircase-Escalante National Monument Objects and Resource Values

Presidential Proclamation 6920—Establishment of the Grand Staircase-Escalante National Monument

September 18, 1996

By the President of the United States of America

A Proclamation

The Grand Staircase-Escalante National Monument's vast and austere landscape embraces a spectacular array of scientific and historic resources. This high, rugged, and remote region, where bold plateaus and multi-hued cliffs run for distances that defy human perspective, was the last place in the continental United States to be mapped. Even today, this unspoiled natural area remains a frontier, a quality that greatly enhances the monument's value for scientific study. The monument has a long and dignified human history: it is a place where one can see how nature shapes human endeavors in the American West, where distance and aridity have been pitted against our dreams and courage. The monument presents exemplary opportunities for geologists, paleontologists, archeologists, historians, and biologists.

The monument is a geologic treasure of clearly exposed stratigraphy and structures. The sedimentary rock layers are relatively undeformed and unobscured by vegetation, offering a clear view to understanding the processes of the earth's formation. A wide variety of formations, some in brilliant colors, have been exposed by millennia of erosion. The monument contains significant portions of a vast geologic stairway, named the Grand Staircase by pioneering geologist Clarence Dutton, which rises 5,500 feet to the rim of Bryce Canyon in an unbroken sequence of great cliffs and plateaus. The monument includes the rugged canyon country of the upper Paria Canyon system, major components of the White and Vermilion Cliffs and associated benches, and the Kaiparowits Plateau. That Plateau encompasses about 1,600 square miles of sedimentary rock and consists of successive south-to-north ascending plateaus or benches, deeply cut by steep-walled canyons. Naturally burning coal seams have scorched the tops of the Burning Hills brick-red. Another prominent geological feature of the plateau is the East Kaibab Monocline, known as the Cockscomb. The monument also includes the spectacular Circle Cliffs and part of the Waterpocket Fold, the inclusion of which completes the protection of this geologic feature begun with the establishment of Capitol Reef National Monument in 1938 (Proclamation No. 2246, 50 Stat. 1856). The monument holds many arches and natural bridges, including the 130-foot-high Escalante Natural Bridge, with a 100 foot span, and Grosvenor Arch, a rare "double arch." The upper Escalante Canyons, in the northeastern reaches of the monument, are distinctive: in addition to several major arches and natural bridges, vivid geological features are laid bare in narrow, serpentine canyons, where erosion has exposed sandstone and shale deposits in shades of red, maroon, chocolate, tan, gray, and white. Such diverse objects make the monument outstanding for purposes of geologic study.

The monument includes world class paleontological sites. The Circle Cliffs reveal remarkable specimens of petrified wood, such as large unbroken logs exceeding 30 feet in length. The thickness, continuity and broad temporal distribution of the Kaiparowits Plateau's stratigraphy provide significant opportunities to study the paleontology of the late Cretaceous Era. Extremely significant fossils, including marine and brackish water mollusks, turtles, crocodylians, lizards, dinosaurs, fishes, and mammals, have been recovered from the Dakota, Tropic Shale and Wahweap Formations, and the Tibbet Canyon, Smoky Hollow and John Henry members of the Straight Cliffs Formation. Within the monument, these formations have produced the only evidence in our hemisphere of terrestrial vertebrate fauna, including mammals, of the Cenomanian-Santonian ages. This sequence of rocks, including the overlaying Wahweap and Kaiparowits formations, contains one of the best and most continuous records of Late Cretaceous terrestrial life in the world.

Archeological inventories carried out to date show extensive use of places within the monument by ancient Native American culture. The area was a contact point for the Anasazi and Fremont cultures, and the evidence of this mingling provides a significant opportunity for archeological study. The cultural resources discovered so far in the monument are outstanding in their variety of cultural affiliation, type and distribution. Hundreds of recorded sites

include rock art panels, occupation sites, campsites and granaries. Many more undocumented sites that exist within the monument are of significant scientific and historic value worthy of preservation for future study.

The monument is rich in human history. In addition to occupations by the Anasazi and Fremont cultures, the area has been used by modern tribal groups, including the Southern Paiute and Navajo. John Wesley Powell's expedition did initial mapping and scientific field work in the area in 1872. Early Mormon pioneers left many historic objects, including trails, inscriptions, ghost towns such as the Old Paria townsite, rock houses, and cowboy line camps, and built and traversed the renowned Hole-in-the-Rock Trail as part of their epic colonization efforts. Sixty miles of the Trail lie within the monument, as does Dance Hall Rock, used by intrepid Mormon pioneers and now a National Historic Site.

Spanning five life zones from low-lying desert to coniferous forest, with scarce and scattered water sources, the monument is an outstanding biological resource. Remoteness, limited travel corridors and low visitation have all helped to preserve intact the monument's important ecological values. The blending of warm and cold desert floras, along with the high number of endemic species, place this area in the heart of perhaps the richest floristic region in the Intermountain West. It contains an abundance of unique, isolated communities such as hanging gardens, tinajas, and rock crevice, canyon bottom, and dunal pocket communities, which have provided refugia for many ancient plant species for millennia. Geologic uplift with minimal deformation and subsequent downcutting by streams have exposed large expanses of a variety of geologic strata, each with unique physical and chemical characteristics. These strata are the parent material for a spectacular array of unusual and diverse soils that support many different vegetative communities and numerous types of endemic plants and their pollinators. This presents an extraordinary opportunity to study plant speciation and community dynamics independent of climatic variables. The monument contains an extraordinary number of areas of relict vegetation, many of which have existed since the Pleistocene, where natural processes continue unaltered by man. These include relict grasslands, of which No Mans Mesa is an outstanding example, and pinon-juniper communities containing trees up to 1,400 years old. As witnesses to the past, these relict areas establish a baseline against which to measure changes in community dynamics and biogeochemical cycles in areas impacted by human activity. Most of the ecological communities contained in the monument have low resistance to, and slow recovery from, disturbance. Fragile cryptobiotic crusts, themselves of significant biological interest, play a critical role throughout the monument, stabilizing the highly erodible desert soils and providing nutrients to plants. An abundance of pack rat middens provides insight into the vegetation and climate of the past 25,000 years and furnishes context for studies of evolution and climate change. The wildlife of the monument is characterized by a diversity of species. The monument varies greatly in elevation and topography and is in a climatic zone where northern and southern habitat species intermingle. Mountain lion, bear, and desert bighorn sheep roam the monument. Over 200 species of birds, including bald eagles and peregrine falcons, are found within the area. Wildlife, including neotropical birds, concentrate around the Paria and Escalante Rivers and other riparian corridors within the monument.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431) authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

Now, Therefore, I, William J. Clinton, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Grand Staircase-Escalante National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the document entitled "Grand Staircase-Escalante National Monument" attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 1.7 million acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public land laws, other than by exchange that furthers the protective purposes of the monument. Lands and interests in lands not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

The establishment of this monument is subject to valid existing rights.

Nothing in this proclamation shall be deemed to diminish the responsibility and authority of the State of Utah for management of fish and wildlife, including regulation of hunting and fishing, on Federal lands within the monument.

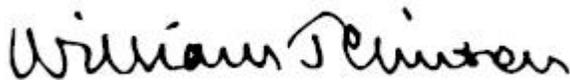
Nothing in this proclamation shall be deemed to affect existing permits or leases for, or levels of, livestock grazing on Federal lands within the monument; existing grazing uses shall continue to be governed by applicable laws and regulations other than this proclamation.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities, to implement the purposes of this proclamation. The Secretary of the Interior shall prepare, within 3 years of this date, a management plan for this monument, and shall promulgate such regulations for its management as he deems appropriate. This proclamation does not reserve water as a matter of Federal law. I direct the Secretary to address in the management plan the extent to which water is necessary for the proper care and management of the objects of this monument and the extent to which further action may be necessary pursuant to Federal or State law to assure the availability of water.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

In Witness Whereof, I have hereunto set my hand this eighteenth day of September, in the year of our Lord nineteen hundred and ninety-six, and of the Independence of the United States of America the two hundred and twenty-first.



WILLIAM J. CLINTON

Presidential Proclamation 9682 of December 4, 2017

Modifying the Grand Staircase-Escalante National Monument

By the President of the United States of America

A Proclamation

In Proclamation 6920 of September 18, 1996, and exercising his authority under the Act of June 8, 1906 (34 Stat. 225) (the “Antiquities Act”), President William J. Clinton established the Grand Staircase-Escalante National Monument in the State of Utah, reserving approximately 1.7 million acres of Federal lands for the care and management of objects of historic and scientific interest identified therein. The monument is managed by the Department of the Interior’s Bureau of Land Management (BLM). This proclamation makes certain modifications to the monument.

Proclamation 6920 identifies a long list of objects of historic or scientific interest within the boundaries of the monument. In the 20 years since the designation, the BLM and academic researchers have studied the monument to better understand the geology, paleontology, archeology, history, and biology of the area.

The Antiquities Act requires that any reservation of land as part of a monument be confined to the smallest area compatible with the proper care and management of the objects of historic or scientific interest to be protected. Determining the appropriate protective area involves examination of a number of factors, including the uniqueness and nature of the objects, the nature of the needed protection, and the protection provided by other laws.

Proclamation 6920 identifies the monument area as rich with paleontological sites and fossils, including marine and brackish water mollusks, turtles, crocodylians, lizards, dinosaurs, fishes, and mammals, as well as terrestrial vertebrate fauna, including mammals, of the Cenomanian-Santonian ages, and one of the most continuous records of Late Cretaceous terrestrial life in the world. Nearly 2 decades of intense study of the monument has provided a better understanding of the areas with the highest concentrations of fossil resources and the best opportunities to discover previously unknown species. While formations like the Wahweap and Kaiparowits occur only in southern Utah and provide an important record of Late Cretaceous fossils, others like the Chinle and Morrison formations occur throughout the Colorado Plateau. The modified monument boundaries take into account this new information and, as described in more detail below, retain the majority of the high-potential areas for locating new fossil resources that have been identified within the area reserved by Proclamation 6920.

Proclamation 6920 also identifies a number of unique geological formations and landscape features within the monument boundaries. These include the Grand Staircase, White Cliffs, Vermilion Cliffs, Kaiparowits Plateau, Upper Paria Canyon System, Upper Escalante Canyons, Burning Hills, Circle Cliffs, East Kaibab Monocline, Grosvenor Arch, and Escalante Natural Bridge, all of which are retained in whole or part within the revised monument boundaries. The Waterpocket Fold, however, is located mostly within the Capitol Reef National Park and the portions within the monument are not unique or particularly scientifically significant. Therefore, the boundaries of the monument may be modified to exclude the Waterpocket Fold without imperiling the proper care and management of that formation. The more general landscape features discussed in the proclamation, such as serpentine canyons, arches, and natural bridges, are common across the Colorado Plateau both within and outside of the modified boundaries of the monument described below.

Archeological and historic objects identified within the monument are more generally discussed in Proclamation 6920, which specifically identifies only the Hole-in-the-Rock Trail, the Paria Townsite, and Dance Hall Rock as objects of historic or scientific interest, all 3 of which will remain within the revised monument boundaries, although a portion of the Hole-in-the-Rock Trail will be excluded. Proclamation 6920 also describes Fremont and Ancestral Puebloan rock art panels, occupation sites, campsites, and granaries, as well as historic objects such as those left behind by Mormon pioneers, including trails, inscriptions, ghost towns, rock houses, and cowboy line camps. These are artifacts that are known to generally occur across the Four Corners region, particularly in southern Utah, and the examples found within the monument are not, as described, of any unique or distinctive scientific or historic significance. In light of the prevalence of similar objects throughout the region, the existing boundaries of the monument are not “the smallest area compatible with the proper care” of these objects, and they may be excluded from the monument’s boundaries. Further, many of these objects or examples of these objects are retained within the modified boundaries described below.

Finally, with respect to the animal and plant species, Proclamation 6920 characterizes the area as one of the richest floristic regions in the Intermountain West, but it identifies only a few specific species as objects of scientific or

historic interest. The revised boundaries contain the majority of habitat types originally protected by Proclamation 6920.

Thus, many of the objects identified by Proclamation 6920 are not unique to the monument, and some of the particular examples of those objects within the monument are not of significant historic or scientific interest. Moreover, many of the objects identified by Proclamation 6920 are not under threat of damage or destruction such that they require a reservation of land to protect them; in fact, many are already subject to Federal protection under existing law and agency management designations. The BLM manages nearly 900,000 acres of lands within the existing monument as Wilderness Study Areas, which the BLM is already required by law to manage so as not to impair the suitability of such areas for future congressional designation as Wilderness.

A host of laws enacted after the Antiquities Act provide specific protection for archaeological, historic, cultural, paleontological, and plant and animal resources and give authority to the BLM to condition permitted activities on Federal lands, whether within or outside a monument. These laws include the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa–470mm, National Historic Preservation Act, 54 U.S.C. 300101 et seq., Bald and Golden Eagle Protection Act, 16 U.S.C. 668–668d, Endangered Species Act of 1973, 16 U.S.C. 1531 et seq., Federal Cave Resources Protection Act of 1988, 16 U.S.C. 4301 et seq., Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 et seq., Migratory Bird Treaty Act, 16 U.S.C. 703–712, Native American Graves Protection and Repatriation Act of 1976, 25 U.S.C. 3001 et seq., and Paleontological Resources Preservation Act, 16 U.S.C. 470aaa–470aaa–11. Of particular note, the Paleontological Resources Preservation Act, enacted in 2009, imposes criminal penalties for unauthorized excavation, removal, damage, alteration, or defacement of paleontological resources. Federal land management agencies can grant permits authorizing excavation or removal, but only when undertaken for the purpose of furthering paleontological knowledge. The Archaeological Resources Protection Act contains very similar provisions protecting archeological resources. And the Migratory Bird Treaty Act and Endangered Species Act protect migratory birds and listed endangered and threatened species and their habitats.

Especially in light of the research conducted since designation, I find that the current boundaries of the Grand Staircase-Escalante National Monument established by Proclamation 6920 are greater than the smallest area compatible with the protection of the objects for which lands were reserved and, therefore, that the boundaries of the monument should be reduced to 3 areas: Grand Staircase, Kaiparowits, and Escalante Canyons. These revisions will ensure that the monument is no larger than necessary for the proper care and management of the objects.

The Grand Staircase area is named for one of the iconic landscapes in the American West. An unbroken sequence of cliffs and plateaus, considered to be the most colorful exposed geologic section in the world, has inspired wonder in visitors since the days of early western explorers.

The White Cliffs that rise more than 1,500 feet from the desert floor are the hardened remains of the largest sand sea that ever existed. The deep red Vermilion Cliffs, once the eastern shore of the ancient Lake Dixie, contain a rich fossil record from the Late Triassic period to the early Jurassic period, including petrified wood, fish, dinosaur, and other reptilian bones. Fossil footprints are also common, including those at the Flag Point tracksite, which includes dinosaur fossil tracks adjacent to a Native American rock art panel depicting dinosaur tracks. This area also contains a number of relict vegetative communities occurring on isolated mesa tops, an example of which, No Mans Mesa, was identified in Proclamation 6920.

The archaeology of the Grand Staircase area is dominated by sites constructed by the Virgin Branch of the Ancestral Puebloans—ancient horticulturalists and farmers who subsisted largely on corn, beans, and squash, and occupied the area from nearly 2000 B.C.E. to about 1250 C.E. The landscape was also the home of some of the earliest corn-related agriculture in the Southwest, and it continues to hold remnants of these early farmsteads and small pueblos. The evidence of this history, including remnants of the beginning of agriculture, development of prehistoric farming systems, and the final abandonment of the area, is concentrated in the lower levels of the Grand Staircase. The higher cliffs, benches, and plateaus hold evidence of occupation by Archaic and Late Prehistoric people, including Clovis and other projectile points and residential pit structures that indicate occupation by hunter-gatherers starting about 13,000 years ago.

The Kaiparowits area is dominated by a dissected mesa that rises thousands of feet above the surrounding terrain. These vast, rugged badlands are characterized by towering cliffs and escarpments that expose tiers of fossil-rich formations.

In addition to striking scenery, the area is world-renowned for rich fossil resources, including 16 species that have been found nowhere else. The plateau is considered one of the best, most continuous records of Late Cretaceous life in the world. It includes fossils of mollusks, reptiles, dinosaurs, fishes, and mammals, as well as the only evidence in

our hemisphere of terrestrial vertebrate fauna from the Cenomanian through Santonian ages. Since 2000, nearly 4,000 new fossil sites have been documented on the plateau. The Dakota, Tropic Shale, Wahweap, and Kaiparowits formations in the area have been found to contain numerous important fossils, including those of early mammals and reptiles (Dakota); marine reptiles, including 5 species of plesiosaur and North America's oldest mosasaur (Tropic Shale); and multiple new species of dinosaurs (Wahweap and Kaiparowits), including the *Diabloceratops eatoni*, a relative of the *Triceratops* named for its devil-like horns, and the *Lythronax argestes*, whose name means "Gore King of the Southwest."

The Kaiparowits area also includes objects of geologic interest, which Proclamation 6920 identified. The rugged canyons and natural arches of the Upper Paria River expose the colorful and varied Carmel and Entrada formations that draw visitors to the area. One of the most famous arches, Grosvenor Arch, is a rare double arch that towers more than 150 feet above the desert floor. The area also contains "hydrothermal-collapse" pipes and dikes that have revealed to researchers a fascinating story of a geologic catastrophe triggered by either a massive earthquake or an asteroid impact.

The western side of the Kaiparowits area includes the majority of the East Kaibab Monocline, which features an erosional "hogback" known as the "Cockscomb," as well as broad exposures of multicolored rocks and intricate canyons. It is considered one of the true scenic and geologic wonders of the area. On the east side of the plateau, the scorched earth of the Burning Hills is a geologic curiosity: a vast underground coal seam that some researchers believe has been burning for eons, sending acrid smoke up through vents in the ground and turning the hillsides brick red. Finally, along the eastern edge of the Kaiparowits Plateau is a series of oddly shaped arches and other rock formations known as the Devil's Garden.

The Kaiparowits area also contains a unique record of human history. The overall archaeology of the Kaiparowits Plateau is dominated by Archaic and Late Prehistoric era sites. There are, however, a few important sites that tell the story of occupation first by the Fremont, who came from an area to the east, and later by Virgin and Kayenta Ancestral Puebloans. These sites show new types of architecture and pottery that mixed traditional Fremont and Ancestral Puebloan styles. Prehistoric cliff structures in parts of the Kaiparowits Plateau are well preserved and provide researchers and visitors an opportunity to better understand the apparently peaceful mixture of 3 cultures starting in the early 1100s. In particular, the Fifty-Mile Mountain area contains hundreds of cultural resource sites, including Ancestral Puebloan habitations, granaries, and masonry structures.

Historical use of the Kaiparowits area plays a very important part in the rich ranching history of southern Utah, which is evidenced by a complex pattern of roads, stock trails, line shacks, attempted farmsteads, and small mining operations. Fifty-Mile Mountain, in particular, contains a number of historic cabins, as well as other evidence of pioneer living, including ruins, rip-gut fences, and historic trails. It is believed that Zane Grey used the Fifty-Mile Mountain area as a landscape reference point when he wrote "Wild Horse Mesa." There are also a number of historic signature panels across the plateau that document continued grazing and ranching use of the landscape by multiple generations of the same families.

To the east of Fifty-Mile Mountain in the Escalante Desert, Dance Hall Rock stands out as an important landmark of Mormon pioneers. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon pioneers camped in this area and held meetings and dances here. Similarly, as described above, the old Paria Townsite is an important ghost town within the Kaiparowits area, as it served as the only town and post office site within the area at the turn of the 20th century.

The Escalante Canyons area likewise contains objects of significance. The canyonlands of the area provide a fantastic display of geologic activities and erosional forces that, over millions of years, created a network of deep, narrow canyons, high plateaus, sheer cliffs, and beautiful sandstone arches and natural bridges, including the 130-foot-tall Escalante Natural Bridge. Additionally, this area boasts Calf Creek Canyon, a canyon of red alcedoed walls with expanses of white slickrock that is named for its use as a natural cattle pen at the end of the 19th century.

To the east of the Canyonlands, Circle Cliffs is a breached anticline with spectacular painted-desert scenery, the result of exposed sedimentary rocks of the Triassic Chinle and Moenkopi formations. The Circle Cliffs area also contains large, unbroken petrified logs up to 30 feet in length. A nearly complete articulated skeleton of *Poposaurus*—a rare bipedal crocodylian fossil—was also found here.

The Escalante Canyons area also contains a high density of Fremont prehistoric sites, including pithouses, villages, storage cists, and rock art. The canyon of the Escalante River and its tributary canyons contain one of the highest densities of rock art sites in southwestern Utah outside of Capitol Reef National Park, with sites dating from the

Archaic to the Historic periods. The Hundred Hands rock art panel is located in the river canyon, and is spiritually significant to all tribes that claim ancestry in the area.

There are also significant historic sites in this area related to grazing and ranching, along with the Boulder Mail Trail, which was used to ferry mail between the small desert outpost towns of Escalante and Boulder beginning in 1902. Today, much of the trail is still visible, and it has become popular with backpackers.

The areas described above are the smallest compatible with the proper care and management of the objects to be protected. The Grand Staircase-Escalante National Monument, as modified by this proclamation, will maintain and protect those objects and preserve the area's cultural, scientific, and historic legacy.

WHEREAS, Proclamation 6920 of September 18, 1996, established the Grand Staircase-Escalante National Monument in the State of Utah and reserved approximately 1.7 million acres of Federal lands for the care and management of the objects of historic and scientific interest identified therein; and

WHEREAS, many of the objects identified by Proclamation 6920 are otherwise protected by Federal law; and

WHEREAS, it is in the public interest to modify the boundary of the monument to exclude from its designation and reservation approximately 861,974 acres of land that I find are no longer necessary for the proper care and management of the objects to be protected within the monument; and

WHEREAS, the boundaries of the monument reservation should therefore be reduced to the smallest area compatible with the protection of the objects of scientific or historic interest, as described above in this proclamation;

NOW, THEREFORE, I, DONALD J. TRUMP, President of the United States of America, by the authority vested in me by section 320301 of title 54, United States Code, hereby proclaim that the boundary of the Grand Staircase-Escalante National Monument is hereby modified and reduced to those lands and interests in lands owned or controlled by the Federal Government within the boundaries described on the accompanying map, which is attached to and forms a part of this proclamation. I hereby further proclaim that the modified monument areas identified on the accompanying map shall be known as the Grand Staircase, Kaiparowits, and Escalante Canyons units of the monument. These reserved Federal lands and interests in lands cumulatively encompass approximately 1,003,863 acres. The boundaries described on the accompanying map are confined to the smallest area compatible with the proper care and management of the objects to be protected. Any lands reserved by Proclamation 6920 not within the boundaries identified on the accompanying map are hereby excluded from the monument. At 9:00 a.m., eastern standard time, on the date that is 60 days after the date of this proclamation, subject to valid existing rights, the provisions of existing withdrawals, and the requirements of applicable law, the public lands excluded from the monument reservation shall be open to:

- (1) entry, location, selection, sale or other disposition under the public land laws;
- (2) disposition under all laws relating to mineral and geothermal leasing;
- and
- (3) location, entry, and patent under the mining laws.

Appropriation of lands under the mining laws before the date and time of restoration is unauthorized. Any such attempted appropriation, including attempted adverse possession under 30 U.S.C. 38, shall vest no rights against the United States. Acts required to establish a location and to initiate a right of possession are governed by State law where not in conflict with Federal law.

Nothing in this proclamation shall be construed to revoke, modify, or affect any withdrawal, reservation, or appropriation, other than the one created by Proclamation 6920.

Nothing in this proclamation shall change the management of the areas designated and reserved by Proclamation 6920 that remain part of the monument in accordance with the terms of this proclamation, except as provided by the following 5 paragraphs:

Paragraph 14 of Proclamation 6920 is updated and clarified to require that the Secretary of the Interior (Secretary) prepare and maintain a management plan for each of the 3 units of the monument with maximum public involvement including, but not limited to, consultation with federally recognized tribes and State and local governments. The Secretary, through the BLM, shall also consult with other Federal land management agencies in the local area in developing the management plans.

Proclamation 6920 is amended to provide that the Secretary shall maintain one or more advisory committees under the Federal Advisory Committee Act (5 U.S.C. App.) to provide information and advice regarding the development of the above-described management plans, and, as appropriate, management of the monument. Any advisory committee maintained shall consist of a fair and balanced representation of interested stakeholders, including State and local governments, tribes, recreational users, local business owners, and private landowners.

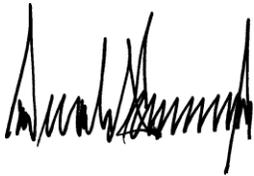
Proclamation 6920 is clarified to provide that, consistent with protection of the objects identified above and other applicable law, the Secretary may allow motorized and non-mechanized vehicle use on roads and trails existing immediately before the issuance of Proclamation 6920 and maintain roads and trails for such use.

Paragraph 12 of Proclamation 6920 governing livestock grazing in the monument is hereby modified to read as follows: "Nothing in this proclamation shall be deemed to affect authorizations for livestock grazing, or administration thereof, on Federal lands within the monument. Livestock grazing within the monument shall continue to be governed by laws and regulations other than this proclamation."

Proclamation 6920 is amended to clarify that, consistent with the care and management of the objects identified above, the Secretary may authorize ecological restoration and active vegetation management activities in the monument.

If any provision of this proclamation, including its application to a particular parcel of land, is held to be invalid, the remainder of this proclamation and its application to other parcels of land shall not be affected thereby.

IN WITNESS WHEREOF, I have hereunto set my hand this fourth day of December, in the year of our Lord two thousand seventeen, and of the Independence of the United States of America the two hundred and forty-second.

A handwritten signature in black ink, appearing to be a stylized name, located below the text of the proclamation.

Grand Staircase-Escalante National Monument

The Antiquities Act of 1906 grants the President authority to designate national monuments to protect “objects of historic or scientific interest.” Since 1906, Presidents and Congress have designated more than 125 national monuments, 27 of which are maintained by the Bureau of Land Management (BLM). Since 1911, the Antiquities Act has also been used at least 18 times by Presidents to reduce the size of 16 national monuments to the smallest area compatible with protection of the objects. Objects identified in the Presidential Proclamation or enabling legislation, “objects of antiquity,” and “objects of historic or scientific interest” may include cultural artifacts or features, historic structures, paleontological or geological features, specific plant or animal species or habitats, and other resources. The BLM has generally interpreted objects as discrete physical items. A national monument may also have less tangible values, such as provision of opportunities for research. The BLM is required to manage monuments for the proper care and management of the objects of historic and scientific interest for which they were designated. While not unlimited, courts have affirmed the BLM’s discretion to determine which items listed in a Presidential Proclamation are the actual objects to be protected. The BLM has not established a process or policy on identification of monument objects; however, under standard agency practice, interdisciplinary teams analyze the Presidential Proclamation and determine the objects, usually as part of a land use planning process or in advance of an analysis under the National Environmental Policy Act.

On September 18, 1996, President William J. Clinton signed Presidential Proclamation 6920 establishing the 1.7 million-acre Grand Staircase-Escalante National Monument (GSENM). On April 26, 2017, President Donald Trump signed Executive Order 13792, which directed the Secretary of the Interior to review certain national monuments designated under the Antiquities Act, including GSENM, to ensure that certain monument designations were made in accordance with the requirements and original objectives of the act and appropriately balance the protection of landmarks, structures, and objects against the use of Federal lands and the effects on surrounding lands and communities.

Following completion of the monument review process, on December 4, 2017, President Trump signed Presidential Proclamation 9682 modifying the boundaries of GSENM to ensure that the monument boundaries were the smallest area compatible with proper care and management of the objects to be protected in accordance with the requirements of the Antiquities Act. The President also identified three separate monument units within GSENM, known as the Grand Staircase, Kaiparowits, and Escalante Canyons Units.

This document contains a summary of the scientific and historic objects within the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM.

Description of Legislative Monument Boundary Modifications

In May 1998, Secretary of the Interior Babbitt and Utah Governor Leavitt negotiated a land exchange to transfer all School and Institutional Trust Lands Administration lands within the original GSENM to the Federal government, as well as the trust lands in the National Forests, National Parks, and Indian Reservations in Utah. On October 31, 1998, President Clinton signed the Utah Schools and Lands Exchange Act (Public Law 105-335), which legislated this exchange. The Utah Schools and Lands Exchange Act resulted in the addition of 176,699 acres

of School and Institutional Trust Lands Administration lands and 24,000 acres of mineral interest to GSENM.

On October 31, 1998, President Clinton also signed Public Law 105-355. Section 201 of this law adjusted the boundary of GSENM by including certain lands (a 1-mile-wide strip north of Church Wells and Big Water) and excluding certain other lands around the communities of Henrieville, Cannonville, Tropic, and Boulder. This law resulted in the addition of approximately 5,546 acres to GSENM.

In 2009, Public Law 111-11, Section 2604 codified a boundary change and purchase for Turnabout Ranch, removing approximately 25 acres from GSENM.

On December 4, 2017, Presidential Proclamation 9682 modified GSENM, dividing it into three units and resulting in the exclusion of 861,974 acres from the boundaries. The modified monument encompasses approximately 1,003,863 acres. The Grand Staircase, Kaiparowits, and Escalante Canyons Units are reserved for the care and management of the objects of historic and scientific interest.

BLM Policies for National Monuments

The BLM's monuments are managed as part of the National Landscape Conservation System, whose mission is to conserve, protect, and restore nationally significant landscapes recognized by the President or Congress for their outstanding ecological, cultural, or scientific resources and values.

According to BLM policy (Manual 6220) and Federal court precedent, the Federal Land Policy and Management Act mandates the BLM to manage public lands for multiple use, and sustained yield includes managing specially designated public lands for the purposes for which they were designated.

The BLM's objective in managing a national monument is to:

- A. Comply with the Presidential Proclamations by conserving, protecting, and restoring the objects and values for which the monument was designated for the benefit of present and future generations.
- B. Effectively manage valid existing rights and compatible uses within a monument.
- C. Manage discretionary uses within a monument to ensure the protection of the objects and values for which the monument was designated.
- D. Utilize science, local knowledge, partnerships, and volunteers to effectively manage a monument.
- E. Provide appropriate recreational opportunities, education, interpretation, and visitor services to enhance the public's understanding and enjoyment of a monument.

The BLM is also required to inventory and monitor the objects and values for which a monument was designated. Identification of the location and extent of such objects and values is critically important, as the BLM must ensure the compatibility of any uses within a monument with protection of objects and values.

Objects and Values

A summary of identified objects within the Grand Staircase, Kaiparowits, and Escalante Canyons Units of GSENM are provided below.

Grand Staircase Unit

The Grand Staircase Unit is named for one of the iconic landscapes in the American West. An unbroken sequence of cliffs and plateaus, considered to be the most colorful exposed geologic section in the world, has inspired wonder in visitors since the days of early western explorers.

Archaeological, Historic, and Cultural Resources

Archaeological resources within Grand Staircase Unit encompass both prehistoric and historic sites. Prehistoric sites range in age from the Archaic period to the Late Prehistoric, but are dominated by sites associated with the Virgin Branch of Ancestral Puebloans. Among the variety of sites are abundant rock art panels, occupation sites, ceremonial sites, and countless other sites and artifacts. Historic sites include inscriptions, trails, townsites, and cowboy line shacks.

Objects

General objects

- Small pueblos
- Clovis and other projectile points
- Residential pit structures
- Historic trails and roads
- Cowboy line shacks
- Early farmsteads
- Rock houses
- Abandoned townsites

Specific cultural, archaeological, and historic objects

- Sites constructed by the Virgin Branch of the Ancestral Puebloans
- Native American rock art panel depicting dinosaur tracks
- Old Paria townsite and movie set

Geological Features and Landscapes

The geological features of Grand Staircase Unit are vast and austere, and include scenic panoramic views and the colorful “Grand Staircase,” the high, rugged, and remote region where bold plateaus and multi-hued cliffs run for distances that defy human perspective.

Objects

Specific objects

- White Cliffs – high white or yellow cliffs of Navajo Sandstone, varying in height from 600 feet at Deer Springs Point bench to 1,200 feet at Deer Springs Point and the Sheep Creek-Bull Valley Gorge-Paria River confluence. Also a component of the famous ascending staircase, cliff, and terrace physiography.
 - The Vermilion, White, and Pink Cliffs, which contain Triassic, Jurassic, and Cretaceous formations
 - Numerous unnamed arches and natural bridges
 - Upper Paria Watershed
 - Developed and undeveloped springs
 - Starlight Arch
 - Petrified wood deposits
 - Kaiparowits Plateau (portions that extend onto the Grand Staircase Unit)
 - Mollie's Nipple (erosional remnant)
-

Paleontological Resources

Many trace and skeletal fossils are found in the early Mesozoic formations of the area that record the early breakup of the supercontinent Pangea and the rise of the dinosaurs.

Objects

Specific objects

- Flag Point dinosaur tracks
 - Late Triassic to Early Jurassic petrified wood, fish, dinosaur, and other reptilian bones and trackways preserved in the Moenave, Kayenta, and Navajo formations
 - Triassic vertebrate fossils in the Chinle Formation
-

Biological and Ecological Resources and Processes

The Grand Staircase Unit is home to two major riparian areas, the Paria River and Johnson's Creek. It is also home of the famous Paunsaugunt deer herd. The unit contains numerous relict and fragile plant communities and hosts threatened, endangered, and sensitive species.

Objects

General objects

- Diversity of unique vegetation communities
- Unique relict plant community of pinyon-juniper and sagebrush-grass vegetation assemblages
- High concentration of isolated communities: hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
- Cryptobiotic soil crusts
- High abundance of packrat middens

Specific objects

- Contains sensitive and endemic plants
- Special status species and habitat including peregrine falcon (threatened) and bald eagles
- Paria River
 - Paria River riparian corridor and associated biotic resources including neo-tropical birds
 - Mexican spotted owl protected activity center
 - Designated critical habitat for the southwestern willow flycatcher (endangered)
- Johnson's Creek
 - Riparian corridor with elevational gradient connecting desert lowlands to the high country
- Upper Paria Watershed
 - No Man's Mesa and Little No Man's Mesa

Kaiparowits Unit

The Kaiparowits Unit is dominated by a dissected mesa that rises thousands of feet above the surrounding terrain. These vast, rugged badlands are characterized by towering cliffs and escarpments that expose tiers of fossil-rich formations. In addition to striking scenery, the area is world-renowned for rich fossil resources, including at least 16 species of dinosaurs that have been found nowhere else. The Kaiparowits Plateau is considered to hold one of the best, most continuous records of Late Cretaceous terrestrial life in the world.

Archaeological, Historic, and Cultural Resources

Archaeological resources within the Kaiparowits Unit encompass a wide range of sites, prehistoric and historic structures, rock art panels, ancient cliff dwellings, ceremonial sites, and countless other sites and artifacts. The overall archaeology of the Kaiparowits Unit is dominated by Archaic and Late Prehistoric era sites. The area was first occupied by the Fremont, followed by the Virgin and Kayenta Ancestral Puebloans. Hundreds of documented sites and over 8,000 years of prehistory are represented.

Objects

General objects

- Archaic era sites
- Late Prehistoric era sites
- Prehistoric cliff structures
- Cultural resource sites
- Ancestral Puebloan habitations
- Granaries
- Masonry structures
- Historic roads
- Stock trails
- Cowboy line shacks
- Attempted farmsteads
- Small mining operations
- Historic cabins
- Ruins
- Rip-gut fences
- Historic trails
- Historical signature panels

Specific cultural, archaeological, and historic objects

- Old Paria townsite and movie set
- Dance Hall Rock
- Fiftymile Mountain archaeological district area, containing Ancestral Puebloan habitations, granaries, and masonry structures as well as a number of historic cabins, ruins, rip-gut fences, and historic trails

Geological Features and Landscapes

The geological features of Kaiparowits Units are unique and widespread throughout the Kaiparowits Plateau, including the East Kaibab Monocline in addition to hoodoos, natural arches, and other sandstone formations.

Objects

General objects

- Gray Cliffs
- Kaiparowits Badlands (The Blues)
- Straight Cliffs escarpment
- Rugged canyons, arches, and natural bridges
- “Hydrothermal-collapse” pipes and dikes that reveal a geologic catastrophe triggered by either a massive earthquake or an asteroid impact
- Upper Paria River – Carmel and Entrada formations
- Twenty-four undeveloped springs and six developed springs

Specific objects

- Sam Pollock Arch, Window Wind Arch, and other arches and natural bridges
- Hackberry Canyon – petrified wood deposits, perennial water, geological features, and stunning scenery
- Dry Valley Creek Canyon – a waterfall blocks the entrance to Dry Valley Creek Canyon; consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches.
- The Cockscomb (erosional hogback) forms two parallel knife-edged ridges with a bisected V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge.
- Grosvenor Arch – a double arch towering over 150 feet
- Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, hogbacks, and a spectacular 42-mile-long Straight Cliffs wall, topping a 1,000-foot-high cliff line of the Summerville, Morrison, and Dakota formations.
- Devils Garden – oddly shaped arches and rock formations
- Right Hand Collet Canyon – ancient coal fires have left surface remains in the form of clinkers and deep red ash.
- Window Wind Arch – scenic value because of its location on the very edge of the Straight Cliffs
- Burning Hills -naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red. The red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires.
- Henrieville Creek Fold
- High scenic quality and intense coloration of Paria River Valley, Pilot Canyon, Starlight Canyon, Kirbys Point, upper Paradise Canyon, and Eight Mile Pass
- High scenic value includes the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.
- Sand-calcite crystals from the Morrison Formation

Paleontological Resources

The Kaiparowits Unit contains the richest fossil deposits in the entire region. It includes fossils of plants (including petrified wood), mollusks and other invertebrates, trace fossils, fishes, diverse reptiles, dinosaurs, and mammals, as well as some of the only evidence in our hemisphere of terrestrial vertebrate life from the Cenomanian through Santonian ages. The Kaiparowits Unit is of interest in understanding the evolution of dinosaurs, mammals and other terrestrial vertebrates. It contains unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document

changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time. The fossil resources of the region are of global significance to researchers.

Objects

- Gray Cliffs – a sequence of rocks that may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world
 - Extremely significant fossils including marine and brackish water mollusks, turtles, crocodilians, lizards, dinosaurs, fishes, and mammals have been recovered from the Naturita (formerly Dakota) formation, Tropic Shale, Straight Cliffs Formation, Wahweap Formation, and Kaiparowits Formation.
 - Naturita Formation contains rare early fossil turtles, crocodiles, mammals and other reptiles, and mammals.
 - Tropic Shale contains marine reptiles, including five species of plesiosaur and North America's oldest mosasaur.
 - Straight Cliffs Formation contains rare mammal and reptile (including dinosaur) fossils.
 - Wahweap and Kaiparowits formations contain dozens of new and unique fossil species of dinosaurs, turtles, mammals, fish, lizards, and crocodilians, many of which are found in exceptionally preserved states that include soft tissue.
-

Biological and Ecological Resources and Processes

The elevation gradient and juxtaposition of different ecosystems and substrates supports a broad diversity of plants, animals, communities, and ecosystems. The unit contains the largest number of Mexican spotted owl protected activity centers and stands of ponderosa pines. There are several threatened, endangered, or sensitive species.

Objects

General objects

- Intact ecological values
- Diversity of unique vegetation communities
- Isolated relict vegetation communities
- Elevational gradients
- Hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
- Cryptobiotic soil crusts

Specific objects

- Several Mexican spotted owl protected activity centers
 - Kodachrome bladderpod (endangered) and Ute ladies tresses (threatened)
 - Large number of sensitive and endemic plant species
 - Peregrine falcon (endangered) and special status animal species
 - Fourmile Bench Old Tree Area – a unique area of extremely old (1,400 years) pinyon and juniper trees
 - Cockscomb hogback including high diversity of both general and endemic flora
 - Dry Valley – relict plant community in the upper part
 - Fiftymile Mountain – special status species and aspen groves
 - Wahweap – special status species
 - Mud Spring – relict plant communities, ponderosa pine stands, and special status species
 - Burning Hills – high density of nesting raptors
 - Upper Paria River – riparian corridor and associated biotic resources, including neo-tropical birds
 - Carcass Canyon – exceptional raptor habitat
-

Escalante Canyons Unit

The Escalante Canyons Unit contains a variety of objects of significance. The canyonlands of the area provide a fantastic display of geologic activities and erosional forces that, over millions of years, created a network of deep, narrow canyons, high plateaus, sheer cliffs, and beautiful sandstone arches and natural bridges. The unit contains a high density of Fremont prehistoric sites, including pithouses, villages, storage cists, and rock art panels. The unit also contains the largest amount of perennial water of the three units, providing for a wider diversity of plant and animal life.

Archaeological, Historic, and Cultural Resources

Archaeological resources within the Escalante Canyon Unit include numerous sites and several historic features. This unit contains artifacts from pioneer Mormon exploration, early homesteading, and use by the Virgin and Kayenta Ancestral Puebloans and Fremont cultures, as well as a Paleoarchaic and Late Prehistoric presence.

Objects

General objects

- Pithouses
- Villages
- Storage cists
- Rock art
- Archaic period sites
- Historic sites

Specific objects

- Hundred Hands Rock Art Panel
 - Boulder Mail Trail
 - Escalante-Boulder telephone line
 - Old Boulder Road
 - Escalante River Canyon rock art sites
 - North Escalante Canyons known and recorded cultural sites
 - Phillips-Death Hollow known and recorded cultural sites
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Geological Features and Landscapes

The geological features of the Escalante Canyons Unit are vast and rugged, including sheer cliffs, benches, entrenched canyons with perennial water, waterfalls, and significantly colorful features. These features are of outstanding scenic quality and attract large volumes of visitors.

Objects

General objects

- White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.
- Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone.
- Other deep narrow canyons, high plateaus, sheer cliffs, sandstone arches, and natural bridges

Specific objects

- Escalante Natural Bridge
- Lamanite Natural Bridge – actually a large arch with good symmetry and form
- Calf Creek Canyon is characterized by red alcoved walls, two waterfalls, and extensive expanses of white slickrock.
- Lower Calf Creek Falls drop 126 feet and Upper Calf Creek Falls drop 86 feet.
- Upper Gulch-Circle Cliffs – contains large, unbroken logs of petrified wood
 - Four Outstanding Natural Areas designated to preserve “unique scenic values and natural wonders”:
 - North Escalante Canyon (5,800 acres)
 - The Gulch (3,430)
 - Escalante Canyons (480 acres)
 - Phipps-Death Hollow (34,288 acres)
- Iron concretions known as Moqui Marbles in the Spencer Flat area
- Outstanding scenic value and geologically complex nature of North Escalante Canyons, and Harris Wash
- Deer Creek, Steep Creek, and The Gulch have perennial flows of clear, cold water.
- North Escalante Canyon and The Gulch Instant Study Area contain a unique canyon and bench system and have outstanding scenery.
- Escalante River Canyon – an area of diverse geology represented by spectacular deep canyons. The canyon walls are rough and broken and the canyon is narrow and meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. The extensive upper basin through which Mamie Creek flows is an extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.
- Escalante River and its tributary canyons contain one of the highest densities of rock art sites.
- The Gulch – deeply entrenched, very sheer, red, straight-line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.
- Circle Cliffs –inward-facing walls of sandstone that rim an oval depression; a breached anticline with spectacular painted desert scenery. It also contains large, unbroken petrified logs.

Paleontological Resources

The Circle Cliffs area contains large exposures of the highly fossiliferous Chinle Formation, which contains an important Late Triassic Age terrestrial fossil record that includes plants, invertebrates, reptiles, and tracks.

Objects

General objects

- Terrestrial fossils in the Chinle Formation

Specific objects

- Pposaurus specimen from north of the Wolverine Trailhead area.

Biological and Ecological Resources and Processes

The Escalante Canyons Unit encompasses a large portion of the Escalante River watershed and supports native fish; threatened, endangered, and sensitive plant and animal species; and gallery cottonwood riparian corridors. The unit has premier visitor destinations, which have the potential to affect some of the biological and ecological resources and processes.

Objects

General objects

- Intact ecological values
- Diversity of unique and endemic vegetation communities
- Isolated relict vegetation communities
- Elevational gradients
- Hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket, and rock crevice communities
- Cryptobiotic soil crusts

Specific objects

- Perennial streams enter entrenched canyons in white Navajo and deep-red Wingate Sandstone.
 - Deer Creek, Steep Creek, and The Gulch have perennial flows of clear, cold water.
 - Contains many different geologic substrates (and, therefore, soils with different physical and chemical attributes) in a small area. The majority of endemic species in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemic species.
 - Jones cycladenia (threatened) and Ute ladies'-tresses (threatened)
-

Abbreviations-Acronyms

Term	Definition
BLM	Bureau of Land Management
GSENM	Grand Staircase-Escalante National Monument

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix F

Laws, Regulations, Policies, and Guidance

August 2018

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Appendix F: Laws, Regulations, Policies, and Guidance

Introduction

The foundations of public land management are in the mandates and authorities provided in laws, regulations, and executive orders. These statements of policy direct the Bureau of Management (BLM) concerning management of public lands and resources. The United States Congress has acknowledged that the appropriate use of these resources requires proper planning. The sections below identify Federal, State, and local laws, regulations, and policies that apply to all resources and resource uses considered in the BLM land use planning process as well as those that apply to specific resources and resource uses.

Federal, State, and Local Laws, Regulations, and Policies that Apply to All Resources and Resource Uses

Federal Laws, Regulations, Statutes, and Orders

The BLM planning process (as described at 43 Code of Federal Regulations [CFR] 1600) is authorized and mandated through two fundamental laws, the Federal Land Policy and Management Act of 1976 (FLPMA) and the National Environmental Policy Act of 1969 (NEPA).

Federal Land Policy and Management Act of 1976

FLPMA states that the BLM “shall, with public involvement...develop, maintain, and when appropriate, revise land use plans” (43 United States Code [U.S.C.] 35 1712(a)). In addition to Federal direction for planning, FLPMA declares the policy of the United States concerning the management of federally owned BLM-administered surface lands. Key to this management policy is the direction that the BLM “shall manage the public lands under principles of multiple use and sustained yield, in accordance with the [developed] land use plans” (43 U.S.C. 35 1732(a)). The commitment to multiple use will not mean that all land will be open for all uses. Some uses could be excluded on some lands to protect specific resource values or uses, as directed by FLPMA (43 U.S.C. 35 1712(c)(3)). Any such exclusion, however, will be based on laws or regulations or be determined through a planning process subject to public involvement. In writing and revising Land Use Plans, FLPMA also directs the BLM to coordinate land use activities with the planning and management of other Federal departments and agencies, State and local governments, and Native American tribes. This coordination, however, is limited “to the extent [the planning and management of other organizations remains] consistent with the laws governing the administration of the public lands” (43 U.S.C. 35 1712(c)(9)).

National Environmental Policy Act of 1969

In NEPA, Congress directs “all agencies of the Federal Government...[to]...utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man’s environment” (42 U.S.C. 55 4332 (2A)). Because the development of a new Resource Management Plan (RMP) could cause impacts on the environment, NEPA regulations require the analysis and disclosure of potential environmental impacts in the form

of an environmental impact statement (EIS). The EIS will examine a range of alternatives, including a No Action Alternative, to resolve the issues in question. Alternatives should represent complete, but alternative means of satisfying the identified purpose and need of the EIS and of resolving the issues. These RMPs/EIS are being prepared using the best available existing information and in consideration of required NEPA time frames in accordance with Secretarial Order 3355 and subsequent implementing guidance.

Other

Other laws, regulations, policies, and orders that support the BLM planning process include:

- Presidential Proclamation 6920 (1996)—Original Presidential Proclamation establishing Grand Staircase-Escalante National Monument and identifying monument objects
- Presidential Proclamation 9682 (2017)—Presidential Proclamation adjusting the boundaries of Grand Staircase-Escalante National Monument, including the identification of three monument units
- 23 CFR 460—Public Road Mileage for Apportionment of Highway Safety Funds
- 43 CFR 1000–9999 contains the Federal regulations for the BLM
- 40 CFR 1500–1508 contains Council on Environmental Quality NEPA regulations
- U.S. Department of the Interior (DOI) Departmental Manual Part 516, Chapter 11, contains NEPA guidance for the BLM
- BLM Handbook H-1790-1 provides NEPA guidance
- BLM Handbook H-1601-1 contains land use planning guidance
- Executive Order 13807 “Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects”
- Secretarial Order 3355 - Streamlining National Environmental Policy Act Reviews and Implementation of Executive Order 13807 “Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects”
- Deputy Secretary Memorandum – Additional Direction for Implementing Secretarial Order 3355
- *Zion National Park General Management Plan (2001)*
- *Bryce Canyon National Park Fire Management Plan and Environmental Assessment/Assessment of Effects (2004)*

State Laws, Regulations, and Policies

- Utah Code Sections 63j-4-401 establish State planning policies in relation to management of Federal land
- *Scenic Byway 12 Corridor Management Plan (2001)*
- *State Comprehensive Outdoor Recreation Plan (2003)*
- *Utah Comprehensive Wildlife Conservation Strategy (2005)*
- *Coral Pink Sand Dunes State Park General Management Plan (2005)*
- *Utah’s Water Resources: Planning for the Future*, Utah Division of Water Resources (2001)

Memoranda

- Master Memorandum of Understanding (MOU) with the United States Fish and Wildlife Service (USFWS), December 1986

- State Protocol Agreement Between the Utah State Director of the BLM and the Utah State Historic Preservation Office (SHPO) and the Programmatic Agreement Among the BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs
- Interagency MOU between the DOI-BLM and the United States Department of Agriculture (USDA) in 1995 (60F26045-48)
- Supplement No. 1 to an MOU between the Utah State Offices of the National Park Service (NPS) and the BLM dated September 26, 1973

Local Laws, Regulations, and Policies

- *Garfield County RMP (2017)*
- *Garfield County Comprehensive Plan 2030 (Adopted November 2010, last amended November 2013)*
- *Garfield County General Management Plan (August 2017)*
- *Garfield County Economic Development Plan (2007)*
- *Kane County RMP (2017)*
- *Kane County 2040 Plan (adopted May 2012)*
- *Kane County 2030 Land RMP (March 2011)*
- *Kane County General Plan (2013) and General Plan Amendment (2017)*
- *St. George Field Office RMP*

Federal, State, and Local Laws, Regulations, and Policies that Apply to Specific Resources and Resource Uses

Air Resources

The BLM does not have direct authority to regulate air resources in the Planning Area. The U.S. Congress designated the Environmental Protection Agency (EPA) as the regulatory entity for air resources under a framework of environmental laws. EPA may also delegate regulatory authority to States, tribes, and local agencies. As a Federal agency, the BLM is required to work cooperatively with EPA and the delegated State agency in planning resource development to ensure that applicable air quality standards and regulations are met on public lands.

Federal Laws, Regulations, Statutes, and Orders

- The Clean Air Act, as amended (1990), 42 U.S.C. 7418, requires Federal agencies to comply with all Federal, State, and local requirements regarding the control and abatement of air pollution. This includes abiding by the requirements of State Implementation Plans. The following sections of the act apply to this planning process:
 - Applicable National Ambient Air Quality Standards (Section 109)
 - State Implementation Plans (Section 110)
 - Control of Pollution from Federal Facilities (Section 118)
 - Prevention of Significant Deterioration (PSD), including visibility impacts on mandatory Federal Class I Areas (Section 160 et. seq.)
 - Conformity Analyses and Determinations (Section 176(c))
- Executive Order 12088, Federal Compliance with Pollution Control Standards
- National Emission Standards for Hazardous Air Pollutants (40 CFR 61)
- Regional Haze Rule (40 CFR 51)
- Regional Haze Regulation (64 *Federal Register* 35714, July 1, 1999)

Policies

- DOI Departmental Manual (910 DM 1.3)

State Laws and Regulations

- Utah Code, Title 19, Chapter 2, Air Conservation Act
- Utah Air Conservation Rule R307-406 (Visibility)
- Utah Air Conservation Rule R307-401-6 (Conditions for Ordering and Approval Order)
- Utah Air Conservation Rule R307-405-4 (PSD Increments and Ceilings)
- Utah Air Conservation Rule R307-405-6 (PSD Areas–New Sources and Modifications)
- Utah Air Conservation Rule R307-410-3 (Modeling of Criteria Pollutants in Attainment Areas)
- Utah Air Conservation Rule R307-410-4 (Documentation of Ambient Air Impacts for Hazardous Air Pollutants)
- Utah Air Conservation Rule R307-205-3 (Emission Standards for Fugitive Dust)
- Utah Air Conservation Rule R307-205-4 (Emission Standards for Roads)

Cultural and Heritage Resources

Federal Laws, Regulations, Statutes, and Orders

- The Antiquities Act of 1906, 16 U.S.C. 431–433, provides guidance for protecting cultural resources on Federal lands and authorizes the President to designate national monuments on Federal lands.
- The Historic Sites Act of 1935, 16 U.S.C. 461–467, established a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.
- The National Historic Preservation Act of 1966, as amended, 54 U.S.C. 306108, directs agencies to consider the effects of proposed actions on properties eligible for or included on the National Register of Historic Places (NRHP). An “historic property” is any district, building, structure, site, or object that is eligible for listing on the NRHP because the property is significant at the national, State, or local level in American history, in its architecture, archaeology, engineering, or culture (36 CFR 60.4). In some cases, such properties can be eligible because of historical importance to Native Americans, including traditional religious and cultural importance. National Historic Preservation Act Section 110 (54 U.S.C. 306102) requires each Federal agency to establish an affirmative program to identify, evaluate, protect, and preserve historic properties in consultation with others.
- NEPA establishes national policy for protection and enhancement of the human environment. Part of the function of the Federal Government, as stated in the act, is to “preserve important ... cultural ... aspects of our national heritage and maintain whenever possible an environment which supports diversity and variety of individual choice” (42 U.S.C. 4331(b)4).
- FLPMA requires coordination with Indian tribes, and with other Federal agencies and State and local governments, in the preparation and maintenance of an inventory of the public lands and their various resource and other values as well as in the development and maintenance of long-range plans providing for use management of the public lands.
- The American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996, establishes a national policy to protect and preserve the right of American Indians to exercise traditional

Indian religious beliefs or practices including, but not limited to, access to religious sites. Agencies are to avoid unnecessary interference with traditional tribal spiritual practices. In addition, compliance requires consultation with tribes when land uses might conflict with Indian religious beliefs or practices.

- The Archaeological Resources Protection Act of 1979, 16 U.S.C. 470, as amended, defines and provides for the protection of archaeological resources on Federal lands, irrespective of their eligibility for listing on the NRHP, establishes a permit system for resources more than 100 years old, and requires agencies to provide for public education and continuing inventory of Federal lands.
- The Native American Graves Protection and Repatriation Act of 1990, 25 U.S.C. 3001, establishes rights to Indian tribes and Native Hawaiians to claim ownership for the repatriation of human remains, and also funerary, sacred, and other objects, controlled by Federal agencies and museums. Agency discoveries of such human remains and associated cultural items during land use activities require consultation with appropriate tribes to determine ownership and disposition.
- Executive Order 11593 (Protection and enhancement of the cultural environment; 36 *Federal Register* 8921, May 15, 1971) directs Federal agencies to inventory public lands and to nominate eligible properties to the NRHP.
- Executive Order 13007 (Indian Sacred Sites; 61 *Federal Register* 26771, May 29, 1996) does not explicitly create any new right for Indian tribes, but does require Federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners; avoid adversely affecting the physical integrity of such sacred sites; and maintain the confidentiality of sacred sites.
- Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments; 65 *Federal Register* 67249, November 9, 2000) provides, in part, that each Federal agency shall establish regular and meaningful consultation and collaboration with Indian tribal governments in the development of regulatory practices on Federal matters that significantly or uniquely affect their communities.
- Executive Order 13287 (Preserve America; 68 *Federal Register* 10635, March 5, 2003) directs Federal agencies to provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of historic properties managed by the Federal Government; by promoting intergovernmental cooperation and partnerships for the preservation and use of historic properties; and by establishing agency accountability for inventory and stewardship.
- Secretarial Order 3206 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act) requires DOI agencies to consult with Indian Tribes when agency actions to protect a listed species, as a result of compliance with the Endangered Species Act (ESA), affect or could affect Indian lands, tribal trust resources, or the exercise of American Indian tribal rights.
- The Tribal Forest Protection Act of 2004 (Public Law 108-278) provides a tool for tribes to propose work and enter into contracts and agreement with the United States Forest Service (USFS) or the BLM to reduce threats from catastrophic events that originate on Federal lands adjacent to Indian trust land and Indian communities.
- 36 CFR 60 and 63 discuss the NRHP and eligibility criteria for listing properties.

- 36 CFR 68 describes the Secretary of the Interior's standards for the treatment of historic properties.
- 36 CFR 800 outlines the National Historic Preservation Act Section 106 (54 U.S.C. 306108) process for protecting historic properties.
- 43 CFR 3 discusses the preservation of American antiquities under the Antiquities Act of 1906.
- 43 CFR 7 implements the preservation of archaeological resources under the Archaeological Resources Protection Act of 1979.
- 43 CFR 10 discusses requirements for implementing the Native American Graves Protection and Repatriation Act.

Policies

- BLM Manual 8100 Series: Cultural Resources Management provides basic information and general summary guidance for the BLM cultural resource management program. The series includes 8110 (Identifying Cultural Resources); 8120 (Tribal Consultation under Cultural Resource Authorities); 8130 (Planning for Uses of Cultural Resources); and 8140 (Protecting Cultural Resources).
- BLM Handbook H-8120-1 (Guidelines for Conducting Tribal Consultation)The 1997 rangeland programmatic Memorandum of Agreement (MOA) among the BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs

Local Laws, Regulations, and Policies

- Garfield County Cultural Resource Protection Ordinance 2013-1
- Resolution 2013-2 Recognizing the Cultural/Historic Value of Grazing and Placing the Escalante Historic/Cultural Grazing Region on the County Register of Cultural and Historic Resources

Fish, Wildlife, and Special Status Species

Federal Laws, Regulations, Statutes, and Orders

- Sikes Act of 1974, Title II (16 U.S.C. 670g et seq.), as amended: This act directs the Secretaries of Interior and Agriculture, in cooperation with the State agencies, to develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish, and game species. Such conservation and rehabilitation programs shall include, but are not limited to, specific habitat improvement projects and related activities, and adequate protection for species considered threatened or endangered.
- The Migratory Bird Conservation Act of 1929, as amended (16 U.S.C. 715 et seq.): This act establishes Federal responsibility to protect international migratory birds and authorizes the Secretary of the Interior, through USFWS, to regulate hunting of migratory birds.
- The Migratory Bird Treaty Act of 1918, as amended: This act makes it unlawful for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.
- The ESA (16 U.S.C. 1531 et seq.), as amended, directs the BLM to conserve threatened and endangered species and the ecosystems upon which they depend, and not contribute to the need to list a species. Provisions of the ESA, as amended, apply to plants and animals that

have been listed as endangered or threatened, those proposed for being listed, and designated and proposed critical habitat.

- The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668d, 54 Stat. 250, as amended), prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The act provides for criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”
- Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.)
- International Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–711)
- FLPMA (43 U.S.C. 1701–1785)
- Fish and Wildlife Act of 1956 (16 U.S.C. 742a et seq.)
- Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901–2911)
- Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–712)
- Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531)
- Public Rangeland Improvement Act of 1978 (43 U.S.C. 1901–1908)
- Executive Order 13186 (Responsibilities of Federal Agencies To Protect Migratory Birds; 66 *Federal Register* 3853, January 17, 2001)

Policies

- BLM Manual Section 6840.06 (Sensitive Species Policy): It is BLM policy to undertake conservation measures for sensitive species. As established in BLM Manual 6840.06, “the BLM shall designate BLM sensitive species and implement measures to conserve these species and their habitats, including ESA proposed critical habitat, to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA.” The sensitive species designation is normally used for species that occur on BLM-administered surface lands for which the BLM has the capability to significantly affect the conservation status of the species through management.
- *Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, Utah, 2015*, identifies and incorporates appropriate measures into existing land use plans to conserve, enhance, and restore greater sage-grouse habitat by avoiding, minimizing, or compensating for unavoidable impacts on greater sage-grouse habitat in the context of the BLM’s multiple use and sustained yield mission under FLPMA.
- BLM Manual 1745, Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants, requires use of native species unless specific conditions are met to augment, translocate, or introduce populations of desirable, nonnative species.
- BLM Handbook 1740-2, Integrated Vegetation Management, guides implementation of vegetation management planning and treatment activities to achieve the objectives set forth for the update manual, 1740 Renewable Resource Improvements and Treatments.
- IM No. 2016-013, Managing for Pollinators on Public Lands, provides direction for implementation of the 2015 Federal Strategy to Promote the Health of Honey Bees and Other Pollinators.

- National Strategy to Promote the Health of Honey Bees and Other Pollinators of 2015 outlines a comprehensive approach to tackling and reducing the impact of multiple stressors on pollinator health.

Memoranda

- USFWS and the BLM signed an MOU in April 2010 that outlines a collaborative approach to promote the conservation of migratory bird populations.
- Plant Conservation Alliance’s National Seed Strategy for Rehabilitation and Restoration in 2015 (BLM/WO/GI-15/012+7400) provides a framework for actively working with the private sector in order to build a “seed industry” for rehabilitation and restoration.

Local Laws, Regulations, and Policies

- Garfield County’s Wildlife Habitat Zone Ordinance

Lands with Wilderness Characteristics

Federal Laws and Policies

- Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values, which includes wilderness characteristics.

Paleontology

Federal Laws and Policies

- FLPMA (Public Law 94-579) requires that the public lands be managed in a manner that protects the quality of scientific and other values. The act also requires the public lands to be inventoried and provides that permits may be required for the use, occupancy, and development of the public lands.
- NEPA (Public Law 91-190) requires that “important historic, cultural and natural aspects of our national heritage” be protected, and that “a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences ... in planning and decision making” be followed.
- Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470bb(1))
- Omnibus Public Land Management Act of 2009, Public Law 111-011, Title VI, Subtitle D on Paleontological Resources Preservation (123 Stat. 1172; 16 U.S.C. 470aaa) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise.
- 43 CFR 8365 addresses the collection of invertebrate fossils and, by administrative extension, fossil plants.
- 43 CFR 3622 addresses the free use collection of petrified wood as a mineral material for non-commercial purposes.
- 43 CFR 3621 addresses collection of petrified wood for specimens exceeding 250 pounds in weight.
- 43 CFR 3610 addresses the sale of petrified wood as a mineral material for commercial purposes.
- 43 CFR 3802 and 3809 address protection of paleontological resources from operations authorized under the mining laws.

- 43 CFR 8200 addresses procedures and practices for the management of lands that have outstanding natural history values, such as fossils, that are of scientific interest.
- 43 CFR 1610.7-2 addresses the establishment of Areas of Critical Environmental Concern (ACECs) for the management and protection of significant natural resources, such as paleontological localities.
- 43 CFR 8364 addresses the use of closure or restriction of public lands to protect resources. Such closures or restrictions may be used to protect important fossil localities.
- 43 CFR 8365.1-5 addresses the willful disturbance, removal, and destruction of scientific resources or natural objects, and 8360.0-7 identifies the penalties for such violations.
- 36 CFR 62 addresses procedures to identify, designate, and recognize national natural landmarks, which includes fossil areas.
- 18 U.S.C. 641 addresses the unauthorized collection of fossils as a type of government property.
- Secretarial Order 3104 grants the BLM the authority to issue paleontological resource use permits for lands under its jurisdiction.
- Onshore Oil and Gas Order No. 1 and 43 CFR 3162 provide for the protection of natural resources and other environmental concerns, and is used to protect paleontological resources where appropriate.
- Federal Cave Resources Protection Act of 1988 (Public Law 100-691) and 43 CFR 37 address protection of significant caves and cave resources, including paleontological resources.

Policies

- BLM Manual Part 8270 and Handbook H-8270-1 provide uniform policy and direction for the BLM Paleontological Resource Management Program. The objective of the program is to provide a consistent and comprehensive approach in all aspects relating to the management of paleontological resources, including identification, evaluation, protection, and use.

Soil and Water

Federal Laws, Regulations, Statutes, and Orders

- Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001)
- Soil Conservation and Domestic Allotment Act of 1935, as amended
- Executive Order 11988, as amended by Executive Order 12148, Floodplain Management
- The Clean Water Act, as amended, 33 U.S.C. 1251, establishes objectives to restore and maintain the chemical, physical, and biological integrity of the Nation's water.
- The Federal Water Pollution Control Act, 33 U.S.C. 1323, requires the Federal land manager to comply with all Federal, State, and local requirements regarding the control and abatement of water pollution in the same manner and to the same extent as any nongovernmental entity.
- The Safe Drinking Water Act, 42 U.S.C. 201, is designed to make the Nation's waters "drinkable" as well as "swimmable." Amendments establish a direct connection between safe drinking water, watershed protection, and management.
- Colorado River Basin Salinity Control Act of 1974 (Public Law 93-320)
- Water Resources Development Act of 1974 (Public Law 93-251)

- Water Resources Planning Act of 1965 (Public Law 89-79, as amended)
- Water Resources Research Act of 1954, as amended (42 U.S.C. 10301 et seq.)
- Watershed Protection and Flood Control Act of 1954, as amended through Public Law 106-580
- EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act
- Executive Order 11507 (Prevention, control, and abatement of air and water pollution at Federal facilities; 35 *Federal Register* 2573, February 5, 1970)
- Executive Order 11752 (Prevention, control, and abatement of environmental pollution at Federal facilities; 38 *Federal Register* 34793, December 19, 1973)

State Laws and Regulations

- Utah Code, Title 73, Water and Irrigation
- Utah Administrative Rule R309-605, Drinking Water Source Protection for Ground-Water Sources
- Utah Administrative Rule R317-2, Standards of Quality for Waters of the State
- Utah Administrative Rule R317-6, Ground Water Quality Protection
- Utah Administrative Rule R317-8, Utah Pollution Discharge Elimination System
- Utah Administrative Rule R68-8, Utah Seed Law
- *Utah Nonpoint Source Pollution Management Plan*
- *Utah Nonpoint Source Management Plan for Hydrologic Modifications*
- *Utah Nonpoint Source Management Plan for Silviculture Activities*

Policies

- The U.S. Water Resource Council published Floodplain Guidelines on February 10, 1978 (43 *Federal Register* 6030), after being directed to establish guidelines for floodplain management and preservation.
- The Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (65 *Federal Register* 62565, October 18, 2000)

Vegetation and Fire and Fuels

Federal Laws, Regulations, Statutes, and Orders

- Executive Order 13112 (Invasive Species; 64 *Federal Register* 6183, February 8, 1999) provides that no Federal agency shall authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk or harm will be taken in conjunction with the actions.
- The Carlson-Foley Act (Public Law 90-583; 43 U.S.C. 1241) establishes legal guidance and responsibility for the management of weeds on Federal lands. This law authorizes Federal agencies to allow States to take measures to control weeds on Federal lands.
- Federal Noxious Weed Act of 1974 (7 U.S.C. 2814)
- Executive Order 11987 (Exotic Organisms; 42 *Federal Register* 26949, May 25, 1977)

- The Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594) authorizes the Secretary of the Interior to protect and preserve from fire, disease, or the ravages of beetles or other insects timber owned by the United States upon the public lands, national parks, national monuments, Indian reservations, or other lands under DOI jurisdiction.
- The Clark-McNary Act of 1928 (45 Stat. 221; 16 U.S.C. 487) authorized technical and financial assistance to the States for forest fire control and for production and distribution of forest tree seedlings (Sections 1 through 4 were repealed by the Cooperative Forestry Assistance Act of 1978).
- The Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856, 1856a) authorizes agencies that provide fire protection for any property of the United States to enter into reciprocal agreements with other firefighting organizations to provide mutual aid for fire protection.
- The Clean Air Act of July 14, 1955, as amended (42 U.S.C. 7401 et seq.), provides for the protection and enhancement of the Nation's air resources and applies to the application and management of prescribed fire.
- The Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201) authorizes reimbursement to State and local fire services for costs incurred in firefighting on Federal property.
- The Forest and Rangeland Renewable Resources Planning Act of August 17, 1974, as amended through Public Law 106-580
- The Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837) authorized the Secretary of Agriculture and Secretary of the Interior to enter into contracts with State and local governmental entities, including local fire districts, for procurement of services in the preparedness, detection, and suppression of fires on any units within their jurisdiction.
- The Wildfire Suppression Assistance Act of April 7, 1989 (Public Law 100-428, as amended by Public Law 101-11, April 7, 1989; 42 U.S.C. 1856) authorizes the Secretary of Agriculture to enter into agreements with firefighting organizations of foreign countries for assistance in wildfire protection.
- The Healthy Forest Restoration Act, December 2003 (Public Law 108-148) was crafted to reduce the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes.
- Secretarial Order Number 3336, Rangeland Fire Prevention, Management, and Restoration (2015)
- MS-9211 & H-9211-1, BLM Fire Planning Manual & Handbook, provide requirements for Fire Management Planning, including in Land Use Plans, NEPA analyses, and Fire Management Plans.

State Laws and Regulations

- The Utah Noxious Weed Act (Utah Administrative Code, Rule R68-9)
- Utah Air Conservation Rule R307-204, Smoke Management

Policies

- The 2017 Wildland Fire Directive encourages aggressive fuels reduction and pre-suppression techniques to prevent and combat the spread of uncharacteristic wildfires.

- **Guidance for Implementation of Federal Wildland Fire Management Policy (February, 2009)** serves to advise and guide implementation of the Review and Update of the 1995 Federal Wildland Fire Management Policy (2001).
- **DOI Departmental Manual (910 DM 1.3)**
- **DOI Departmental Manual Part 620 (Wildland Fire Management), Chapter 1, (General Policy and Procedures)**
- **Review and Update of the 1995 Federal Wildland Fire Management Policy (2001)**
- **Interagency Standards for Fire and Fire Aviation Operations: As amended annually,** describes policy and operations for all fire-related activities of DOI and USDA.
- **BLM Manual Section 9212, Fire Prevention (1992):** It is the policy of the BLM to take all necessary actions to protect human life, the public lands, and the resources and improvements thereon through the prevention of wildfires.
- **BLM Manual Section 1742, Emergency Fire Rehabilitation, and BLM Handbook 1742** provide guidance for emergency fire rehabilitation, including measures to prevent accelerated soil erosion, prevent the establishment of noxious and/or invasive plant species, and implement post-fire management of restoration areas. Fireline rehabilitation would include restoration of surface contours and closure to vehicles.
- **BLM Manual Section 9214, Prescribed Fire Management (1988), and BLM Handbook 9214 (2000)** describe the authority and policy for prescribed fire use on BLM-administered surface lands.
- **BLM Manual 1740 and BLM Manual Handbook H-1740-1** provide guidance and procedures for management and treatment of renewable resources, including utilization of management-prescribed fire and emergency fire rehabilitation.
- ***A Report to the President in Response to the Wildfires of 2000 (September 2000), "Managing the Impacts of Wildfires on Communities and the Environment"***
- ***A Collaborative Approach for Reducing Wildland Fire Risk to Communities and the Environment: 10-Year Comprehensive Strategy:*** This document provides a foundation for wildland agencies to work closely with all levels of government, tribes, and conservation, commodity, and community-based restoration groups to reduce wildland fire risk to communities and the environment. It also provides a suite of core principles and four goals. The core principles include the concepts of collaboration, priority setting, and accountability.
- ***Restoring Fire Adapted Ecosystems on Federal Lands: A Cohesive Strategy for Protecting People and sustaining Natural Resources, February 2002:*** The primary goal is to coordinate an aggressive, collaborative approach to reduce the threat of wildland fire to communities and to restore and maintain land health.
- ***Healthy Forests: An Initiative for Wildfire Prevention and Stronger Communities, August 2002:*** The Healthy Forest Initiative implements core components of *A Collaborative Approach for Reducing Wildland Fire Risk to Communities and the Environment: 10-Year Comprehensive Strategy and Implementation Plan*. This historic plan, which was adopted by Federal agencies and western governors in collaboration with county commissioners, State foresters, and tribal officials, calls for protecting communities and the environment through local collaboration on thinning, planned burns, and forest restoration projects. The initiative complements the National Fire Plan by reducing unnecessary regulatory obstacles and allowing more effective and timely actions.

- BLM Manual 1745, Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants, requires use of native species unless specific conditions are met to augment, translocate, or introduce populations of desirable, nonnative species.
- BLM Handbook 1740-2, Integrated Vegetation Management, guides implementation of vegetation management planning and treatment activities to achieve the objectives set forth for the update manual, 1740 Renewable Resource Improvements and Treatments.
- IM No. 2016-013, Managing for Pollinators on Public Lands, provides direction for implementation of the 2015 Federal Strategy to Promote the Health of Honey Bees and Other Pollinators.
- National Strategy to Promote the Health of Honey Bees and Other Pollinators of 2015 outlines a comprehensive approach to tackling and reducing the impact of multiple stressors on pollinator health.

State Laws and Regulations

- Utah Administrative Code, Rule R317: Utah regulations concerning water quality
- Utah Administrative Code, Rule R307: Utah regulations concerning air quality
- *Natural Hazard Mitigation Plan: 5-Year Plan 2010–2014*

Memoranda

- MOU between the BLM and the Animal and Plant Health Inspection Service Addressing the Management of Grasshoppers and Mormon Crickets
- Plant Conservation Alliance’s National Seed Strategy for Rehabilitation and Restoration in 2015 (BLM/WO/GI-15/012+7400) provides a framework for actively working with the private sector in order to build a “seed industry” for rehabilitation and restoration.

Other

- *State of Utah Catastrophic Wildfire Reduction Strategy*: This strategy and guidance document describes a cooperative strategy to reduce the size, intensity, and frequency of catastrophic wildland fires in Utah.
- *Utah Division of Forestry, Forest Action Plan (2016)*: The Forest Action Plan provides a comprehensive analysis of the forest-related conditions, trends, threats, and opportunities within Utah and will be used to guide the division’s planning efforts and project work.
- *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10-Year Comprehensive Strategy: Implementation Plan*: This plan outlined a comprehensive approach for the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on Federal and adjacent State, tribal, and private forest and rangelands in the United States, emphasizing measures to reduce the risk to communities and the environment.
- National Academy of Public Administration: Federal Fire Management: Limited Progress in Restarting the Prescribed Fire Program (GAO/RCED-91-42), December 5, 1990: The report reiterated that fire is beneficial and even necessary to wildlands. Where fire has been a historic component of the environment, it is essential to continue that influence, and attempts to exclude fire from such lands could result in unnatural ecological changes and increased risks created by accumulation of fuels on the forest floor. The report supported the use of prescribed burns to achieve management objectives, when the risks of such burns have been analyzed.

- *Southern Utah Support Area Fire Management Plan, 2005*

Visual Resources

Federal Laws, Regulations, Statutes, and Orders

- BLM Manual Section 8400 (Visual Resource Management) dictates policy and procedures for the Visual Resource Management system, and outlines procedures for the inventory, evaluation, and classification of visual resources on BLM-administered surface lands.

Wild Horses

Federal Laws, Regulations, Statutes, and Orders

- Public Law 92-195 (Wild Free Roaming Horse and Burro Act of 1971, as amended)
- Public Law 95-514 (Public Rangelands Improvement Act of 1978)
- Public Law 108-447 (Fiscal Year 2005 Omnibus Appropriations Act Division E, Section 142)
- 43 CFR 4700 (Protection, Management, and Control of Wild Free-Roaming Horses and Burros)

Memoranda

- MOU, BLM Cedar City, BLM Richfield Respective Area of Responsibility, signed January 2, 1981
- MOU between USDA, the State of Utah, the BLM Utah State Office, DOI, and USFS, Region 4, Wild and Free-Roaming Horse Responsibilities

Other

- *Sulphur Wild Horse Herd Management Area Plan*
- *North Hills Wild Horse Management Plan*
- *Bible Springs, Blawn Wash, Four Mile, and Tilly Creek Wild Horse Appropriate Management Level Assessment*
- *Frisco Wild Horse Herd Management Area Plan*

Forestry and Woodland Products

Federal Laws, Regulations, Statutes, and Orders

- The Healthy Forests Initiative
- The Healthy Forests Restoration Act of 2003 (Public Law 108-148)
- Omnibus Appropriations Bill of 2003 (Public Law 108-7) section 323 (Stewardship Contracting)
- Tribal Forest Protection Act (Public Law 108-27)

State Laws and Regulations

- Utah Code 78-38-4.5 through 4.8, Forest Products Transportation Act (1983): requires proof of ownership to harvest or transport forest products or native vegetation.

Memoranda

- The Forest Restoration and Community Capacity Building Partnership (2004, amended 2005) was established to jointly identify priority forest restoration needs, build community capacity to accomplish these needs, and expand the use of stewardship contracting on

publicly owned lands (all ownerships) in the Great Basin and Colorado Plateau of Utah and Arizona.

Lands and Realty and Renewable Energy

Federal Laws, Regulations, Statutes, and Orders

- The Energy Policy Act of 2005 (Public Law 109-58) recommended that DOI strive to approve at least 10,000 megawatts of renewable energy projects on public lands by 2015.
- The Energy Independence and Security Act of 2007 (Public Law 110-140 [8]) requires the Department of Energy to assess methods to integrate electric power generated at utility-scale solar facilities into regional electricity transmission systems and to identify transmission system expansions and upgrades needed to move solar-generated electricity to growing electricity demand centers throughout the United States. In addition, this act requires Department of Energy to consider methods to reduce the amount of water consumed by concentrating solar power systems.
- The Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.), contains the statutes that provide overall guidance to the BLM on mineral leasing, including geothermal development.
- Recreation and Public Purposes Act of 1926, as amended (43 U.S.C. 869 et seq.)
- Federal Highway Act of 1958 (23 U.S.C. 317)
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1971 (Public Law 91-646)
- Land and Water Conservation Fund Act of 1965, as amended through Public Law 88-578
- Federal Land Transaction Facilitation Act of 2000 (Public Law 106-248)
- Federal Power Act of 1920, as amended through Public Law 113-23
- The Biomass Research and Development Act of 2000, as amended through Public Law 107-293, established mechanisms for interagency coordination on biomass technologies, including the Biomass Research and Development Technical Advisory Committee and the Biomass Research and Development Board.
- Farm Bill 2014 included a number of authorizations related to renewable energy development and bioenergy.
- The Healthy Forests Restoration Act of 2003, as amended through Public Law 113-79, encouraged biomass energy production through grants and assistance to local communities, creating market incentives for removal of otherwise valueless forest material.
- The Food Conservation and Energy Act of 2008 provided grants and financial incentives for investment in renewable technologies to use agricultural and forestry crops for bioenergy.
- The Mining and Mineral Policy Act of 1970 (30 U.S.C. 21a) requires Federal agencies to encourage the development of mineral resources, including geothermal resources, on Federal lands.
- The Geothermal Steam Act of 1970 (30 U.S.C. 1019), which was amended and supplemented by the Energy Policy Act of 2005, provides statutory guidance for geothermal leasing by the BLM.
- The Advanced Geothermal Energy Research and Development Act of 2007 (42 U.S.C. 17191 et seq.) called for programs of research, development, demonstration, and commercial application to expand the use of geothermal energy production.

- Secretarial Order 3283 (January 2009) clarifies DOI roles and responsibilities to accomplish the goals for renewable energy development established in Section 211 of the Energy Policy Act of 2005.
- Secretarial Order 3285A1 (March 2009) set a goal of identifying and prioritizing specific locations best suited for large-scale production of solar energy on public lands. It requires DOI agencies and bureaus to work collaboratively to encourage development of renewable energy and associated transmission while protecting the environment, and to establish clear policy direction for authorizing the development of solar energy on public lands. On February 22, 2010, Secretarial Order 3285 was amended to clarify departmental roles and responsibilities in prioritizing development of renewable energy. The amended order is referred to as Secretarial Order 3285A1.
- Executive Order 13212 (66 *Federal Register* 28357, May 22, 2001) states that “[i]t is the policy of this Administration that executive departments and agencies (agencies) shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.”
- Executive Order 13514 (74 *Federal Register* 52117, October 5, 2009) requires that Federal agencies take efforts to align their policies to advance local planning efforts for energy development, including renewable energy, and states that agencies shall “advance regional and local integrated planning by...aligning Federal policies to increase the effectiveness of local planning for energy choices such as locally generated renewable energy.”
- Executive Order 13134 (Developing and Promoting Biobased Products and Bioenergy; 64 *Federal Register* 44639, August 16, 1999) called for a comprehensive strategy to stimulate technologies to make biobased products and bioenergy cost-competitive in national and international markets.
- 43 CFR 2100 (Acquisitions)
- 43 CFR 2200 (Exchanges)
- 43 CFR 2300 (Withdrawals)
- 43 CFR 2400 (Land Classification)
- 43 CFR 2500 (Disposition: Occupancy and Use)
- 43 CFR 2600 (Disposition: Grants)
- 43 CFR 2700 (Disposition: Sales)
- 43 CFR 2800 (Use: Rights-of-Way)
- 43 CFR 2900 (Uses: Leases and Permits)
- 43 CFR 9230 (Trespass)

Policies

- BLM Handbook H-2100-1 (Acquisition Handbook)
- BLM Handbook H-2740-1 (Recreation and Public Purposes)
- BLM Manual Section 2200 (Land Exchange Handbook)
- BLM Manual Section 2880 (Mineral Leasing Act right-of-way)
- BLM Manual Section 2800 (FLPMA right-of-way)
- H-3809-1 (Surface Management Handbook)
- H-3600-1 (Mineral Materials Disposal Handbook)
- DOI Departmental Manual Part 603 (Land Withdrawals)

- Bureau of Land Management - Energy and Mineral Policy: sets BLM policy for management of energy and mineral resources on public lands as part of the agency's multiple-use mission, including environmentally sound energy and minerals development.
- BLM Manual Section 2881, Mineral Leasing Act, provides overall guidance to the BLM on mineral leasing procedures.
- BLM Manual Section 3031, Energy and Mineral Resource Assessment, provides guidance and sets standards for gathering and analyzing information on energy and mineral resources, including geothermal resources, for land use decisions.
- BLM Manual 3060, Mineral Reports Preparation and Review, provides guidelines for preparation and review of energy and mineral resources reports.

Memoranda

- Wind Energy Protocol Between the Department of Defense and the BLM Concerning Consultation on Development of Wind Energy Projects (July 2008) is an interagency agreement between the Department of Defense and the BLM intended to improve communications and coordination between the two agencies in the review of right-of-way applications for wind energy projects that could have an adverse effect on adjacent or nearby Department of Defense Military Operational Areas or Airspace. For the Planning Area, this protocol would apply to the Utah Test and Training Range.
- MOU on Policy Principles for Woody Biomass Utilization for Restoration and Fuel Treatments on Forests, Woodlands, and Rangelands (2003) was signed by the departments of Agriculture, Energy, and the Interior and encouraged opportunities to provide a reliable sustainable supply of wood biomass and the sustainable development and stabilization of woody biomass markets.
- MOU, Implementation of Section 225 of the Energy Policy Act of 2005 Regarding Geothermal Leasing and Permitting (2006) established procedures for processing geothermal lease applications, a program to reduce the backlog of pending geothermal lease applications, and a data retrieval system for tracking lease and permit applications.

Other

- *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States*
- *Approved Resource Management Plan Amendments/Record of Decision for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* adopted a comprehensive Wind Energy Development Program on BLM-administered surface lands in 11 western States, including Utah. The Record of Decision also established policies and best management practices to mitigate the impacts of wind energy projects. In addition, it amended 52 BLM land use plans to include the Wind Energy Development Program policies and best management practices. The amended plans included the Cedar-Beaver-Garfield-Antimony RMP.

Local Laws, Regulations, and Policies

- Garfield County Land Use Management Ordinance

Livestock Grazing

Federal Laws, Regulations, Statutes, and Orders

- The Taylor Grazing Act of June 28, 1934, as amended (42 U.S.C. 315, 315a through 315r), provides direction to protect rangelands by preventing overgrazing and soil deterioration while providing for managed use and improvement, and to stabilize the livestock industry dependent upon public lands.
- FLPMA (43 U.S.C. 1701 et seq.) recognizes livestock grazing as one of the “principal or major uses” of the public lands. It directs that the public lands be managed on the basis of multiple use and sustained yield in a manner that will provide food and habitat for fish and wildlife and domestic animals while protecting the quality of other values (i.e., scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological).
- Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.) provides policy to manage, maintain, and improve the condition of public rangelands to increase productivity in accordance with management objectives and the land use planning process.
- Grazing Administration, exclusive of Alaska (43 CFR 4100.0-2), provides uniform guidance for administration of grazing on the public lands. The objectives for grazing administration regulations are to “promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; to promote the orderly use, improvement and development of the public lands; to establish efficient and effective administration of grazing of public rangelands; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands.”
- Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration (43 CFR 4180 et seq.) defines the minimum resource conditions that must be achieved and maintained and the acceptable management practices to be applied to achieve those conditions.

Policies

- BLM Manual 1745, Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants, requires use of native species unless specific conditions are met to augment, translocate, or introduce populations of desirable, nonnative species.
- BLM Handbook 1740-2, Integrated Vegetation Management, guides implementation of vegetation management planning and treatment activities to achieve the objectives set forth for the update manual, 1740 Renewable Resource Improvements and Treatments.
- IM No. 2016-013, Managing for Pollinators on Public Lands, provides direction for implementation of the 2015 Federal Strategy to Promote the Health of Honey Bees and Other Pollinators.
- National Strategy to Promote the Health of Honey Bees and Other Pollinators of 2015 outlines a comprehensive approach to tackling and reducing the impact of multiple stressors on pollinator health.

Memoranda

- The 1997 rangeland programmatic MOA among the BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs

- Plant Conservation Alliance’s National Seed Strategy for Rehabilitation and Restoration in 2015 (BLM/WO/GI-15/012+7400) provides a framework for actively working with the private sector in order to build a “seed industry” for rehabilitation and restoration.

Local Laws, Regulations, and Policies

- Garfield County’s 2017 Grazing Plan
- Garfield County’s Sustainable Grazing Ordinance

Minerals

Federal Laws, Regulations, Statutes, and Orders

- The Onshore Oil and Gas Leasing Reform Act, 30 U.S.C. 181 et seq., requires potential oil and gas resources to be adequately addressed in planning documents; the social, economic, and environmental consequences of exploration and development of oil and gas resources be determined; and any stipulations to be applied to oil and gas leases be clearly identified.
- Onshore Oil and Gas Orders Nos. 1, 2, and 7
- The General Mining Law, as amended, 30 U.S.C. 21 et seq., allows the location, use, and patenting of mining claims on sites on public domain lands of the United States. Amendments established a policy of fostering development of economically stable mining and minerals industries, their orderly and economical development, and studying methods for disposal of waste and reclamation.
- Combined Hydrocarbon Leasing Act of 1981 (Public Law 97–78)
- Energy Policy and Conservation Act, as amended (42 U.S.C. 6201)
- Federal Coal Leasing Amendments Act of 1976 (30 U.S.C. 201)
- Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.)
- Mineral Materials Act of 1947, as amended (30 U.S.C. 601).
- Mining and Mineral Policy Act of 1970 (30 U.S.C. 21a)
- Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)
- Surface Resources Act of 1955 (69 Stat. 367)

Memoranda

- The Federal coal management programmatic MOA among the BLM, Office of Surface Mining, DOI, U.S. Geological Survey, and the Advisory Council on Historic Preservation
- National BLM/USFS MOU Concerning Oil and Gas Leasing and Operations, FS Agreement No. 06-SU-11132428-052

Recreation

Federal Laws, Regulations, Statutes, and Orders

- The Recreation and Public Purposes Act, as amended (43 U.S.C. 869 et seq.), authorizes the Secretary of the Interior to lease or convey BLM-administered surface lands for recreational and public purposes under specified conditions.
- Executive Order 11644 (37 *Federal Register* 2877, February 8, 1972), provided that off-highway vehicle (OHV) use will be controlled and managed to protect resource values, promote public safety, and minimize conflicts with uses of public lands. This Executive

Order directed Federal agencies to designate specific areas and trails on public lands where OHV use may be permitted and areas where OHV use may not be permitted.

- On May 24, 1977, President Carter amended Executive Order 11644 with Executive Order 11989 (42 *Federal Register* 26959, May 25, 1977). This Executive Order further defined OHV administrative use exemptions, and directed agencies to immediately close areas and trails whenever the agency determines that the use of OHVs will cause or is causing considerable adverse effects on the soil, wildlife and wildlife habitat, or cultural or historic resources (42 U.S.C. 4321).
- The BLM National Management Strategy for Motorized OHV Use on Public Lands (BLM 2001) provides agency guidance and offers recommendations for future actions to improve OHV vehicle management.

State Laws and Regulations

- *Utah State Comprehensive Outdoor Recreation Plan* (Utah State Parks 2014)

Transportation and Access

Federal Laws, Regulations, Statutes, and Orders

- Executive Order 11644 (Use of off-road vehicles on the Public Lands; 37 *Federal Register* 2877, February 8, 1972)
- Executive Order 11989 (Use of off-road vehicles on the Public Lands; 42 *Federal Register* 26959, May 25, 1977)
- Off-Road Vehicles (43 CFR Part 8340)
- 23 CFR Part 460—Public Road Mileage for Apportionment of Highway Safety Funds

Policies

- BLM Manual Section 1626 (Travel and Transportation)
- BLM Handbook H-8342-1 (Travel and Transportation)
- BLM Manual Section 9100 Series (Engineering)

Local Laws, Regulations, and Policies

- Emergency Resolution for Roads on Federal Lands in Garfield County from January 25, 2016

Areas of Critical Environmental Concern

Federal Laws, Regulations, Statutes, and Orders

- FLPMA section 103, 201, and 202 (43 U.S.C. 1712(c)(3))
- 43 CFR 1610.7-2

Policies

- BLM Manual Section 1613: requires the BLM to consider ACECs during the land use planning process.

National Historic Trails

Federal Laws, Regulations, Statutes, and Orders

- The National Trails System Act of 1968 (Public Law 90-543; 16 U.S.C. 1241 et seq., as amended through Public Law 107-325, December 4, 2002) established a National Trails System to promote preservation of, public access to, travel within, and enjoyment of the open-air, outdoor areas and historic resources of the Nation. The act designated initial trail system components and established methods and standards for adding additional components.
- The Old Spanish Trail Recognition Act of 2002 (Public Law 107-325, December 4, 2002) designates the Old Spanish Trail as a National Historic Trail.
- BLM Manual Sections 6250 and 6280 provide National Scenic and Historic Trails guidance.

Scenic Routes

Federal Laws, Regulations, Statutes, and Orders

- The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998. The program recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities. For a highway to be considered for inclusion in the National Scenic Byways Program, it must provide safe passage for passenger cars year-round, be designated a State Scenic Byway, and have a current corridor management plan in place. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways.
- BLM Backcountry Byways: The Backcountry Byway Program was developed by the BLM to complement the National Scenic Byways Program. These byways highlight the spectacular nature of the western landscapes. Backcountry Byways vary from narrow, graded roads, passable only during a few months of the year, to two-lane paved highways providing year-round access.

State Laws and Regulations

- Utah Scenic Byways are similar to National Scenic Byways. Utah State Scenic Byways are paved highways that have been designated by official State declaration for their scenic, historic, recreational, cultural, archaeological, or natural qualities (Utah Administrative Code, Rule R926-14). The byways are paved roads that are generally safe year-round for passenger cars. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways.
- Utah Scenic Backways have been designated by official State declaration for their scenic, historic, and recreational qualities, but do not generally meet Federal safety standards for safe year-round travel by passenger cars (Utah Administrative Code, Rule R926-15). Backways often require four-wheel drive and road conditions can vary due to factors such as season and weather.

Wild and Scenic Rivers

Federal Laws, Regulations, Statutes, and Orders

- The Wild and Scenic Rivers Act of 1968, as amended, 16 U.S.C. 1271 et seq., requires Federal land management agencies to identify river systems and then study them for potential designation as wild, scenic, or recreational rivers. Section 5(d)(1) of the act requires that Federal agencies make Wild and Scenic River considerations during planning.
- BLM Manual Section 6400 provides National Wild and Scenic Rivers guidance.

Memoranda

- MOU Concerning Wild and Scenic River Studies in Utah Among the State of Utah and Intermountain Region USFS, Utah BLM, and Intermountain Region NPS (1997)

Wilderness Study Areas

Federal Laws, Regulations, Statutes, and Orders

- FLPMA Section 603
- BLM Manual Section 6330 (Management of Wilderness Study Areas)
- Federal Onshore Oil and Gas Leasing Reform Act of 1987

Social and Economic Conditions

Federal Laws, Regulations, Statutes, and Orders

- Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; 59 *Federal Register* 7629, February 16, 1994) requires that each Federal agency consider the impacts of its programs on minority populations and low-income populations.

Abbreviations-Acronyms

Term	Definition
ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
DOI	United States Department of the Interior
EIS	Environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act (of 1973)
FLPMA	Federal Land Policy and Management Act (of 1976)
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act (of 1969)
NPS	National Park Service
NRHP	National Register of Historic Places
OHV	Off-highway vehicle
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan (BLM land use plan under FLPMA)
SHPO	State Historic Preservation Officer
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix G

Best Management Practices

August 2018

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Appendix G: Best Management Practices

Introduction

The application of best management practices (BMPs) is often the first tool used to mitigate site-specific impacts in order to meet the Bureau of Land Management's (BLM's) statutory requirements for environmental protection and meet the resource-specific goals and objectives of the Resource Management Plan (RMP). The BLM will apply BMPs to modify the operations or design of authorized uses or activities to meet these obligations.

BMPs will be applied to avoid, minimize, rectify, and reduce impacts during activity and implementation-level decisions. BMPs for authorizations will be identified as part of the National Environmental Policy Act (NEPA) process, through interdisciplinary analysis involving resource specialists, project proponents, government entities, landowners, or other surface management agencies. Those measures selected for implementation will be identified in the Record of Decision or Decision Record for those authorizations and will inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered surface lands and minerals to mitigate impacts from those authorizations. Because these actions create a clear obligation for the BLM to ensure any proposed BMP adopted in the environmental review process is performed, there is assurance that mitigation will lead to a reduction of environmental impacts in the implementation stage and have binding mechanisms for enforcement (CEQ 2011).

Because of site-specific circumstances and localized resource conditions, BMPs are site- and project-specific and may not apply to some or all activities (e.g., a resource or conflict is not present on a given site) and/or may require slight variations from what is generally recommended. The BLM may add additional measures as deemed necessary during site-specific environmental analysis and as developed through coordination with other Federal, State, and local regulatory and resource agencies. In addition, many BMPs may be required by other Federal or State agencies as part of their permitting process. As such, this appendix does not attempt to list all possible BMPs or sources. During the activity or implementation-level decisions, the BLM will determine the appropriate source of BMPs and which to apply. While the overall vision embraces the use of these guidelines to reduce/minimize impacts on the environment, they are not to be considered a land use plan decision.

Air Quality

1. All site-specific proposals would be reviewed for compliance with existing laws and policies regarding air quality and would be designed not to degrade existing quality. Specific procedures would include:
 - a. Coordination with the Utah Department of Environmental Quality if an emission permit is required.
 - b. Prescribed fires would comply with the State of Utah Interagency Memorandum of Understanding requirements to minimize air quality impacts from resulting particulates. This procedure requires obtaining an open burning permit from the State prior to conducting a management-ignited fire (BLM 1999).
2. Fugitive Dust

- a. Water or alternative dust suppressants (i.e., surfactants or other erosion control materials) would be utilized to minimize fugitive dust during construction and applied on material (sand, gravel, soil, minerals, or other matter that may create fugitive dust) piles.
 - b. Periodic watering or chemical stabilization of unpaved roads.
 - c. Restrict vehicle speeds to 10 miles per hour on well pads and production facility locations.
 - d. Vehicles are not to exceed a speed of 20 miles per hour on any unpaved road to discourage the generation of fugitive dust.
 - e. Enclose, cover, water, or otherwise treat loaded haul trucks to minimize loss of material to wind and spillage.
 - f. Cover, enclose, or stabilize excavated or inactive material piles after activity ceases.
 - g. Use chip-seal or asphalt surface for long-term access where applicable.
 - h. Train workers to handle construction materials and debris to reduce fugitive emissions.
3. Surface Disturbance
- a. Minimize the period of time between initially disturbance of the soil and revegetation or other surface stabilization. Utilize interim reclamation.
 - b. Minimize the area of disturbed land.
 - c. Prompt revegetation of disturbed lands.
 - d. Revegetate, mulch, or otherwise stabilize the surface of all disturbed areas adjoining roads.
4. Engine Exhaust
- a. All vehicles and construction equipment would be properly maintained to minimize exhaust emissions.
 - b. Utilize carpooling to and from sites to minimize vehicle-related emissions.
 - c. Reduce unnecessary idling.
 - d. Reduce elemental carbon, particularly from diesel-fueled engines, by utilizing controls such as diesel particulate filters on diesel engines, or using lower emitting engines (e.g., Tier 2 or better).
 - e. Opportunities to reduce nitrogen oxides (NO_x), particularly from internal combustion engines, should be pursued to control impacts related to deposition and visibility in nearby Class 1 areas. This may include the use of lower-emitting engines (e.g., Tier 2 or better for mobile and non-road diesel engines), and/or add-on controls (e.g., selective catalytic reduction) where appropriate.
 - f. Use of ultra-low sulfur diesel in engines when available.
5. Mineral Development
- a. Apply best available control technology to minimize air pollutant emissions in order to comply with applicable local, State, and Federal laws, statutes, regulations, standards, and implementation plans.
 - b. Manage timing, pace, place, density, and intensity of development to reduce peak emissions of all pollutants.
 - c. Utilize flareless technology to reduce volatile organic compounds and methane emission; if not feasible, flaring of natural gas is preferred to venting.

- d. To the extent possible, utilize solar or other locally renewable energy to power equipment.
- e. Use telemetry and automation to remotely monitor and control production.
- f. Use centrally stored water that is piped to the well pads through a temporary surface line.
- g. Centralize (or consolidate) oil and gas processing facilities (e.g., separation, dehydration, sweetening).
- h. Utilize directional drilling to reduce construction-related emissions and decrease surface disturbance and vegetation impacts.
- i. Install vapor recovery units on all oil and condensate tanks.
- j. Tighten connections and replace packing to minimize leaks and fugitive emissions.
- k. Install and maintain low volatile organic compound-emitting hatches, seals, and valves on production equipment.
- l. Minimize use of toxic materials. May include substituting organic additives, polymers, or biodegradable additives for oil-based mud, or lubricating with mineral oil and lubricants instead of diesel oil.
- m. Initiate an equipment leak detection and repair program.
- n. Use vapor recovery on truck loading/unloading operations at tanks.
- o. Utilize high-efficiency equipment such as compressed air, electric, or low bleed valves.
- p. To mitigate any potential impact oil and gas development emissions may have on regional ozone formation, the following BMPs would be required for any development projects:
 - Tier II or better drilling rig engines, natural gas-fired drill rig engines, or electrification of drill rig engines
 - Stationary internal combustion engine standard of 2 grams NO_x/brake horsepower-hour (bhp-hr) for engines 300 horsepower and 1 gram NO_x/bhp-hr for engines more than 300 horsepower
 - Low-bleed or no-bleed pneumatic pump valves
 - Dehydrator volatile organic compound emission controls to +95 percent efficiency
- q. If feasible, use of Reduced Emissions Completions, aka Green Completions and Green Workovers, to capture gas produced during well completions that is otherwise vented or flared.
- r. For coal mines, an air quality permit would be required from the Utah Division of Air Quality. The permit would address allowable particulate and other emission levels and would stipulate mechanisms to be used to control emissions. As part of the air quality permit, a dust control plan would be developed and implemented.

Cultural Resources

1. Site-specific cultural resource inventories would be required for all new proposed surface disturbance. In the event that archaeological or historic artifacts are identified during the site inventories, the location of the proposed project would be moved to avoid impacts. Where avoidance is not possible, other measures to protect the sensitive resource (e.g., construction of barriers, interpretation, data documentation) would be used. Efforts to excavate and curate the resource could be taken as a last resort. Consultation with appropriate Native American communities and the State Historic Preservation Officer

would be required. Consultation with local communities would also be a priority (BLM 1999).

2. Refer to Appendix J (*Cultural Resources*) for more information on cultural resource management, site protection, monitoring, and BMPs related to cultural resources for Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area (GSENM/KEPA).
3. Prioritize new field inventories (Class II or III) directed by the National Historic Preservation Act Section 110 as follows:
 - Recreation areas identified for public use (e.g., off-highway vehicle [OHV] open areas)
 - 150 feet (45 meters) (depending on topography) on either side from the centerline of designated road systems and OHV routes
 - Areas of special cultural designation (e.g., Areas of Critical Environmental Concern [ACECs], National Register of Historic Places [NRHP] sites) that have not been fully inventoried
 - Resources eligible for the NRHP at a national level of significance that have not been fully inventoried
 - Areas lacking existing inventories (large areas with no inventory data)
 - 5-mile vulnerability zones surrounding cities and towns
 - Hiking/equestrian trails
4. Cultural surveys and inventories in high-use areas, such as along trails and open routes, would be prioritized to ensure protection of vulnerable cultural and historic resources. Beyond these areas, inventory and research efforts would be expanded to fill in the information gaps and complete research that would contribute to protection of sites.
5. Prior to authorizing surface-disturbing activities in areas where cultural sites and their associated landscape contributes to eligibility for the NRHP, the BLM would conduct a viewshed analysis and consultation to inform appropriate site locations outside of the viewshed or apply mitigation to minimize impacts on the setting component.
6. Provide opportunities for local interpretation (for local population) of cultural resources and public education (for general resource users).

Fish and Wildlife and Special Status Species

General

1. Reduce impacts on fish and wildlife resources by applying the following BMPs as appropriate when conducting mineral exploration and development. Application of these BMPs would be considered and applied during project-specific NEPA reviews, as appropriate.
 - a. Directional drilling of oil and gas wells
 - b. Drilling of multiple wells from a single pad
 - c. Closed drilling systems
 - d. Cluster development
 - e. Belowground wellheads
 - f. Remote well monitoring
 - g. Piping of produced liquids to centralized tank batteries off site to reduce traffic to individual wells
 - h. Transportation planning (i.e., to reduce road density and traffic volumes)

- i. Compensatory mitigation
 - j. Noise-reduction techniques and designs
 - k. Installation of raptor anti-perch devices in greater sage-grouse habitat on a case-by-case basis
 - l. Monitoring of wildlife populations during drilling operations
 - m. Avoidance of human activity between 8:00 p.m. and 8:00 a.m. from March through May 15 within 0.25 mile of the perimeter of occupied sage-grouse leks
 - n. Onsite bioremediation of oil field waste and spills
 - o. Removal of trash, junk, waste, and other materials not in current use
 - p. Reclamation of all disturbed surface areas promptly, performance of concurrent reclamation as necessary, and minimization of the total amount of surface disturbance
 - q. Stripping and separation of soil surface horizons where feasible and reapplication in proper sequence during reclamation
 - r. Establishment of vegetation cover on soil stockpiles that are to be in place longer than 1 year
 - s. Construction and rehabilitation of temporary roads, consistent with intended use, to minimize total surface disturbance
 - t. Consideration of temporary measures such as silt fences, straw bales, and mulching to trap sediment in sensitive areas until reclaimed areas are stabilized with vegetation
 - u. Interim reclamation of well locations and access roads after wells are put into production
 - v. Reshaping of all areas to be permanently reclaimed to the approximate original contour, providing for proper surface drainage (BLM 2008)
2. The size of water storage tanks and troughs should accommodate the expected needs of wildlife using them (BLM 2008).
 3. Water should be left at the site for wildlife. Wells should be cased to prevent cave-ins, and well sites should be fenced (BLM 2008).
 4. If sensitive wildlife or wildlife habitat is identified, the location of the proposed project may be moved or the project modified to reduce impacts (BLM 1999).
 5. Require wildlife-passable fences, consistent with the species found in the area, and essential for effective range management or other administrative functions.
 6. Apply BMPs for bees and other pollinators described in the *Pollinator-Friendly Best Management Practices on Federal Lands* (USFWS 2015a) and the National Strategy to Promote the Health of Honey Bees and other Pollinators (Pollinator Health Task Force 2015).
 7. Follow the guidance provided in WO IM 2016-023, Reducing Preventable Wildlife Mortalities.
 8. Disturbance will occur outside of the migratory bird nesting season. If disturbance cannot occur outside of the entire nesting season window, disturbance should occur outside of the prime nesting season (April 1–July 31). If disturbance must occur within the nesting season, site-specific nest surveys will be conducted.

Water Developments

1. Continue to work with the Utah Division of Wildlife Resources (UDWR) and conservation organizations to establish additional water developments, subject to NEPA consideration, and maintain existing water developments to improve wildlife distribution and encourage habitat use by native wildlife species and introduced nonnative species. BLM will file for

water rights on any water developments over 100 gallons per Title 73 Chapter 3 Section 1.5 of Utah Code of Water and Irrigation.

2. Storage structures should be designed to provide water for wildlife. Drinking ramps should be installed, and their heights should not prohibit young wildlife from obtaining water (BLM 2008).

Big Game

1. Apply timing restrictions on surface-disturbing activities. Dates for big game habitat restrictions include:
 - a. Pronghorn: Prohibit surface-disturbing activities in crucial pronghorn habitat from May 15 through June 15 during fawning season.
 - b. Desert Bighorn Sheep: Prohibit surface-disturbing activities in crucial desert bighorn sheep habitat from April 1 through June 15 for lambing and from October 15 through December 15 for rutting.
 - c. Mule Deer and Elk: Prohibit surface-disturbing activities in crucial mule deer and elk winter range from November 15 to April 15 unless the activity would improve mule deer or elk habitat.
2. Plan maintenance would accommodate future minor adjustments to crucial wildlife habitat boundaries periodically made by UDWR.
3. Prohibit placement of new permanent structures or roads within 1 mile of known big game migration corridors.

Raptors

1. Implement the following BMPs (adapted from the U.S. Fish and Wildlife Service [USFWS] *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances*) as Conditions of Approval to all BLM use authorizations that have the potential to adversely affect nesting raptors or would cause occupied nest sites to become unsuitable for nesting in subsequent years:
 - a. Prohibit disruptive activities to nesting raptors within 0.25 mile of a raptor nest during the following time periods (modifications of spatial and seasonal buffers for BLM-authorized actions would be permitted as long as protection of nesting raptors is ensured):
 - i. Great-horned owl: December 1–September 31
 - ii. Boreal owl: February 1–July 31
 - iii. Long-eared owl: February 1–August 15
 - iv. Screech owl: March 1–August 15
 - v. Northern saw-whet owl: March 1–August 31
 - vi. Northern pygmy owl: April 1–August 1
 - vii. Prairie falcon: April 1–August 31
 - viii. Flammulated owl: April 1–30
 - b. Prohibit disruptive activities to nesting raptors within 0.5 mile of raptor nests during the following time periods (modifications of spatial and seasonal buffers for BLM-authorized actions would be permitted as long as protection of nesting raptors is ensured):

- i. Golden eagle: January 1–August 31
 - ii. Red-tailed hawk: March 15–August 15
 - iii. Cooper’s hawk and sharp-shinned hawk: March 15–August 31
 - iv. Swainson’s hawk: March 1–August 31
 - v. Northern harrier: April 1–August 15
 - vi. Merlin and osprey: April 1–August 31
 - vii. Turkey vulture: May 1–August 15
- c. Minimize and/or mitigate habitat loss or fragmentation both within and outside of raptor nest buffers, which can include the following measures:
- i. Drill multiple wellheads per pad.
 - ii. Limit access roads and avoid loop roads to well pads.
 - iii. Effectively rehabilitate or restore plugged and abandoned well locations and access roads that are no longer required.
 - iv. Rehabilitate or restore areas affected by wildland fires to prevent establishment of nonnative invasive annual species.
 - v. Implement vegetation treatments and riparian restoration projects to achieve *Utah Standards for Rangeland Health*.
 - vi. Create artificial nesting structures if appropriate in areas where preferred nesting substrates are limited.
- d. Protect unoccupied raptor nests (3 years of non-use) but allow for permanent (long-term) facilities and structures to be constructed within the spatial buffer zone, outside of the breeding season as long as they would not cause the nest site to become unsuitable for future nesting. Non-permanent (short-term) activities would be allowed within the spatial buffer of nests as long as those activities are shown to not affect nesting raptors.
- e. Delay excavation and studies of cultural resources in caves and around cliff areas until a qualified biologist surveys the area to be disturbed by the activity for the presence of raptors or nest sites. If raptors are present, reschedule the project to occur outside of the seasonal buffer for the identified species.
- f. Review hazardous fuel reduction projects and shrub-steppe restoration projects for drought, and high possible impacts on nesting raptors. Avoid the removal of trees containing either stick nests or nesting cavities through prescribed fire or mechanical or manual treatments.
- g. Locate sheep camps and other temporary intrusions in areas away from raptor nest sites during the nesting season. Locate the placement of salt and mineral blocks away from nesting areas.
- h. Prioritize livestock management practices that maintain or enhance vegetative attributes that preserve raptor prey species density and diversity.
- i. Locate Special Recreation Management Areas that are developed for OHV use outside of areas that have important nesting, roosting, or foraging habitats for raptors. Limit OHV use to designated roads, trails, and managed open areas and not in areas important to raptors for nesting, roosting, and foraging. Areas for OHV events would be surveyed by a qualified wildlife biologist to determine if the area is used by raptors and potential conflicts would be identified and either avoided or mitigated prior to the issuance of any permit.

- j. Analyze lands proposed for disposal that include raptor nesting, roosting, or foraging areas for relative significance before a decision is made for disposal or retention.
 - k. Avoid the development of biking trails near raptor nesting areas. Authorize rock-climbing activities in areas where there are no conflicts with cliff-nesting raptors.
 - l. Consider creating artificial nest structures in nearby suitable habitat (if it exists) and seasonal protection of nest sites through fencing or other restrictions in recreation high-use areas where raptor nest sites have been made unsuitable by existing disturbance or habitat alteration (BLM 2008, Appendix 2).
2. Prohibit disruptive activities within 1 mile of peregrine falcon nest sites from February 1 to August 31.
 3. Comply with *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006) and *Avian Protection Plan (APP) Guidelines* (Avian Power Line Interaction Committee and USFWS 2005) for new powerline construction (including upgrades and reconstruction) to prevent electrocution of raptors.

Special Status Species

General

1. Areas subject to surface disturbance would be evaluated for the presence of threatened, endangered, or candidate animal or plant species. This is usually accomplished through the completion of a biological clearance. An on-the-ground inspection by a qualified biologist is required. In cases where threatened, endangered, or candidate species are affected, the preferred response would be to modify the proposed action to avoid the species or its habitat (avoidance). If avoidance of a threatened, endangered, or candidate species or its habitat is not possible, a Section 7 consultation with USFWS would be required and a biological assessment would be prepared to recommend actions to protect the species or its habitat (BLM 2008).
2. Avoid, control, or regulate surface-disturbing and disruptive activities on a case-by-case basis to minimize impacts on identified crucial habitat for special status species for the purpose of protecting these species and their associated habitats.
3. In cases where special status species may be affected by a project, the project would be relocated or modified to avoid species or their habitat in consultation with USFWS.
4. Should special status species be found, temporarily stop surface-disturbing and disruptive activities until species-specific protective and/or mitigation measures are developed and implemented, in consultation with USFWS and/or UDWR when applicable.
5. Consider and implement the appropriate guidelines and management recommendations presented in current and future species recovery or conservation plans (as revised), or alternative management strategies developed in consultation with USFWS and/or UDWR).
6. Prioritize the maintenance of natural flows and flood events. The maintenance of instream flows would provide adequate water for natural structure and function of riparian vegetation, which serves as habitat for many special status animal species.
7. Livestock grazing allotments would be evaluated, and grazing as it relates to all endangered species would be addressed during management processes.
8. Apply BMPs to avoid or reduce fragmenting habitat, including:
 - Co-locating communication and other facilities
 - Employing directional drilling for oil and gas

- Using topographic and vegetative screening to reduce the influence of intrusions
 - Applying compensatory and offsite mitigation during implementation-level decisions, as appropriate
9. Follow the BMPs established in the *Pollinator-Friendly Best Management Practices on Federal Lands* (USFWS 2015a).
 10. Avoid surface-disturbing activities or placement of permanent facilities in areas where there are known populations of endemic plant species. Surveys for endemic plant species may be required during site-specific permitting in areas where there are known or likely occurrences of endemic plants.
 11. Consider changes to livestock grazing season of use (or pasture rotation) so that no grazing occurs in Kodachrome bladderpod habitat during the flowering and fruiting period.

Special Status Plant Species

1. Surface-disturbing projects or activities would not be allowed in identified special status plant populations (BLM 1999).
2. Surface-disturbing research would generally not be allowed in special status species habitat, except where deemed appropriate in consultation with USFWS (BLM 1999).
3. Appropriate actions would be taken to prevent trampling of the plants by visitors in high-use areas. These actions may include replanting native vegetation or construction of barriers.
4. Areas may be closed if necessary to protect special status plant species. Barriers would be constructed and restoration work initiated to stabilize the soil and banks and provide the best possible habitat for these plants.

Special Status Fish Species

1. Use of chemical substances that may affect the Colorado pikeminnow or the razorback sucker downstream habitat may not be used (BLM 1999).

Special Status Raptor Species

1. All BMPs referenced for general raptor species under the *Fish and Wildlife* section also apply to special status raptor species (BLM 2008, Appendix 2).
2. Prohibit surface-disturbing activities within 0.25 mile around special status raptor species nest sites during the following time periods:
 - Short-eared owl: March 1–August 1
 - Burrowing owl: March 1–August 31
3. Protect unoccupied special status species raptor nests in compliance with the BLM's raptor BMPs (BLM 2008, Appendix 2).
4. Apply *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (USFWS 2002a) to all land use activities.
5. No designated climbing areas would be allowed within known special-status raptor species nesting areas (BLM 1999).

Bald Eagle

1. Place restrictions on all authorized activities that may adversely affect bald eagles, their breeding habitat, roosting sites, and known winter concentration areas to avoid or minimize potential impacts. Measures include, but may not be limited to, seasonal/daily timing limitations and/or spatial buffers as follows:

- a. Restrict temporary activities or habitat alterations that may disturb nesting bald eagles from January 1 to August 31 within 1 mile of bald eagle nest sites. Exceptions may be granted where no nesting behavior is initiated prior to June 1.
 - b. Restrict temporary activities or habitat alterations that may disturb bald eagle within 0.5 mile of known winter concentration areas from November 1 to March 31. Where daily activities occur within these spatial buffers and area approved through subsequent consultation, activities should also be properly scheduled to occur after 9 a.m. and terminate at least 1 hour before official sunset to ensure that bald eagles using these roosts are allowed the opportunity to vacate their roost in the morning and return undisturbed in the evening.
 - c. Do not place any permanent infrastructure within 1 mile of bald eagle nest sites or within 0.5 mile of bald eagle winter concentration areas.
2. Conduct appropriately timed surveys in suitable bald eagle nesting habitat or identified concentration areas in accordance with approved protocols prior to any activities that may disturb bald eagles. Surveys would be conducted only by BLM-approved individuals or personnel.
 3. The BLM shall, in coordination with cooperating agencies and/or partners (e.g., UDWR and USFWS), verify annual status (active versus inactive) of all known bald eagle nests and other identified concentration areas on BLM-administered surface lands.
 4. BLM-administered surface lands within 1 mile of bald eagle nests, or identified communal winter roosts, should not be exchanged or sold. If it is imperative that these lands be transferred out of BLM ownership, then every effort should be made to include conservation easements or voluntary conservation restrictions to protect the bald eagles and support their conservation.
 5. Proponents of BLM-authorized actions would be advised that roadside carrion can attract foraging bald eagles and potentially increase the risk of vehicle collisions with individual bald eagles feeding on carrion. When carrion occurs on the road, appropriate officials would be notified to initiate necessary removal on a weekly basis and record the location.
 6. The BLM would make educational information available to project proponents and the general public pertaining to the following topics:
 - a. Appropriate vehicle speeds and the associated benefit of reduced vehicle collisions with wildlife
 - b. Use of lead shot (particularly over water bodies)
 - c. Use of lead fishing weights
 - d. General ecological awareness of habitat disturbance
 7. Because bald eagles are often dependent on aquatic species as prey items, the BLM would periodically review existing water quality records (e.g., Utah Department of Environmental Quality, UDWR, and U.S. Geological Survey) from monitoring stations on or near important bald eagle habitats (i.e., nests, roosts, and concentration areas) on BLM-administered surface lands for any conditions that could adversely affect bald eagles or their prey. If water quality problems are identified, the BLM would contact the appropriate jurisdictional entity to cooperatively monitor the condition and/or take corrective action (BLM 2008, Appendix 9).

Condor

1. Disturbance activity will avoid roost sites by 0.5 mile and nest sites by 1 mile (Romin and Muck 2002).
2. Garbage will be properly disposed.

Mexican Spotted Owl

1. The BLM would place restrictions on all authorized (permitted) activities that may adversely affect Mexican spotted owl (MSO) in identified protected activity centers (PACs), breeding habitat, or designated critical habitat in order to reduce the potential for adverse impacts on the species:
 - a. Surveys, according to USFWS protocol, would be required prior to any disturbance-related activities that would have the potential to affect MSO, unless current species occupancy and distribution information is complete and available. All surveys would be conducted by USFWS-certified individuals and approved by the BLM authorized officer:
 - i. Assess habitat suitability for nesting and foraging using accepted habitat models in conjunction with field reviews. Apply the appropriate conservation measures below if project activities occur within 0.5 mile of suitable owl habitat, dependent in part on whether the action is temporary or permanent:
 1. For all temporary actions that may affect owls or suitable habitat:
 - a. If the action occurs entirely outside of the owl breeding season and leaves no permanent structure or permanent habitat disturbance, the action can proceed without an occupancy survey.
 - b. If the action occurs during a breeding season, survey for owls prior to commencing the activity. If owls are found, the activity should be delayed until the end of the breeding season.
 - c. Eliminate access routes created by a project through such means as raking out scars, revegetating, and gating access points.
 2. For all permanent actions that may affect owls or suitable habitat:
 - a. Survey for 2 consecutive years for owls according to established protocol prior to commencing the activity. If owls are found, no actions would occur within 0.5 mile of identified nest sites. If the nest site is unknown, no activity would occur within the designated PACs. Avoid placing permanent structures within 0.5 mile of suitable habitat unless it has been surveyed and is not occupied. Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 A-weighted decibels at 0.5 mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5-mile for suitable habitat, including canyon rims. Limit disturbances to and within suitable owl habitat by staying on designated routes. Limit new access routes created by the project.
2. The BLM would, as a condition of approval on any project proposed within identified PACs and designated critical habitat within spatial buffers for MSO nests (0.5 mile), ensure that project proponents are notified of their responsibilities for rehabilitation of temporary access routes and other temporary surface disturbances created by their project according

to individual BLM field office standards and procedures or those determined in the project-specific Section 7 consultation.

- a. Monitoring results should document what, if any, impacts on individuals or habitat may occur during project construction/implementation. In addition, monitoring should document successes or failures of any impact minimization or mitigation measures. Monitoring results would be considered an opportunity for adaptive management, and as such would be carried forward in the design and implementation of future projects.
3. For all survey and monitoring actions:
 - a. Provide reports to the affected field offices within 15 days of completion of survey or monitoring efforts.
 - b. Report any detection of MSO during survey or monitoring activities to the authorized officer within 48 hours.
 4. The BLM would, in areas of designated critical habitat, ensure that any physical or biological factors (i.e., the primary constituent elements), as identified in determining and designating such habitat, remain intact during implementation of any BLM-authorized activity.
 5. For all BLM actions that “may adversely affect” the primary constituent elements in any suitable MSO habitat, the BLM would implement measures as appropriate to minimize habitat loss or fragmentation, including rehabilitation of access routes created by the project through such means as raking out scars, revegetating, and gating access points.
 6. Where technically and economically feasible, use directional drilling from single drilling pads to reduce surface disturbance, and minimize or eliminate the need to drill in canyon habitats suitable for MSO nesting.
 7. Prior to surface-disturbing activities in MSO PACs, breeding habitats, or designated critical habitat, specific principles should be considered to control erosion. These principles include:
 - a. Conduct long-range transportation planning for large areas to ensure that roads would serve future needs. This would result in less total surface disturbance.
 - b. Avoid surface disturbance in areas with high erosion hazards to the extent possible. Avoid mid-slope locations, headwalls at the source of tributary drainages, inner valley gorges, and excessively wet slopes such as those near springs. In addition, avoid areas where large cuts and fills would be required.
 - c. Locate roads to minimize roadway drainage areas and to avoid modifying the natural drainage areas of small streams.
 8. Project developments should be designed and located to avoid direct or indirect loss or modification of MSO nesting and/or identified roosting habitats.
 9. Water production associated with BLM-authorized actions should be managed to ensure maintenance or enhancement of riparian habitats.
 10. Retain, where appropriate, large down logs, large trees (generally greater than 24 inches in diameter at breast height), and snags as prey habitats in occupied and suitable habitat.
 11. Surface-disturbing projects or activities would not be allowed within 0.5 mile of MSO nests unless USFWS consultation shows no impacts would occur (BLM 1999).

12. Additional restrictions for MSO include:

- **Permit no surface-disturbing activities from March 1 to August 31 in PACs, breeding habitats, or designated critical habitat to avoid disturbance to breeding owls.**
- **If a disruptive or surface-disturbing action occurs entirely outside of the breeding season (March 1 to August 31) and leaves no permanent structure or permanent habitat disturbance, the action may proceed without an occupancy survey. Land disposal actions would require breeding season surveys.**
- **If disruptive actions occur during the seasonal restriction period (March 1 to August 31), surveys (according to USFWS protocol for MSO) would be required prior to commencement of activities. If MSO are detected, activities should be delayed until after the seasonal restriction period.**

Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo

- 1. Where possible, co-locate roads, new trails, and rights-of-way (ROWs) and develop stream crossings at right angles to riparian habitats used by yellow-billed cuckoo and Southwestern willow flycatcher to minimize impacts.**
- 2. Manage for regeneration and multiple age classes in cottonwood/willow vegetation in yellow-billed cuckoo and Southwestern willow flycatcher habitat.**
- 3. Identify sites where Southwestern willow flycatcher habitat restoration (i.e., occupied, suitable, and potentially suitable sites) is warranted. Prioritize riparian restoration in Southwestern willow flycatcher habitat consistent with riparian rehabilitation decisions in the *Water Resources* section.**
- 4. Surveys would be required prior to operations that “may adversely affect” Southwestern willow flycatcher unless species occupancy data and distribution information are complete and available. Surveys would be conducted only by BLM-approved personnel that hold a valid permit from the USFWS to conduct protocol-level surveys. In the event species occurrence is verified, project proponents may be required to modify operational plans at the discretion of the authorized officer. Modifications may include appropriate measures for minimization of adverse effects on Southwestern willow flycatcher and habitat.**
- 5. The BLM would monitor and restrict, when and where necessary, authorized or casual use activities that “may adversely affect” Southwestern willow flycatcher, including but not limited to recreation, mining, and oil and gas activities. Monitoring results should be considered in the design and implementation of future projects.**
- 6. To monitor the impacts of BLM-authorized projects determined “likely to adversely affect” Southwestern willow flycatcher, the BLM should prepare a short report describing progress, including success of implementation of all associated mitigation. Reports should be submitted annually to the USFWS Utah Field Office by March 1 beginning 1 full year from the date of implementation of the proposed action. The report should list and describe the following items:**
 - a. Any unforeseen adverse effects resulting from activities of each site-specific project (may also require re-initiation of formal consultation)**
 - b. If and when any level of anticipated incidental take is approached (as allowed by separate Incidental Take Statements of site-specific formal Section 7 consultation efforts)**
 - c. If and when the level of anticipated take (as allowed by separate Incidental Take Statements from site-specific formal consultations) is exceeded.**

- d. Results of annual, periodic monitoring that evaluates the effectiveness of the reasonable and prudent measures or terms and conditions of the site-specific consultation
7. The BLM should avoid granting activity permits or authorizing development actions in Southwestern willow flycatcher habitat. Unoccupied potential habitat should be protected in order to preserve it for future management actions associated with flycatcher recovery.
8. The BLM would ensure that the project design incorporates measures to avoid direct disturbance to populations and suitable habitats where possible. At a minimum, project designs should include consideration of water flows, slope, seasonal and spatial buffers, possible fencing, and pre-activity flagging of critical areas for avoidance.
9. The BLM would continue to address illegal and unauthorized OHV use and activity upon BLM-administered surface lands. To protect, conserve, and recover the Southwestern willow flycatcher in areas of heavy unauthorized use, temporary closures or use restrictions beyond those already in place may be imposed. As funding allows, the BLM should complete a comprehensive assessment of all OHV use areas that interface with Southwestern willow flycatcher populations. Comparison of Southwestern willow flycatcher populations and OHV use areas using GIS would give BLM personnel another tool to manage and/or minimize impacts.
10. All surface-disturbing activities should be restricted within a 0.25-mile buffer from suitable riparian habitats, and permanent surface disturbances should be avoided within 0.5 mile of suitable Southwestern willow flycatcher habitat:
 - a. Unavoidable ground-disturbing activities in occupied Southwestern willow flycatcher habitat should be conducted only when preceded by current year survey, should only occur between August 16 and April 14 (the period when Southwestern willow flycatchers are not likely to be breeding), and should be monitored to ensure that adverse impacts on Southwestern willow flycatcher are minimized or avoided and to document the success of project-specific mitigation/protection measures. As monitoring is relatively undefined, project-specific requirements would be identified.
11. The BLM would properly consider nesting periods for Southwestern willow flycatcher when conducting horse-gathering operations in the vicinity of habitat.
12. The BLM would ensure that plans for water extraction and disposal are designed to avoid changes in the hydrologic regime that would be likely to result in loss or undue degradation of riparian habitat.
13. Native species would be preferred over nonnative for revegetation of habitat in disturbed areas.
14. The BLM would coordinate with other agencies and private landowners to identify voluntary opportunities to modify current land stewardship practices that may affect the Southwestern willow flycatcher and its habitat.
15. Limit disturbances to within suitable habitat by staying on designated routes.
16. Ground-disturbing activities would require monitoring throughout the duration of the project to ensure that adverse impacts on Southwestern willow flycatcher are avoided. Monitoring results should document what if any impacts on individuals or habitat occur during project construction/implementation. In addition, monitoring should document the successes or failures of any impact minimization or mitigation measures. Monitoring results would be considered an opportunity for adaptive management and as such would be carried forward in the design and implementation of future projects.

17. Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface disturbance and eliminate drilling in Southwestern willow flycatcher habitat.
18. Habitat disturbances (e.g., organized recreational activities requiring special use permits or drilling activities) would be avoided within 0.25 mile of suitable Southwestern willow flycatcher habitat from April 15 to August 15.
19. If Southwestern willow flycatcher nests are located within the grazing allotment, the allotment would be managed with consideration for recommendations provided by the *Southwestern Willow Flycatcher Recovery Plan* (USFWS 2002b) and other applicable research.
20. Avoid surface and vegetation disturbance within Southwestern willow flycatcher designated critical habitat.

Geology

1. If geologic hazards or sensitive geomorphologic features (e.g., arches, natural bridges) are identified during site inventories, the project would be moved or modified to prevent conflicts or damage (BLM 1999).

Paleontological Resources

1. Areas found to have unique paleontological resource would be avoided. In other cases where ubiquitous fossils are present, samples may be taken to record their presence and the proposed activity may be allowed. Measures would be taken to minimize impacts on the remaining paleontological resources (BLM 1999).

Soil Resources

1. Design roads to minimize total disturbance, to conform to topography, and to minimize disruption of natural drainage patterns (BLM 2008).
2. Locate roads on stable terrain (such as ridgetops, natural benches, and flatter transitional slopes near ridges and valley bottoms and moderate sideslopes) and away from slumps, slide-prone areas, concave slopes, clay beds, and where rock layers are parallel to the slope. Locate roads on well-drained soil types; avoid wet area (BLM 2008).
3. Construct roads for surface drainage by using outslopes, crowns, grade changes, drain dips, waterbars, and/or insloping to ditches as appropriate. Maintain drain dips, waterbars, road crowns, insloping, and outsloping, as appropriate, during road maintenance. Grade roads only as necessary (BLM 2008).
4. Slope the road base to the outside edge for surface drainage for local spurs or minor collector roads where low-volume traffic and lower traffic speeds are anticipated. This is also recommended in situations where long intervals between maintenance occur and where minimum excavation is wanted. Outsloping is not recommended on steep slopes. Sloping the road base to the inside edge is an acceptable practice on roads with steep sideslopes and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure (BLM 2008).
5. Construct roads when soils are dry and not frozen, if possible, in soil types with a low sand component. When these types of soils or road surfaces become saturated to a depth of 3 inches, BLM-authorized activities should be limited or cease unless otherwise approved by the authorized officer (BLM 2008).

6. Strip and stockpile topsoil ahead of construction of new roads, if feasible. Reapply soil to cuts and fill slopes prior to revegetation (BLM 2008).
7. Utilize existing roads whenever possible instead of constructing new roads (BLM 2008).
8. If sensitive soil resources are identified, project locations or design would be modified to minimize impacts on sensitive soil crusts (BLM 1999).
9. Implement BMPs designed to improve vegetation cover and/or reduce soil erosion for surface-disturbing activities, especially with regard to sources of saline sediments in the Colorado River Basin.
10. Maintain and/or repair salinity and sediment collection structures as necessary for continual function of the structures.
11. If surface disturbances must occur on saline soils, implement BMPs from erosion and sediment control from the *Construction Stormwater Field Guide* (USDOT 2016).
12. Avoid placing salts or supplements in areas with a high percentage cover of biological soil crusts or near areas with fragile or sensitive soils. Do not place salt or supplements:
 - a. within 0.5 mile of a water source
 - b. within 0.5 mile of developed recreation sites or designated primitive campsites (e.g., day use area or trailhead)
13. Avoid implementing structural range improvements in areas with a high percentage cover of biological soil crust, areas with fragile or sensitive soils, or where removal of biological soil crust would degrade soil, hydrology, or ecosystem function, except where the range improvements would prevent or reduce degradation of soil resources.
14. Initiate reclamation of surface disturbances, where appropriate, during or upon completion of the authorized project.
15. Close and reclaim temporary roads upon completion of the project that required the roads.
16. Remove and reclaim facilities or improvements no longer necessary or desirable, provided no historic properties are affected.
17. Identify areas of “fragile soils” during preparation of project-level plans, as well as necessary mitigation measures to minimize risks and degradation.
18. Develop and implement site-specific restrictions and/or mitigations for activities proposed in fragile soil areas on a case-by-case basis. Surface-disturbing activities must be approved by the BLM before construction and maintenance is authorized.

Water Resources

1. Design roads to minimize total disturbance, to conform to topography, and to minimize disruption of natural drainage patterns (BLM 2008).
2. Retain vegetation between roads and streams to filter runoff caused by roads (BLM 2008).
3. Use culverts that pass, at a minimum, a 50-year storm event and/or have a minimum diameter of 24 inches for permanent stream crossings and a minimum diameter of 18 inches for road crossdrains (BLM 2008).
4. Sediment barriers should be constructed when needed to slow runoff, allow deposition of sediment, and prevent transport from the site. Straining or filtration mechanisms also may be employed for the removal of sediment from runoff (BLM 2008).
5. Avoid locating roads, trails, and landings in wetlands (BLM 2008).
6. Locate, identify, and mark riparian management areas during the design of projects that may cause adverse impacts on riparian management areas (BLM 2008).
7. Keep open water free from slash (BLM 2008).

8. Avoid equipment operation in areas of open water, seeps, and springs (BLM 2008). However, allow equipment that does not inhibit repair and maintenance of range structures. However, allow equipment that does not inhibit repair and maintenance of range structures.
9. Utilize low-ground-pressure equipment (flotation tires or tracks) as necessary to minimize rutting and compaction (BLM 2008).
10. Work in springs and stream beds should be done by hand where possible. If machinery is needed in these areas, select equipment that minimizes disturbance (BLM 2008).
11. Original water sources should be protected, and fenced if required, and an offstream watering supply should be provided near the site (BLM 2008).
12. Impacts on water resources should be assessed for all projects. Specific restrictions include:
 - a. Water developments could only be used when beneficial to GSENM/KEPA resources.
 - b. Water developments could not jeopardize or de-water springs or streams.
 - c. Water could not be diverted out of GSENM/KEPA (exceptions could be made for local community culinary needs if the applicant demonstrates no effect on GSENM/KEPA resources).
 - d. Water quality protection measures would be required for all projects, including subsequent monitoring.
13. No projects or activities resulting in permanent fills or diversions would be allowed in Federal Emergency Management Agency–designated special flood hazard areas (BLM 1999).
14. For Special Recreation Permit holders, require that human waste be buried greater than 300 feet from water sources and/or packed out. When operating in an area less than 300 feet from water sources, permittees must use a portable, self-contained toilet system and/or carry and use wag bags. All human waste that is packed out must be disposed of at a certified disposal site.
15. For Special Recreation Permit hunting authorizations, require entrails from field dressing of harvested animals be buried greater than 300 feet from water sources and/or packed out.
16. Promote Leave-No-Trace principles for protecting water resources by advising hikers to pack out or bury human waste greater than 300 feet from water sources. Require human waste to be packed out in areas where there are no areas greater than 300 feet from water.
17. Implement BMPs for sediment and erosion control where contamination of perennial streams or rivers may occur. Refer to the American Association of State Highway and Transportation Officials Construction Stormwater Field Guide for common BMPs for sediment and erosion control.

Vegetation

General

1. Fill material should be pushed into cut areas and up over back slopes. Depressions should not be left that would trap water or form ponds (BLM 2008).
2. Disturbed areas within road ROWs and utility corridors should be stabilized by vegetation practices designed to hold soil in place and minimize erosion. Vegetation cover should be

- reestablished to increase infiltration and provide additional protection from erosion (BLM 2008).
3. To reduce the potential for the introduction of noxious weeds, all equipment should be cleaned off, by pressure washing, prior to operating on BLM-administered surface lands. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts would be required (BLM 2008).
 4. All seed, hay, straw, mulch, and other vegetation material transported and used on public land weed-free zones for site stability, rehabilitation, or project facilitation should be certified by a qualified Federal, State, or county officer as free of noxious weeds and noxious weed seed (BLM 2008).
 5. For all reclamation (interim and final) activities, seed mixes will be composed of appropriate native and ecotype-adapted seed sources unless all five conditions listed in Manual 1745 and Handbook 1740-2 are met.
 6. Fencing, erosion control structures, and vegetation treatments would each be an option where changes in use would not meet management objectives within the desired time frame.
 7. Maintain sufficient water, to the extent possible, to sustain native flora and fauna when developing/redeveloping springs. Return unused or overflow water to its original drainage.
 8. Vegetation treatments may be authorized where protection of sensitive resources would be ensured.
 9. Focus restoration or vegetation treatment projects based on the following factors:
 - Restore areas that include noxious weed and/or nonnative invasive plants to minimize re-colonization of treated areas by noxious weed and/or nonnative invasive species.
 - Maintain previously treated areas.
 - Achieve other objectives identified in this RMP.
 - Restore special status species habitats to achieve long-term conservation and recovery objectives.
 - Achieve rangeland health objectives.
 10. Control of noxious weeds is a priority in order to achieve the overall vegetation management objectives. Implications for weed management would be considered in all projects. Specific considerations include:
 - a. Chemical treatment methods, including aerial spraying, would generally be restricted to control noxious weed species. BLM employees or contractors with appropriate certification would be responsible for use of chemicals and would take precautions to prevent possible effects on non-target plant species. Use of such chemicals would be allowed near special status plant populations.
 - b. Biological control methods would be used only for the control of noxious or exotic weed species.
 - c. Aerial chemical applications could only be used in limited circumstances where (1) accessibility is so restricted that no other alternative means is available; (2) it can be demonstrated that non-target sensitive species or other GSENM/KEPA resources would not be detrimentally affected; and (3) noxious weeds are presenting a substantial threat to GSENM/KEPA resources.
 - d. All projects would contain restoration/revegetation protocols to minimize re-colonization of treated areas by noxious weed species (BLM 1999).

11. The BLM will coordinate with local cooperative weed partnerships to coordinate noxious weed control efforts among Federal agencies and local groups, as well as improve control efforts for noxious and invasive weeds.
12. If sensitive vegetation is identified, sites may be moved to avoid impacts, or project design modified to reduce impacts. Specific restrictions on projects include:
 - a. No facilities and surface disturbance would be allowed in hanging garden or relict plant areas.
 - b. No vegetation restoration methods would be allowed in hanging gardens or relict plant areas unless needed for noxious weed removal.
 - c. Chaining and pushing would only be allowed in limited circumstances after wildfires (not for management-ignited fires) (BLM 1999).
13. Install shut-off valves on any new water development and consider their installation during routine maintenance of existing water developments. Shut-off valves allow the water collection system to be shut off when not needed or to protect the riparian area from dewatering.
14. In the GSENM/KEPA units, during routine maintenance of existing water developments and on new water developments, install float valves to allow unneeded water to remain in the riparian area. In situations where float valves are not feasible, consider overflows to return unused water to the riparian area.
15. Establish vegetation monitoring plots and other monitoring as deemed necessary (e.g., erosion, dust emissions) to determine the effectiveness of vegetation treatments and large-scale invasive plant treatments in achieving management objectives and to provide baseline data of overall change. Develop standard monitoring methods including pre- and post-treatment and controls and data analysis and interpretation to inform adaptive management.
16. Follow the BMPs established in the *Pollinator-Friendly Best Management Practices on Federal Lands* (USFWS 2015a).
17. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Reclamation

1. Reclamation should be implemented concurrently with construction and site operations to the fullest extent possible. Final reclamation actions should be initiated within 6 months of the termination of operations unless otherwise approved in writing by the authorized officer (BLM 2008).
2. Native plants would be used as a priority for all projects in GSENM/KEPA. There are limited, emergency situations where it may be necessary to use nonnative plants in order to protect GSENM/KEPA resources (i.e., to stabilize soils and displace noxious weeds) (BLM 1999).
3. Each project and area would be evaluated to determine appropriate restoration or revegetation strategies. General guidelines include:
 - a. Restoration would be the goal wherever possible.
 - b. Species used in both restoration and revegetation would comply with the nonnative plant policy.

- c. Revegetation strategies would be used in areas of heavy visitation, where site stabilization is desired.
- d. Restoration/revegetation provisions would be included in all surface-disturbing projects including provisions for post-restoration monitoring in the area. Costs for these activities would be included in the overall cost of the project.
- e. Priority for restoration and revegetation would be given to projects where GSENM/KEPA resources are being affected (BLM 1999).
- f. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Rangelands

1. Apply BLM *Utah Standards for Rangeland Health* to all rangelands.
2. Apply *Guidelines for Grazing Management on BLM Lands in Utah* (BLM 1997) and *Guidelines for Recreation Management for Public Lands in Utah* (BLM undated) for maintenance and rehabilitation of rangelands.
3. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Riparian Areas

1. Maintain and/or enhance riparian areas through project design features and/or stipulations that protect riparian resources.
2. Incorporate design and operation stipulations as necessary to protect riparian and aquatic resources.
3. Emphasize management of uses rather than structural efforts when rehabilitating degraded riparian areas.
4. Existing and new water developments would be maintained and/or managed to reduce detrimental impacts on riparian areas (i.e., dewatering) and to change grazing management within riparian areas when grazing has been identified as a substantial contributing factor.
5. Consult with water rights holders when ROWs are renewed or amended to determine if water necessary to prevent riparian and aquatic degradation could be left in stream through design or operation stipulations.
6. Specific restrictions on projects in riparian areas also include:
 - a. New recreation facilities would be prohibited in riparian areas, except for small signs for resource protection.
 - b. Trails would be kept out of riparian areas wherever possible. Where this is not possible, or where a trail is necessary to prevent the proliferation of social trails, trails would be designed to minimize impacts by placing them away from streams, using soil stabilization structures to prevent erosion, and planting native plants in areas where vegetation has been removed.
 - c. All other projects would need to avoid riparian areas wherever possible.
 - d. Vegetation restoration treatments would not be allowed in these areas, unless needed for removal of noxious weed species or restoration of disturbed sites (BLM 1999).
 - e. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Fire and Fuels

1. If an aircraft is used in reseeded operations in areas with raptor species, ensure that timing is appropriate to eliminate impacts on these species.
2. To reduce fire risks and to restore ecosystems, the following fuels management tools would be allowed: wildland fire use; prescribed fire; and mechanical, chemical, seeding, and biological actions. As conditions allow, the BLM would employ the least intrusive method over more intrusive methods.
3. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Visual Resources

1. Special design and reclamation measures may be required to protect scenic and natural landscape values. These measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, using low-profile permanent facilities, and painting to minimize visual contrasts. Surface-disturbing activities may be moved to avoid sensitive areas or to reduce the visual effects of the activities (BLM 2008).
2. Aboveground facilities requiring painting should be designed to blend in with the surrounding environment. Paint all aboveground structures not requiring safety coloration an environmental color that is two shades darker than the surrounding environment (BLM 2008).
3. Reduce impacts on visual resources by applying the following BMPs as appropriate when conducting mineral exploration and development:
 - a. Directional drilling of oil and gas wells
 - b. Drilling of multiple wells from a single pad
 - c. Closed drilling systems
 - d. Cluster development
 - e. Belowground wellheads
 - f. Remote well monitoring
 - g. Piping of produced liquids to centralized tank batteries off site to reduce traffic to individual wells
 - h. Transportation planning (i.e., to reduce road density and traffic volumes)
 - i. Compensation mitigation
 - j. Noise-reduction techniques and designs
 - k. Installation of raptor anti-perch devices in greater sage-grouse habitat
 - l. Monitoring of wildlife populations during drilling operations
 - m. Avoidance of human activity between 8:00 p.m. and 8:00 a.m. from March through May 15 within 0.25 mile of the perimeter of occupied sage-grouse leks
 - n. Onsite bioremediation of oil field waste and spills
 - o. Removal of trash, junk, waste, and other materials not in current use
 - p. Reclamation of all disturbed surface areas promptly, performance of concurrent reclamation as necessary, and minimization of the total amount of surface disturbance
 - q. Stripping and separation of soil surface horizons where feasible and reapplication in proper sequence during reclamation
 - r. Establishment of vegetation cover on soil stockpiles that are to be in place longer than 1 year

- s. Construction and rehabilitation of temporary roads, consistent with intended use, to minimize total surface disturbance
 - t. Consideration of temporary measures such as silt fences, straw bales, and mulching to trap sediment in sensitive areas until reclaimed areas are stabilized with vegetation
 - u. Interim reclamation of well locations and access roads after wells are put into production
 - v. Reshaping of all areas to be permanently reclaimed to the approximate original contour, providing for proper surface drainage (BLM 2008)
4. All new and reconstructed utility lines (including powerlines up to 34.5 kilovolts) would be buried unless visual quality objectives can be met without burying, geologic conditions make burying infeasible, or burying would produce greater long-term site disturbance (BLM 1999). Bury distribution powerlines and flow lines in or adjacent to access roads (BLM 2008).
 5. Repeat form, line, color, and texture elements to blend facilities with the surrounding landscape (BLM 2008).
 6. Perform final reclamation and recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography (BLM 2008).
 7. Avoid facility placement on steep slopes, ridgetops, and hilltops (BLM 2008).
 8. Reclaim unused well pads within 1 year (BLM 2008).
 9. Cuts, fills, and excavations should be dressed and seeded to blend with surroundings (BLM 2008).
 10. Where possible, place facilities in areas where there is existing surface disturbance.
 11. In Visual Resource Management (VRM) Class II areas, a visual contrast rating should be completed to ensure that visual resource objectives can be met.
 12. All proposed actions should consider the importance of the visual values and should minimize the impacts the project may have on these values. All projects should be designed to be unobtrusive and follow these procedures:
 - a. The visual resource contrast rating system would be used as a guide to analyze potential visual impacts of all proposed actions. Projects should be designed to mitigate impacts and conform to the assigned VRM class.
 - b. Natural or natural-appearing materials would be used as a priority.
 - c. Restoration and revegetation objectives should be met.
 - d. The Monument Manager may allow temporary projects, such as research projects, to exceed VRM standards if the project terminates within 2 years of initiation. Phased mitigation may be required during the project to better conform with prescribed VRM standards.
 - e. Existing facilities would be brought into VRM class conformance to the extent practicable when the need or opportunity arises, such as during reconstruction (BLM 1999).
 13. For oil and gas and minerals development, limit the use of artificial lighting during nighttime operations to only that necessary for the safety of operations and personnel. During drilling operations, more lighting may be needed due to safety requirements.
 14. Utilize shielding and aiming techniques, as well as limiting the height of light poles to reduce glare and avoid light shining above horizon(s).

15. For oil and gas and minerals development, use lights only where needed, use light only when needed, and direct all lighting on site.
16. For oil and gas and minerals development, use motion sensors, timers, or manual switching for areas that require illumination, but are seldom occupied.
17. For oil and gas and minerals development, reduce lamp brightness and select lights that are not broad spectrum or bluish in color.

Forestry and Woodland Products

1. In general, OHV restrictions apply to forestry product areas. However, because forestry product collection activities are controlled by a permit and permits are issued to further overall management objectives, the BLM could authorize access on administrative routes and, in some cases, in areas more than 50 feet away from routes. These areas/provisions would be delineated in the permit prior to its issuance.
2. Use guidance from the *National Seed Strategy for Rehabilitation and Restoration* (USFWS 2015b) to identify priority plant materials needs and actions to meet those needs.

Lands and Realty

1. Communication site plans and evaluations for the siting and construction of communications towers should take into account potential impacts on migratory birds. Measures to avoid and minimize impacts would be considered during design, including the following:
 - a. Avoid known bird migration corridors.
 - b. Eliminate guy wires.
 - c. Restrict the height of towers to fewer than 200 feet.
 - d. Install minimum lighting with use of white strobe lights rather than red (strobe or non-strobe) lights.
 - e. The addition of new communications devices on existing towers would be considered where it is practical and does not present a safety or operational risk.
2. Preference would be to locate ROW developments in common (within existing ROWs/disturbance areas).
3. Construct powerlines greater than 230 kilovolts using non-reflective wire. Towers would be constructed using non-reflective material. Powerlines would not be high-lined unless no other location exists.
4. The following criteria and/or stipulations apply to the management of all ROWs in GSENM/KEPA where they are allowed:
 - a. Bury new and reconstructed utility lines (including powerlines up to 34.5 kilovolts) unless visual quality objectives can be met without burying, geologic conditions make burying infeasible, or burying would produce greater long-term site disturbance.
 - b. Construct steel towers using galvanized steel.
 - c. Prepare a GSENM/KEPA-wide feasibility study to determine the most appropriate location for new communication sites.
5. New and reconstructed powerlines must meet non-electrocution standards for raptors. If electrocution or line strike issues develop with existing powerlines, corrective actions to meet these non-electrocution standards would be taken.

Livestock Grazing

1. Best practices for maintaining range improvements (note that restrictions on many of these BMPs occur on National Park Service [NPS] lands):
 - Aerial application of tebuthiuron (i.e., Spike) or other BLM-approved herbicides for removal or thinning of sagebrush to increase biodiversity and increase grass/forb production within nonstructural range improvements
 - Chemical applications for brush control (e.g., rabbit brush)
 - Mechanical treatments (e.g., chainings, bull hog, harrow) and hand thinning for new nonstructural range improvements or maintenance/improvements of existing nonstructural range improvements
 - Mechanical treatments (e.g., chainings, bull hog) or fire treatments for control of pinyon and/or juniper encroachments
 - Use of controlled burns for brush, pinyon, and/or juniper control (BLM ID Team)
 - Require that all hay used on BLM-administered surface lands be certified weed free.
 - When grazing occurs during the growing season, try to avoid grazing an area at the same time every year.
 - Follow IM 2016-147 or most current BLM policy for wildlife escape ladders. In addition, include a stipulation in new grazing permits to install and maintain functional wildlife escape ladders in water developments.
 - Where grazing occurs during winter, use rest/rotation grazing so that areas are not grazed more than 2 out of 3 years.
 - Where needed, place signs on any gate through which the public passes to indicate the current dates of livestock in the unit (e.g., allotment, riparian pasture) on either side of the fence. Signs should include instructions to keep the gate closed during those times the livestock should be in one of the two adjacent units.

Livestock Grazing BMPs Specific to Glen Canyon National Recreation Area

- The NPS would not allow structural range improvements in proposed wilderness. The NPS would not allow the use of nonnative species for seeding. Seeding would be conducted using native species that are genetically similar strains to local native plants for ecological restoration purposes.
- All water developments must consider the needs of wildlife and recreation and will not be constructed, maintained, or utilized in such a way as to preclude the access to that source by wildlife or recreation users, as outlined in the 1993 interagency agreement between BLM and NPS for grazing management. Water developments will be considered on a case-by-case basis and will not occur in proposed wilderness.
- As outlined in the 1993 interagency agreement between BLM and NPS for grazing management, new line cabins are not appropriate in Glen Canyon NRA.
- Water developments would only be considered outside of proposed wilderness areas on a case-by-case basis pursuant to a site-specific planning and compliance process.

Minerals

Geophysical

1. Limit vehicular use for necessary tasks, such as geophysical exploration including project survey and layout, to OHV designations. Exceptions may be granted by permit on a case-by-case basis.
2. Allow geophysical operations consistent with existing regulations and policies and subject to constraints in areas with special designations (Wilderness Study Area, ACEC, Wild and Scenic River segments tentatively classified as “wild” or “scenic”) as determined through site-specific NEPA analysis.

Recreation

1. Construct recreation sites and provide appropriate sanitation facilities to minimize impacts on resource values and public health and safety and to minimize user conflicts of approved activities and access within an area as appropriate (BLM 2008).
2. Use public education and/or physical barriers (such as rocks, posts, and vegetation) to direct or preclude uses and to minimize impacts on resource values (BLM 2008).
3. Use Leave No Trace, Tread Lightly, and Respect and Protect programs to promote positive stewardship of public lands.
4. Work with local organizations to identify and develop recreation needs on public land.
5. Develop a volunteer program to assist BLM in the management of Recreation and Visitor services.

Wild and Scenic Rivers

1. All proposed actions would be evaluated to determine potential impacts on outstandingly remarkable values for suitable river segments. Projects would be relocated or modified to avoid impacts on identified outstandingly remarkable values (BLM 1999).

Wilderness Study Areas

1. Existing Wilderness Study Areas would be managed under the BLM’s *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (BLM 1999).

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Abbreviations-Acronyms

Term	Definition
ACEC	Area of Critical Environmental Concern
bhp-hr	Brake horsepower-hour
BLM	Bureau of Land Management
BMP	Best management practice
GIS	Geographic information system
GSENM/KEPA	Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area
MSO	Mexican spotted owl
NEPA	National Environmental Policy Act
NO _x	Nitrogen oxides
NPS	National Park Service
NRHP	National Register of Historic Places
OHV	Off-highway vehicle
PAC	Protected activity center
RMP	Resource Management Plan
ROW	Right-of-way
UDWR	Utah Division of Wildlife Resources
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix H

***Stipulations and Exceptions, Modifications, and
Waivers***

August 2018

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Appendix H: Stipulations and Exceptions, Modifications, and Waivers

Introduction

This appendix identifies stipulations for surface-disturbing activities for Grand Staircase-Escalante National Monument (GSENM) and Kanab-Escalante Planning Area Resource Management Plans (RMPs)/Environmental Impact Statement (EIS). Stipulations are generally applied to minerals development (lands excluded from GSENM only) and land use authorizations, permits, and leases issued on Bureau of Land Management (BLM)-administered surface lands. In addition to stipulations, this table includes lease notices. Lease notices are notices of an authorization or contract by which one party conveys the use of property to another party in return for rental payments. The regulations establishing procedures for the processing of these leases are found in 43 Code of Federal Regulations (CFR) 2920 and 2740. Stipulations are applied to activities that are allowed within portions of the Planning Area. Certain areas have been closed to minerals development and other surface-disturbing activities; therefore, because these areas are closed, no stipulations are necessary. However, the table does note where areas are closed so the reader can compare how resources are protected under various alternatives. As appropriate, this appendix also identifies exceptions, modifications, and waivers for these stipulations.

Surface-disturbing activities are actions that alter the vegetation, surface/near-surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other public land values. Surface-disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; construction of pipelines, power lines, and roads; and intensive vegetation treatments (e.g., prescribed fire).

Surface-disturbing activities would typically **not** include such activities as livestock grazing, cross-country hiking, driving on designated routes, and minimum impact filming permits.

Description of Stipulations

Table 1 identifies stipulations for surface-disturbing activities that would be applied during project implementation. The term “stipulation” is used to broadly encompass the various types of limitations that would be placed on mineral development, rights-of-way, renewable energy development, or other surface-disturbing activities.

Exceptions, Modifications, and Waivers

In addition to identifying the stipulations by resource, Table 1 identifies exceptions, modifications, and waiver criteria for the stipulations. Stipulations could be excepted, modified, or waived by the authorized officer, under the circumstances, and in accordance with the requirements, set forth in these RMPs/EIS.

An exception is a one-time exemption for a site-specific authorization; exceptions are determined on a case-by-case basis. A modification is a change to the language or provisions of a lease stipulation, either temporarily or for the term of the lease. A waiver is a permanent exemption from a stipulation.

Exceptions, waivers, and modifications would be considered when the BLM conducts site-specific analysis. The authorized officer may require surveys, mitigation, environmental analysis, or consultation with other government agencies when making this determination.

Table 1 specifies the circumstances under which the general exceptions, modifications, and waivers would apply. The **general** exceptions, modifications, and waivers that commonly apply to many stipulations are as follows:

Exception – The authorized officer may grant an exception to a stipulation if, after environmental review, it is determined that the factors leading to its inclusion in the lease have changed sufficiently such that the protection provided by the stipulation is no longer necessary to meet resource objectives established in the RMPs.

Modification – The authorized officer may modify a stipulation as a result of new information if: (1) the protection provided by the stipulation is no longer necessary to meet resource objectives established in the final RMPs; or (2) the protection provided by the stipulation is no longer sufficient to meet resource objectives established in the final RMPs. The modification may be subject to public review for a least a 30-day period.

Waiver – The authorized officer may waive a stipulation if it is determined that the factors leading to its inclusion in the lease no longer exist. The waiver may be subject to public review for at least a 30-day period.

When no exceptions, modifications and waivers can be granted under a specific resource or resource use (e.g., the general exceptions, modifications, and waivers do not apply for the resource), then the table will state “none.” Specific exceptions, modifications, and waivers have also been developed for some of the lease stipulations or right-of-way avoidance/exclusion criteria and are provided in Table 1.

Standard Terms and Conditions

All oil and gas leases are subject to standard terms and conditions. These include the stipulations that are required in order to protect special status species and to comply with the Endangered Species Act, as well as other resources of concern.

Standard terms and conditions for oil and gas leasing provide for relocation of proposed operations up to 200 meters and for prohibiting surface-disturbing operations for a period not to exceed 60 days, in accordance with 43 CFR 3101.1-2.

Table 1. Stipulations including Exceptions, Modifications, and Waivers by Alternative

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Air Quality (1003)	Leasable Minerals	Planning Area		X	X	X	<p>To mitigate potential impacts that mineral development emissions may have on regional ozone formation or air quality and air quality-related values, the following BMPs would be required for any development projects:</p> <ol style="list-style-type: none"> 1. Tier II or better drilling rig engines, natural gas-fired drill rig engines, or electrification of drill rig engines 2. Stationary internal combustion engine standard of 2 grams NO_x/bhp-hr for engines equal to or less than 300 horsepower and 1 gram NO_x/bhp-hr for engines more than 300 horsepower 3. Low-bleed or no-bleed pneumatic pump valves 4. Dehydrator VOC emission controls to +95 percent efficiency 5. Tank VOC emission controls to +95 percent efficiency equivalent to New Source Performance Standards subpart 0000 <p>Purpose: To mitigate any potential impact mineral development emissions may have on regional ozone formation.</p> <p>Exception: None.</p> <p>Modification: The authorized officer may modify the stated requirements in accordance with updated specifications to comply with the Clean Air Act, or as deemed necessary to ensure that the stipulation is sufficient to maintain air quality and protect air quality related values.</p> <p>Waiver: None.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Air Quality (1003)	Leasable Minerals	Planning Area		X	X	X	<p>All new and replacement internal combustion gas field engines of less than or equal to 300 design rated horsepower shall not emit more than 2 grams of NO_x per horsepower-hour. This requirement does not apply to gas field engines of less than or equal to 40 design-rated horsepower. All new and replacement internal combustion gas field engines of greater than 300 design-rated horsepower must not emit more than 1 gram of NO_x per horsepower-hour.</p> <p>Purpose: To protect air quality and air quality-related values.</p> <p>Exception: None.</p> <p>Modification: The authorized officer may modify the stated requirements in accordance with updated specifications to comply with the Clean Air Act, or as deemed necessary to ensure that the stipulation is sufficient to maintain air quality and protect air quality related values.</p> <p>Waiver: None.</p>
Air Quality (1003)	Leasable Minerals	Planning Area		X	X	X	<p>A Fugitive Dust Control Plan would be required for mineral activities that would disturb a surface area larger than 0.25 acre or that would involve truck traffic on unpaved or untreated surfaces.</p> <p>Purpose: To minimize the generation of fugitive dust.</p> <p>Exception: None.</p> <p>Modification: General modification applies.</p> <p>Waiver: None.</p>

Appendix H: Stipulations and Exceptions, Modifications, and Waivers

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Air Quality	Leasable Minerals Lease Notice	Planning Area		X	X	X	<p>The lessee/operator is given notice that prior to project-specific approval, additional air quality analyses may be required to comply with the National Environmental Policy Act, Federal Land Policy and Management Act, and/or other applicable laws and regulations. Analyses may include dispersion modeling for deposition and visibility impacts analysis, control equipment determinations, and/or emission inventory development. These analyses may result in the imposition of additional project-specific air quality control measures.</p> <p>Purpose: To protection air quality if changes in conditions (environmental or human-derived) differ from those used in the air analysis for these RMPs.</p> <p>Exception: None.</p> <p>Modification: None.</p> <p>Waiver: None.</p>
Fish and Wildlife (1015)	Leasable Minerals TLS ROWs and Renewable Energy Avoidance	Big-game crucial seasonal ranges, birthing habitats, and migration corridors		X			<p>Prohibit surface-disturbing and disruptive activities in big-game crucial seasonal ranges, birthing habitats, and migration corridors during sensitive seasons (from May 15 through June 15 during fawning season).</p> <p>Purpose: To protect big game crucial ranges, birthing habitats, and migration corridors.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Fish and Wildlife (1015)	Leasable Minerals CSU ROWs and Renewable Energy Avoidance	Big-game crucial seasonal ranges, birthing habitats, and migration corridors		X			<p>Co-locate or consolidate placement of permanent facilities in big game habitat so as to limit surface disturbance and habitat fragmentation.</p> <p>Purpose: To protect big game crucial ranges, birthing habitats, and migration corridors.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Fish and Wildlife (1015)	Leasable Minerals CSU ROWs and Renewable Energy Avoidance	Big-game crucial seasonal ranges, birthing habitats, and migration corridors			X		<p>Allow placement of permanent facilities and surface-disturbing and new surface-disruptive activities during sensitive seasons if after coordination with UDWR it is determined that (1) the activity is consistent and compatible with protection, maintenance, or enhancement of the habitat and populations, or (2) the activity is relocated or redesigned to eliminate or reduce detrimental impacts.</p> <p>Purpose: To protect big game crucial ranges, birthing habitats, and migration corridors.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Fish and Wildlife (1015)	Leasable Minerals NSO	Crucial desert bighorn sheep habitat		X			<p>Prohibit surface-disturbing activities in crucial desert bighorn sheep habitat.</p> <p>Purpose: To protect desert bighorn sheep habitat.</p> <p>Exception: None.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Fish and Wildlife (1015)	Leasable Minerals TLS	Crucial desert bighorn sheep habitat			X		<p>Prohibit surface-disturbing activities in crucial desert bighorn sheep habitat from April 1 through June 15 for lambing and from October 15 through December 15 for rutting.</p> <p>Purpose: To minimize disturbance within desert bighorn sheep lambing and rutting habitat.</p> <p>Exception: The authorized officer may grant an exception if it is determined that the animals are not present in the project area or the activity can be completed so as to not adversely affect the animals. Routine operation and maintenance are allowed.</p> <p>Modification: The authorized officer may modify the stipulation if a portion of the area is not being used for lambing or rutting if the habitat is being utilized outside of stipulation boundaries as lambing and rutting habitat and needs to be protected.</p> <p>Waiver: The authorized officer may waive the stipulation if the lambing and rutting habitat is determined to be unsuitable or unoccupied and there is no reasonable likelihood of future use of the lambing or rutting habitat.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Fish and Wildlife (1011)	Leasable Minerals CSU/TLS	Occupied raptor nest sites	X	X	X	X	<p>Prohibit disruptive activities nesting raptors within 0.25 mile of a raptor nest during the following time periods (modifications of spatial and seasonal buffers for BLM-authorized actions would be permitted as long as protection of nesting raptors is ensured).</p> <ul style="list-style-type: none"> • Great-horned owl: December 1–September 31 • Boreal owl: February 1–July 31 • Long-eared owl: February 1–August 15 • Screech owl: March 1–August 15 • Northern saw-whet owl: March 1–August 31 • Northern pygmy owl: April 1–August 1 • Prairie falcon: April 1–August 31 • Flammulated owl: April 1–30 <p>Purpose: To minimize disruptions to nesting raptor species. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.</p>
Fish and Wildlife (1011)	Leasable Minerals TLS	Occupied raptor nest sites	X	X	X	X	<p>Prohibit disruptive activities nesting raptors within 0.5 mile of a raptor nest during the following time periods (modifications of spatial and seasonal buffers for BLM-authorized actions would be permitted as long as protection of nesting raptors is ensured):</p> <ul style="list-style-type: none"> • Golden eagle: January 1–August 31 • Red-tailed hawk: March 15–August 15 • Cooper’s hawk and sharp-shinned hawk: March 15–August 31 • Swainson’s hawk: March 1–August 31 • Northern harrier: April 1–August 15 • Merlin and osprey: April 1–August 31 • Turkey vulture: May 1–August 15 <p>Purpose: To minimize disruptions to nesting raptor species. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Fish and Wildlife (1011)	Leasable Minerals CSU	Peregrine falcon nest sites	X	X	X	X	Prohibit disruptive activities within 1 mile of peregrine falcon nest sites from February 1 to August 31. Purpose: To minimize disruptions to nesting peregrine falcon. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
Special Status Species – Raptors (1022)	Leasable Minerals CSU	Special status species nest sites	X	X	X	X	Prohibit surface-disturbing activities within 0.25 mile around special status raptor species nest sites during the following time periods: <ul style="list-style-type: none"> • Short-eared owl: March 1–August 1 • Other special status raptor species: March 1–August 31 Purpose: To protect special status raptor species. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
Special Status Species (1025)	ROWs and Renewable Energy Exclusion	Special Status Species Conservation and Habitat Enhancement		X	X		Prohibit new ROWs and communication sites in special status habitat and applicable buffers (as specified in Appendix G [BMPs] or current guidance) when predevelopment surveys confirm species' presence or when BLM staff determine that development could inhibit species' recovery. (Alternatives B and C) Purpose: Protect special status species and special status species habitat. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
Special Status Species (1025)	ROWs and Renewable Energy Avoidance	Special Status Species Conservation and Habitat Enhancement				X	Avoid new ROWs and facilities in special status habitat and within applicable buffers (as specified in Appendix G [BMPs] or current guidance) where suitable alternatives exist. Surveys would be required prior to authorization of surface-disturbing activity. Purpose: Protect special status species and special status species habitat. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Special Status Species – Mexican Spotted Owl (MSO) (1029)	Leasable Minerals Moderate (CSU/TLS) Lease Stipulation	MSO habitat and nest sites	X	X	X	X	<p>If project activities occur within 0.5 mile of suitable owl habitat, dependent in part on whether the action is temporary or permanent:</p> <ul style="list-style-type: none"> ● For all temporary actions that may affect owls or suitable habitat: <ul style="list-style-type: none"> ○ If action occurs entirely outside of the owl breeding season and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey. ○ If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity should be delayed until outside of the breeding season. ○ Eliminate access routes created by a project through such means as raking out scars, revegetating, and gating access points. <p>For all permanent actions that may affect owls or suitable habitat:</p> <ul style="list-style-type: none"> ● Survey 2 consecutive years for owls according to established protocol prior to commencing activity. If owls are found, no actions will occur within 0.5 mile of identified nest site. If nest site is unknown, no activity will occur within the designated PACs. ● Avoid placing permanent structures within 0.5 mile of suitable habitat unless surveyed and not occupied. Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5-mile buffer for suitable habitat, including canyon rims. Limit disturbances to and within suitable owl habitat by staying on designated routes. Limit new access routes created by the project. <p>The BLM will, as a condition of approval on any project proposed within identified PACs and designated critical habitat within spatial buffers for MSO nests (0.5 mile), ensure that project proponents are notified as to their responsibilities for rehabilitation of temporary access routes and other temporary surface disturbances created by their project according to individual BLM field office standards and procedures or those determined in the project-specific Section 7 consultation.</p> <p>Purpose: To protect MSO habitat. Exception: General exception applies.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
							<p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
<p>Special Status Species – Mexican Spotted Owl (MSO) (1022, 1029)</p>	<p>Leasable Minerals CSU</p>	<p>MSO Protected Activity Centers</p>	X	X	X	X	<ul style="list-style-type: none"> ● Permit no surface-disturbing activities from March 1 to August 31 in PACs, breeding habitats, or designated critical habitat to avoid disturbance to breeding owls. ● If a disruptive or surface-disturbing action occurs entirely outside of the breeding season (March 1 to August 31) and leaves no permanent structure or permanent habitat disturbance, the action may proceed without an occupancy survey. Land disposal actions would require breeding season surveys. ● If disruptive actions occur during the season restriction (March 1 to August 31), surveys (according to USFWS protocol for MSO) would be required prior to commencement of activities. If MSO are detected, activities should be delayed until after the seasonal restriction. <p>In areas that contain suitable habitat for MSO or designated Critical Habitat, actions would be avoided or restricted that may cause stress and disturbance during nesting and rearing of their young. Appropriate measures would depend on whether the action is temporary or permanent and whether it occurs within or outside the owl nesting season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss. A permanent action continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e., creation of a permanent structure. Current avoidance and minimization measures include the following:</p> <ul style="list-style-type: none"> ● Activities may require monitoring throughout the duration of the project. To ensure desired results are being achieved, minimization measures will be evaluated, and, if necessary, Section 7 consultation reinitiated. ● Any activity that includes water production should be managed to ensure maintenance of enhancement of riparian habitat. ● Where technically and economically feasible, use directional drilling or multiple wells from the same pad to reduce surface

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
							<p>disturbance and eliminate drilling in canyon habitat suitable for MSO nesting.</p> <p>For all temporary actions that may affect owls or suitable habitat:</p> <ul style="list-style-type: none"> • If the action occurs entirely outside of the owl breeding season from March 1 through August 31, and leaves no permanent structure or permanent habitat disturbance, the action can proceed without an occupancy survey. • If the action will occur during a breeding season, a survey for owls is required prior to commencing the activity. If owls are found, the activity should be delayed until outside of the breeding season. • Rehabilitate access routes created by the project through such means as raking out scars, revegetating, gating access points, etc. <p>For all permanent actions that may affect owls or suitable habitat:</p> <ul style="list-style-type: none"> • Survey 2 consecutive years for owls according to accepted protocol prior to commencing activities. • If owls are found, no actions will occur within 0.5 mile of an identified site. If nest site is unknown, no activity will occur within the designated current and historic PAC. • Avoid permanent structures within 0.5 mile of suitable habitat unless surveyed and not occupied. • Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims. Placement of permanent noise-generating facilities should be contingent upon a noise analysis to ensure noise does not encroach upon a 0.5-mile buffer for suitable habitat, including canyon rims. • Limit disturbances to and within suitable habitat by staying on designated and/or approved routes. • Limit new access routes created by the project. <p>Modifications to the Surface Use Plan of Operations may be required in order to protect the MSO and/or habitat in accordance with Section 6 of the lease terms, the Endangered Species Act, and the regulations at 43 CFR 3101.1-2.</p> <p>Purpose: To protect MSO habitat.</p> <p>Exception: General exception applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
							<p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Special Status Species (1030)	Leasable Minerals Moderate (CSU, TLS)	Southwestern willow flycatcher habitats		X	X	X	<p>Prohibit surface-disturbing and disruptive activities within 0.25 mile of suitable habitat for southwestern willow flycatcher from April 15 to August 15. (Alternative B)</p> <p>Prohibit surface-disturbing activities within 0.25 mile of occupied breeding habitat for southwestern willow flycatcher from April 15 to August 15. (Alternative C)</p> <p>Allow surface-disturbing activities within occupied breeding habitat between April 15 and August 15 for southwestern willow flycatcher if after site-specific analysis and consultation with USFWS it is determined that the activity would not adversely affect either the birds or their habitat. (Alternative D)</p> <p>Purpose: To protect Southwestern willow flycatcher habitat.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Special Status Species – Plants (1038)	Leasable Minerals CSU	Special status species plant habitat		X			<p>Prohibit surfacing-disturbing activities within occupied special status plant habitat.</p> <p>Purpose: To protect special status species plant habitat.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Special Status Species – Plants (1038)	Leasable Minerals NSO	Special status species plant habitat			X		<p>Prior to allowing any surface disturbance, a survey must be conducted by a qualified botanist within the habitats of all the special status plants prior to any activity. If species are identified during survey, appropriate measures would be taken to avoid identified special status plants including the following stipulations. Allow surface-disturbing activities within 330 feet or habitat-fragmenting activities within 660 feet of potential, suitable, and occupied special status plant habitat only if (1) the activity is consistent and compatible with protection, maintenance or enhancement of the habitat and populations as outlined in recovery and conservation plans and when such actions would not lead to the need to list the plant, or (2) the activity is relocated or redesigned to eliminate or reduce detrimental impacts to acceptable limits.</p> <p>Purpose: To protect special status species plants.</p> <p>Exception: An exception could be authorized if: (1) the activity is consistent and compatible with protection, maintenance, or enhancement of the habitat and populations as outlined in recovery and conservation plans and when such actions would not lead to the need to list the plant, or (2) the activity is relocated or redesigned to eliminate or reduce detrimental impacts to acceptable limits.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Special Status Species – Plants (1038)	Leasable Minerals CSU	Special status species plant habitat				X	<p>Prior to allowing any surface disturbance, a survey must be conducted by a qualified botanist within the habitats of all the special status plants prior to any activity. If species are identified during survey, appropriate measures would be taken to avoid identified special status plants.</p> <p>Purpose: To protect special status species plants.</p> <p>Exception: An exception could be authorized with appropriate mitigation or in occupied listed species habitat after consultation with USFWS.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Special Status Species – Plants (1039)	Leasable Minerals NSO	Federally listed plant species occupied and suitable habitat		X			Manage mineral leasing as open subject to major constraints (NSO) in federally listed plant species occupied and suitable habitat. Purpose: To protect federally listed plant species habitat. Exception: None. Modification: None. Waiver: None.
Special Status Species – Plants (1039)	Leasable Minerals CSU	Federally listed plant species occupied and suitable habitat			X	X	Prior to approving any surface-disturbing activity, a survey must be conducted by a qualified botanist within all special status plant habitat. In these areas, new surface disturbance would be located in areas that do not adversely affect the species or their habitats. Purpose: To protect federally listed plant species. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
Special Status Species – Fish (1040)	Leasable Minerals NSO	Special status fish habitat		X			Prohibit surface-disturbing and disruptive activities within 0.5 mile of special status fish species habitat. Purpose: To protect special status fish habitat. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
Special Status Species – Fish (1040)	Leasable Minerals CSU	Special status fish habitat			X	X	Avoid surface-disturbing and disruptive activities within 330 feet of current special status fish species habitat. Purpose: To protect special status fish habitat. Exception: An exception could be authorized only if impacts from the proposed action can be adequately mitigated, or the action would benefit the species and/or habitat. (Alternative C) An exception could be authorized only after a site-specific analysis and consultation with USFWS for listed fish species. (Alternative D) Modification: General modification applies. Waiver: General waiver applies.

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
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Lands with Wilderness Characteristics (1043)	Mineral Leasing Closed Salable Minerals Closed ROWs and Renewable Energy Exclusion Area	BLM-identified lands with wilderness characteristics (~481,000 acres) and former SITLA inholdings completely surrounded by a WSA (54,450)		X			Closed to mineral leasing. ROW exclusion area. Closed to mineral material sales. Purpose: To protect the size, naturalness, and outstanding opportunities for solitude and/or primitive and unconfined recreation.
Lands with Wilderness Characteristics (1043)	Mineral Leasing NSO Salable Minerals Open only to existing site expansion ROWs and Renewable Energy Avoidance Area	Lands managed for protection of wilderness characteristics			X		Open to mineral leasing with major constraints (NSO restriction). Salable Minerals: Only existing mineral material sites can be expanded. ROWs will be allowed under the following circumstances: <ul style="list-style-type: none"> • To provide access to non-federal lands (i.e., State and or private lands). • For short-term or temporary land use authorizations where the land would be restored to its original condition. • Where no feasible alternative exists and construction of the ROW would not affect the size of the unit. Purpose: To protect the size, naturalness, and outstanding opportunities for solitude and/or primitive and unconfined recreation. Exception: None. Modification: General modification applies. Waiver: General waiver applies.
Paleontological Resources (1046)	Leasable Minerals CSU	Within Potential Fossil Yield Classification (PFYC) Class 4 and 5 Areas		X	X	X	Surveys and monitoring (where appropriate) are required for all surface-disturbing mineral activities in PFYC Class 4 and 5 areas. Where monitoring encounters vertebrate and vertebrate trace fossils during mineral operations, all operations must cease until the BLM determines whether the site can be avoided, protected, or fully excavated. Purpose: To protect paleontological resources. Exception: None. Modification: General modification applies. Waiver: General waiver applies.

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Soil Resources (1053)	Leasable Minerals NSO	Fragile or sensitive soil areas		X			<p>Prohibit surface-disturbing activities in fragile or sensitive soil areas.</p> <p>Purpose: To protect fragile or sensitive soils.</p> <p>Exception: For minerals related actions, the authorized officer may grant an exception if the operator can provide a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use and mitigate erosion. Roads must be designed to meet BLM road standards for drainage control and surfaced for the appropriate level and type of vehicle use. Sediment, erosion control, and reclamation plans would be required.</p> <p>For ROW proposed actions, the authorized officer may grant an exception if there is no reasonable alternative for relocating the ROW. Sediment and erosion control and reclamation plans would be required.</p> <p>For other surface-disturbing activities, the authorized officer may grant an exception to improve rangeland health so that site characteristics are trending toward those described in the respective ecological site description.</p> <p>Modification: The authorized officer may modify the stipulation if it is determined that the project area is not within fragile or sensitive soils.</p> <p>Waiver: The authorized officer may waive the stipulation if areas mapped as fragile or sensitive are verified as not present on the entire project area.</p>

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			A	B	C	D	
Soil Resources (1053)	Leasable Minerals CSU	Fragile or sensitive soil areas			X	X	<p>Prior to allowing surface disturbance in fragile or sensitive soil areas (e.g., saline soils, highly erosive, late successional biological, expansive), operators would be required to submit a soil health and restoration plan that includes site-specific mitigation measures for activities proposed in fragile or sensitive soil areas. The BLM must approve the plan before surface-disturbing activities would be authorized. The BLM may allow surface disturbance in fragile or sensitive soil areas as long as impacts would be mitigated.</p> <p>Purpose: To protect fragile or sensitive soils.</p> <p>Exception: None.</p> <p>Modification: The authorized officer may modify the stipulation if it is determined that the project area is not within fragile or sensitive soils.</p> <p>Waiver: The authorized officer may waive the stipulation if areas mapped as fragile or sensitive are verified as not present on the entire project area.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Soil Resources (1054)	Leasable Minerals NSO	Slopes greater than 30 percent		X	X	X	<p>Prohibit surface-disturbing activities on slopes greater than 30 percent.</p> <p>Purpose: To limit erosion and protect steep slopes.</p> <p>Exception: For minerals related actions, the authorized officer may grant an exception if the operator can provide a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use and mitigate erosion. Roads must be designed to meet BLM road standards for drainage control and surfaced for the appropriate level and type of vehicle use. Sediment and erosion control and reclamation plans would be required. Under Alternative B, no exceptions for leasable minerals. Under alternatives C and D, exceptions would be considered.</p> <p>For ROW proposed actions, the authorized officer may grant an exception if there is no reasonable alternative for relocating the ROW. Sediment and erosion control and reclamation plans would be required. Under Alternative B, ROW exclusion. Under alternatives C and D, avoidance.</p> <p>Modification: The authorized officer may modify the stipulation if it is determined that the project area does not contain slopes greater than 30 percent.</p> <p>Waiver: The authorized officer may waive the stipulation if it is verified that steep slopes are not present on the entire project area.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
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Water Resources (1061)	Leasable Minerals NSO	Drinking Water Source Protection Zones		X			<p>Prohibit surface-disturbing actions in Drinking Water Source Protection Zones and develop strategies to mitigate any existing BLM-authorized activities that pose a threat to public water systems.</p> <p>Purpose: To protect drinking water.</p> <p>Exception: The authorized officer may grant an exception if the operator can provide a hydrogeologic survey and a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use without degrading the quality or quantity of water supplied by the drinking water source. A drinking water source protection plan would be required. When authorized, minimum distance of disturbance from the water source will be defined by the Water Source Protection Zone Classification (1, 2, 3, or 4).</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Water Resources (1061)	Leasable Minerals CSU	Drinking Water Source Protection Zones			X	X	<p>Avoid surface-disturbing activities within Drinking Water Source Protection Zones. Where avoidance is not possible, locate permanent facilities to eliminate potential contamination or pollution sources, and design facilities to prevent contaminated discharges to groundwater.</p> <p>Purpose: To protect culinary water sources</p> <p>Exception: The authorized officer may grant an exception if the operator can provide a hydrogeologic survey and a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use without degrading the quality or quantity of water supplied by the drinking water source. A drinking water source protection plan would be required. When authorized, minimum distance of disturbance from the water source will be defined by the Water Source Protection Zone Classification (1, 2, 3, or 4).</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
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Vegetation (1077)	Leasable Minerals NSO	Riparian and wetland areas		X			<p>Prohibit surface-disturbing activities and permanent facilities within 0.5 mile (2,640 feet) of riparian/wetland areas.</p> <p>Purpose: To protect riparian and wetland areas.</p> <p>Exception: The authorized officer may grant an exception if the operator can provide a hydrologic assessment that includes a description of the geology and potentially affected aquifers and springs and a drilling plan showing how riparian resources would be protected. Riparian monitoring and reclamation plans would also be required. Monitoring would occur prior to, during, and after anticipated surface disturbances to detect impacts on riparian resources.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Vegetation (1077)	Leasable Minerals NSO	Riparian and wetland areas			X	X	<p>Avoid new surface-disturbing activities within 330 feet of riparian/wetland areas unless it could be shown that (1) there are no practical alternatives, (2) all long-term impacts could be fully mitigated, or (3) the activity would benefit and enhance the riparian area (Map 18). Apply CSU on Federal mineral leasing and ROW avoidance.</p> <p>Purpose: To protect riparian and wetland areas.</p> <p>Exception: The authorized officer may grant an exception if the operator can provide a hydrologic assessment that includes a description of the geology and potentially affected aquifers and springs and a drilling plan showing how riparian resources would be protected. Riparian monitoring and reclamation plans would also be required. Monitoring would occur prior to, during, and after anticipated surface disturbances to detect impacts on riparian resources.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Lands and Realty (2010)	Leasable Minerals NSO	R&PP leases		X	X	X	Manage R&PP leases subject to NSO stipulations. If these sites are no longer required, they would be managed consistent with adjacent lands. Purpose: To protect the realization of purposes for which the R&PP lease was issued. Exception: None. Modification: General modification applies. Waiver: General waiver applies.
Visual Resources (1086)	Moderate CSU	VRM Class II Areas		X	X	X	Surface-disturbing activities must meet the objectives of VRM Class II. Purpose: To protect high-quality visual resources. Exception: None. Modification: None. Waiver: None.
Visual Resources (1093)	ROWs and Renewable Energy ROW Exclusion	Sensitive visual areas (i.e., visible areas inventoried as high sensitivity within the foreground/mid-ground and background distance zones)		X			Sensitive visual areas (i.e., visible areas inventoried as high sensitivity within the foreground/mid-ground and background distance zones) are also excluded from utility-scale renewable energy development. Purpose: To protect visual high sensitivity areas. Exception: None. Modification: General modification applies. Waiver: General waiver applies.
Visual Resources (1093)	ROWs and Renewable Energy ROW Avoidance	Sensitive visual areas (i.e., visible areas inventoried as high sensitivity within the foreground/mid-ground and background distance zones)			X	X	Sensitive visual areas (i.e., visible areas inventoried as high sensitivity within the foreground/mid-ground and background distance zones) are variance areas for utility-scale renewable energy developments. Purpose: To protect visual high sensitivity areas. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.

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Recreation and Visitor Services (2073)	Leasable Minerals (NSO)	Developed recreation sites and backcountry airstrips	X	X	X	X	Apply an NSO stipulation for leasable minerals to developed recreation sites and backcountry airstrips. Purpose: Provide for safety. Exception: General exceptions applies. Modification: General modification applies. Waiver: General waiver applies.
Recreation (2081-2096)	Leasable Minerals NSO	Escalante Canyons SRMA Burr Trail RMZ Circle Cliffs SRMA Fiftymile Mountain SRMA Highway 12 Corridor SRMA Little Desert RMZ Highway 89 Corridor SRMA Hole-in-the-Rock Road RMZ Nephi Pasture SRMA Paria-Hackberry SRMA Cottonwood Road RMZ Skutumpah SRMA Paria Canyon-Vermilion Cliffs SRMA		X			Specific SRMAs and RMZs open to mineral leasing with major constraints (NSO). Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values. Exception: None. Modification: General modification applies. Waiver: General waiver applies.
Recreation (2097)	Leasable Minerals CSU	Kanab-Escalante ERMA		X			Mineral operations would be subject to the following CSU and TLS stipulations: 1. Multiple wells per pad as appropriate. 2. Well pads would be placed no closer than 160 acres apart. 3. Construction, drilling, and completion activities restricted between March 1–June 15 and September 1–October 31.

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
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							<p>4. Production facilities would be co-located and designed to minimize surface impacts. Pipelines and utilities would be placed within or immediately adjacent to existing roads.</p> <p>5. Limit unreclaimed surface disturbance to no more than 15 acres per well pad (including associated facilities, roads, pipelines, and utilities) following interim reclamation.</p> <p>6. Extensive interim reclamation of roadway disturbance and reclamation of well pads to minimize long-term surface disturbance.</p> <p>7. Final reclamation fully restoring the original landform. Travel routes would be restored to their original character.</p> <p>8. This stipulation would allow for geophysical operations.</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p> <p>Exception: Where it can be shown that the proposed operation would not cause unacceptable impacts, the authorized officer may grant an exception based on any of the factors listed below:</p> <ul style="list-style-type: none"> a. If alternative placement of well pads would enable the operator to use areas that have been previously disturbed. b. If alternative placement of well pads would minimize the need for new road construction. c. If there is a demonstrated reduction in impacts on resources. d. If there is a valid safety concern. e. An exception to the 160-acre placement could be granted if the proponent successfully demonstrates that geologic factors preclude access to a substantial portion of the oil and gas reservoir. An exception to the 160-acre placement would still require, where practical, use of directional drilling technology and other BMPs that would result in a reduction in surface disturbance and the number of oil and gas related facilities. <p>Modification: The authorized officer may modify a stipulation as a result of new information if: (1) the protection provided by the stipulation is no longer necessary to meet resource objectives established in the final RMPs; or (2) the protection provided by the stipulation is no longer sufficient to meet resource objectives</p>

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							<p>established in the final RMPs. The modification may be subject to public review for a least a 30-day period.</p> <p>Waiver: The authorized officer may waive a stipulation if it is determined that the factors leading to its inclusion in the lease no longer exist. The waiver may be subject to public review for at least a 30-day period.</p>
Recreation (2083 2088)	Leasable Minerals Closed	Paria River RMZ Burr Trail RMZ		X			<p>Closed to mineral leasing.</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p>
Recreation (2084 2086 2090 2092 2093 2094)	Leasable Minerals NSO	Escalante Canyons SRMA Burr Trail RMZ Highway 12 Corridor SRMA Little Desert RMZ Highway 89 Corridor SRMA Hole in the Rock Road RMZ Cottonwood Road RMZ			X		<p>Specific SRMAs and RMZs open to mineral leasing with major constraints (NSO).</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p> <p>Exception: None.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Recreation (2081 2082 2085 2088 2091 2095 2096 2097)	Leasable Minerals CSU	Circle Cliffs SRMA Fiftymile Mountain SRMA Nephi Pasture SRMA Paria-Hackberry SRMA Skutumpah SRMA Kanab-Escalante ERMA Paria Canyon-Vermilion Cliffs SRMA			X		<p>Open to mineral leasing subject to moderate constraints CSU, including:</p> <ol style="list-style-type: none"> 1. Multiple wells per pad as appropriate. 2. Well pads would be placed no closer than 160 acres apart. In Kanab-Escalante ERMA well pads would be placed no closer than 80 acres apart. 3. Production facilities would be co-located and designed to minimize surface impacts. Pipelines and utilities would be placed within or immediately adjacent to existing roads. 4. Limit unreclaimed surface disturbance to no more than 15 acres per well pad (including associated facilities, roads, pipelines, and utilities) following interim reclamation.

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
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							<p>5. Extensive interim reclamation of roadway disturbance and reclamation of well pads to minimize long-term surface disturbance.</p> <p>6. Final reclamation fully restoring the original landform. Travel routes would be restored to their original character.</p> <p>7. This stipulation would allow for geophysical operations.</p> <p>For the Kanab-Escalante ERMA: Same as above but surface spacing limited to 80 acres and construction, drilling, and completion activities restricted between March 1–June 15 and September 1–October 31.</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p> <p>Exception: Where it can be shown that the proposed operation would not cause unacceptable impacts, the authorized officer may grant an exception based on any of the factors listed below:</p> <ul style="list-style-type: none"> a. If alternative placement of well pads would enable the operator to use areas that have been previously disturbed. b. If alternative placement of well pads would minimize the need for new road construction. c. If there is a demonstrated reduction in the impacts on resources. d. If there is a valid safety concern. e. An exception to the restrictions on well pad density could be granted if the proponent successfully demonstrates that geologic factors preclude access to a substantial portion of the oil and gas reservoir. An exception to the restrictions on well pad density would still require, where practical, use of directional drilling technologies and other BMPs that would result in a reduction in surface disturbance and the number of oil and gas related facilities. <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Recreation (2083)	Leasable Minerals Closed	Paria River RMZ			X		<p>Closed to mineral leasing.</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Recreation (2093)	Leasable Minerals NSO	Little Desert RMZ (tied to OHV open area)				X	<p>Specific SRMAs and RMZs open to mineral leasing with major constraints (NSO).</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p> <p>Exception: General exception applies.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
Recreation (2097)	Leasable Minerals CSU	Kanab-Escalante ERMA				X	<p>Leasable mineral operations would be subject to the following requirements:</p> <ol style="list-style-type: none"> 1. Multiple wells per pad as appropriate. 2. Well pads would be placed no closer than 80 acres apart. 3. Production facilities would be co-located and designed to minimize surface impacts. Pipelines and utilities would be placed within or immediately adjacent to existing roads. 4. Limit unreclaimed surface disturbance to no more than 15 acres per well pad (including associated facilities, roads, pipelines, and utilities) following interim reclamation. 5. Extensive interim reclamation of roadway disturbance and reclamation of well pads to minimize long-term surface disturbance. 6. Final reclamation fully restoring the original landform. Travel routes would be restored to their original character. 7. This stipulation would allow for geophysical operations. 8. Construction, drilling, and completion activities restricted between March 1–June 15 and September 1–October 31. <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p> <p>Exception: Where it can be shown that the proposed operation would not cause unacceptable impacts, the authorized officer may grant an exception based on any of the factors listed below:</p> <ol style="list-style-type: none"> a. If alternative placement of well pads would enable the operator to use areas that have been previously disturbed.

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							<p>b. If alternative placement of well pads would minimize the need for new road construction.</p> <p>c. If there is a demonstrated reduction in the impacts on resources.</p> <p>d. If there is a valid safety concern.</p> <p>e. An exception to the 160-acre placement could be granted if the proponent successfully demonstrates that geologic factors preclude access to a substantial portion of the oil and gas reservoir. An exception to the 160-acre placement would still require, where practical, use of direction drilling technologies and other BMPs that would result in a reduction in surface disturbance and the number of oil and gas related facilities.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies</p>
Recreation (2081–2096)	Salable Minerals Closed	All SRMAs/RMZs		X			<p>Close to mineral material disposal.</p> <p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values.</p>
Recreation (2084 2085 2086 2090 2097 2095 2096)	Salable Minerals Closed in Paria River and Little Desert RMZ Closed to exclusive pits, but open to community pits 5 acres or fewer. Expansion of existing pits would be allowed with application of visual mitigation measures to reduce impacts:	Specific SRMAs/RMZs, as noted			X		<p>Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with important recreation values. In Petrified Wood Area, avoid surface disturbance and placement of facilities near concentrations of wood or in situ logs.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
	<ul style="list-style-type: none"> • Escalante Canyons SRMA • Burr Trail RMZ • Fiftymile Mountain SRMA • Highway 12 Corridor SRMA • Hole-in-the-Rock Road RMZ • Cottonwood Road RMZ • Skutumpah SRMA • Paria Canyon-Vermilion Cliffs SRMA 						
Recreation (2093)	Salable Minerals Closed	Little Desert RMZ				X	Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in areas with intensive recreational use.

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			A	B	C	D	
Recreation (2081 2082 2084 2085 2086 2088 2090 2091 2092 2084 2085 2086 2097)	ROWs and Renewable Energy ROW Avoidance	Escalante Canyons SRMA (1/2) Burr Trail RMZ (2) Circle Cliffs SRMA (2) Fiftymile Mountain SRMA (2) Highway 12 Corridor SRMA (1/2) Highway 89 Corridor SRMA (2) Hole-in-the-Rock Road RMZ (2) Nephi Pasture SRMA (2) Paria Hackberry SRMA (2) Cottonwood Road RMZ (1/2) Skutumpah Road SRMA (2) Paria Canyon Vermilion Cliffs SRMA (2) Kanab-Escalante ERMA (2)		X			These areas would be ROW avoidance areas and subject to the following (as indicated by numbers “1” and “2” in the “applicable area” column). (1) New ROWs would be confined to existing utility corridors. (2) Maintenance, improvement, or upgrade of existing ROWs would be allowed. New ROWs would only be granted to address issues associated with use, maintenance, or improvement of existing road. Purpose: To prevent future placement of transportation and transmission infrastructure in important recreation areas. Exception: General exceptions applies. Modification: General modification applies. Waiver: General waiver applies.
Recreation (2083 2087 2089 2093)	ROWs and Renewable Energy ROW Exclusion	Calf Creek RMZ Spencer Flat RMZ Little Desert RMZ Paria River RMZ		X			These areas would be ROW exclusion areas. Purpose: To prevent future placement of transportation and transmission infrastructure in important recreation areas. Exception: None. Modification: None. Waiver: None.
Recreation (2089)	ROWs and Renewable Energy ROW Avoidance	Spencer Flat RMZ			X		Purpose: To prevent future placement of transportation and transmission infrastructure in important recreation areas. Exception: General exceptions applies Modification: General modification applies. Waiver: General waiver applies.

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Recreation (2083 2087 2093)	ROWs and Renewable Energy ROW Exclusion	Calf Creek RMZ Little Desert RMZ Paria River RMZ			X		These areas would be ROW exclusion areas. Purpose: To prevent future placement of transportation and transmission infrastructure in important recreation areas. Exception: None. Modification: None. Waiver: None.
Recreation (2093)	ROWs and Renewable Energy ROW Exclusion	Little Desert RMZ				X	These areas would be ROW exclusion areas. Purpose: To prevent future placement of transportation and transmission infrastructure in important recreation areas. Exception: None. Modification: None. Waiver: None.
ACEC (3002) ACEC appendix	Leasable Minerals NSO	Alvey Wash ACEC		X			Open to mineral leasing with major constraints (NSO). Surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence. Purpose: To protect relevant and important values in the Alvey Wash ACEC. Exception: None. Modification: None. Waiver: None.
ACEC (3002) ACEC appendix	Other Surface-Disturbing Activities Vegetation Treatments	Butler Valley ACEC		X			Prohibit vegetation treatments in known suitable habitat for special status species plants. Purpose: To protect relevant and important values in the Butler Valley ACEC. Exception: None. Modification: None. Waiver: None.

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ACEC (3002) ACEC appendix	Leasable Minerals NSO	Circle Cliffs ACEC		X			Open to mineral leasing with major constraints (NSO). Class III cultural surveys would be required prior to surface-disturbing activities and surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence. In the Petrified Wood Resource Area, avoid surface disturbance and placement of facilities near concentrations of wood or in situ logs. Purpose: To protect relevant and important values in the Circle Cliffs ACEC. Exception: None. Modification: None. Waiver: None.
ACEC (3002) ACEC appendix	Leasable Minerals CSU	Circle Cliffs ACEC			X		Open to mineral leasing with moderate constraints CSU. Class III cultural surveys would be required prior to surface-disturbing activities and mineral facilities and structures would be avoided in areas where there are known or documented archaeological sites. Where setting is a component of a site's eligibility, a viewshed analysis will be required and facilities would be required to be placed outside the viewshed, or mitigation would be required to avoid adversely affecting the setting. Purpose: To protect relevant and important values in the Circle Cliffs ACEC. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
ACEC (3002) ACEC appendix	Other Surface-Disturbing Activities Vegetation Treatments	Cockscomb East ACEC		X			Prohibit vegetation treatments in known suitable habitat for special status plant species. Purpose: To protect relevant and important values in the Cockscomb East ACEC. Exception: None. Modification: None. Waiver: None.

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
ACEC (3002) ACEC appendix	Leasable Minerals NSO	Cockscomb West ACEC		X			<p>Open to mineral leasing with major constraints (NSO). Class III cultural surveys would be required prior to surface-disturbing activities and surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence.</p> <p>Purpose: To protect relevant and important values in the Cockscomb West ACEC.</p> <p>Exception: Biological Soil Crusts: The authorized officer may grant an exception if the operator can provide a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use and mitigate erosion. Roads must be designed to meet BLM road standards for drainage control and surfaced for the appropriate level and type of vehicle use under the proposed action. Sediment and erosion control and reclamation plans would be required. Reclamation plans must include biological soil crust restoration.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>

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Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
ACEC (3002) ACEC appendix	Leasable Minerals CSU	Cockscomb West ACEC			X		<p>Open to mineral leasing with moderate constraints (CSU). Avoid placement of mineral facilities and structures in areas where there are known or documented archaeological sites. Where setting is a component of a site's eligibility, a viewshed analysis will be required and facilities would be required to be placed outside the viewshed, or mitigation would be required to avoid adversely affecting the setting.</p> <p>Purpose: To protect relevant and important values in the Cockscomb West ACEC.</p> <p>Exception: Biological Soil Crusts: The authorized officer may grant an exception if the operator can provide a plan of development demonstrating that the proposed action would be properly designed and constructed to support the anticipated types and levels of use and mitigate erosion. Roads must be designed to meet BLM road standards for drainage control and surfaced for the appropriate level and type of vehicle use under the proposed action. Sediment and erosion control and reclamation plans would be required. Reclamation plans must include biological soil crust restoration.</p> <p>Modification: General modification applies.</p> <p>Waiver: General waiver applies.</p>
ACEC (3002) ACEC appendix	Leasable Minerals NSO	Hole-in-the-Rock ACEC		X			<p>Open to mineral leasing with major constraints (NSO). Surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence.</p> <p>Purpose: To protect relevant and important values in the Hole-in-the-Rock ACEC.</p> <p>Exception: None.</p> <p>Modification: None.</p> <p>Waiver: None.</p>
ACEC (3002) ACEC appendix	Leasable Minerals NSO	Straight Cliffs/Fiftymile Bench ACEC		X			<p>Open to mineral leasing with major constraints (NSO).</p> <p>Purpose: To protect relevant and important values in the Straight Cliffs/Fiftymile Bench ACEC.</p> <p>Exception: None.</p> <p>Modification: None.</p> <p>Waiver: None.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
ACEC (3002) ACEC appendix	Leasable Minerals CSU	Straight Cliffs/Fiftymile Bench ACEC			X		Open to mineral leasing with moderate constraints (CSU). Class III cultural surveys would be required prior to surface-disturbing activities and surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence. Avoid placement of mineral facilities and structures in areas where there are known or documented archaeological sites. Where setting is a component of a site's eligibility, a viewshed analysis will be required and facilities would be required to be placed outside the viewshed, or mitigation would be required to not adversely impact the setting. Purpose: To protect relevant and important values in the Straight Cliffs/Fiftymile Bench ACEC. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.
ACEC (3002) ACEC appendix	Saleable Closed	Alvey Wash ACEC Circle Cliffs ACEC Cockscomb West ACEC Hole-in-the-Rock ACEC Straight Cliffs / Fiftymile Bench ACEC		X			No exclusive commercial mineral material sites. No community pits larger than 5 acres in size. Allow expansion of existing pits. Apply visual mitigation to reduce visual impacts. Purpose: To minimize the amount of surface disturbance and related impacts on relevant and important values resulting from mineral development in ACECs.
ACEC (3002) ACEC appendix	Saleable Closed	Circle Cliffs ACEC Cockscomb West ACEC Straight Cliffs/Fiftymile Bench ACEC			X		No exclusive commercial mineral material sites. No community pits larger than 5 acres in size. Allow expansion of existing pits. Apply visual mitigation to reduce visual impacts. Purpose: To minimize the amount of surface disturbance and related impacts on relevant and important values resulting from mineral development in ACECs.

Appendix H: Stipulations and Exceptions, Modifications, and Waivers

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
National Trails (3006)	Leasable Minerals NSO ROWs and Renewable Energy Exclusion Area	Old Spanish National Historic Trail (OSNHT) National Trail Management Corridor (NTMC) to include lands up to 3 miles or within the viewshed of the OSNHT, whichever is less, where there is a federal protection component		X			Prohibit new surface-disturbing activities in the OSNHT NTMC. Within KEPA, open to mineral leasing with major constraints (NSO). ROW exclusion area. Allow new crossings only in designated utility corridors. Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in the OSNHT NTMC and to protect the setting along the trail segments. Exception: The authorized officer may grant an exception if the proposed project is not within view of a high potential site or segment as stipulated. Modification: The authorized officer may modify the stipulation to match any changes based on updated information. Waiver: The authorized officer may waive the stipulation if it is determined that high potential sites and segments of the OSNHT do not exist within the lease area.
National Trails (3006)	Leasable Minerals NSO ROWs and Renewable Energy Avoidance Area (except in designated utility corridor)	OSNHT NTMC to include lands up to 0.5 mile or within the viewshed of the OSNHT, whichever is less, where there is a federal protection component			X		Allow mineral leasing subject to NSO unless the proposed project and its associated impacts are not visible from the OSNHT. ROW avoidance area, except in designated utility corridors. Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in the OSNHT NTMC and to protect the setting along the trail segments. Exception: The authorized officer may grant an exception if the proposed project is not within view of a high potential site or segment as stipulated. Modification: The authorized officer may modify the stipulation to match any changes based on updated information. Waiver: The authorized officer may waive the stipulation if it is determined that high potential sites and segments of the OSNHT do not exist within the lease area.

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
National Trails (3006)	Leasable Minerals CSU ROWs and Renewable Energy Open	OSNHT NTMC to include lands up to 300 feet within the viewshed of the OSNHT, whichever is less, where there is a federal protection component				X	Open to mineral leasing with moderate constraints CSU. Purpose: To minimize the amount of surface disturbance and related impacts resulting from mineral development in the OSNHT NTMC and to protect the setting along the trail segments. Exception: The authorized officer may grant an exception if the proposed project is not within view of a high potential site or segment as stipulated. Modification: The authorized officer may modify the stipulation to match any changes based on updated information. Waiver: The authorized officer may waive the stipulation if it is determined that high potential sites and segments of the OSNHT do not exist within the lease area.
Wild & Scenic Rivers (3014)	Leasable Minerals Closed Salable Minerals Closed ROWs and Renewable Energy Exclusion Area	Suitable WSR segments and associated corridors that are tentatively classified as wild or scenic	X	X	X	X	Purpose: To protect the tentative classification and outstandingly remarkable values along suitable river corridors.
Wild & Scenic Rivers (3014)	Leasable Minerals Closed Salable Minerals Open ROWs and Renewable Energy Exclusion Area	Suitable WSR segments and associated corridors that are tentatively classified as recreational	X	X			Purpose: To protect the tentative classification and outstandingly remarkable values along suitable river corridors.

Appendix H: Stipulations and Exceptions, Modifications, and Waivers

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Wild & Scenic Rivers (3014)	Leasable Minerals NSO Salable Minerals Open ROWs and Renewable Energy Avoidance Area	Suitable WSR segments and associated corridors that are tentatively classified as recreational			X		<ul style="list-style-type: none"> Exclude ROWs (including communication sites) in suitable WSR corridors with a tentative classification of wild or scenic. Avoid ROWs (including communication sites) in all suitable WSR corridors with a tentative classification of recreational. Recommend withdrawal of suitable WSR river corridors with a tentative classification of wild or scenic from mineral location and entry. Close all suitable WSR corridors tentatively classified as wild or scenic to mineral leasing. Open suitable WSR corridors tentatively classified as recreational to mineral leasing with an NSO stipulation. Close suitable wild or scenic river corridors to mineral material disposal. <p>Purpose: To protect the tentative classification and outstandingly remarkable values along suitable river corridors. Exception: None. Modification: None. Waiver: None.</p>
Wild & Scenic Rivers (3014)	Leasable Minerals NSO Salable Minerals Closed ("wild or scenic" only) Open for recreational ROWs and Renewable Energy Avoidance Area	All suitable WSR segments and associated corridors				X	<p>Mineral leasing would be managed as NSO. Avoid ROWs including communication sites in all suitable WSR corridors. Close suitable wild or scenic river corridors to mineral material disposal.</p> <p>Purpose: To protect the tentative classification and outstandingly remarkable values along suitable river corridors. Exception: General exception applies. Modification: General modification applies. Waiver: General waiver applies.</p>

Resource	Stipulation	Applicable Area	Alternative				Stipulation Description
			A	B	C	D	
Wilderness Study Areas (3016)	Leasable Minerals Closed Salable Minerals Closed ROWs and Renewable Energy Exclusion Area	Wilderness Study Areas	X	X	X	X	Manage WSAs as ROW exclusion areas, closed to mineral leasing, and closed to mineral material disposal. Purpose: To prevent impairment of the WSA.

ACEC – Area of Critical Environmental Concern, bhp-hr – brake horsepower-hour, BLM – Bureau of Land Management, BMP – best management practice, CFR – Code of Federal Regulations, CSU – Controlled Surface Use, dBA – A-weighted decibel, ERMA – Extensive Recreation Management Zone, MSO – Mexican spotted owl, NO_x – nitrogen oxides, NSO – No Surface Occupancy, NTMC – National Trail Management Corridor, OHV – off-highway vehicle, OSNHT – Old Spanish National Historic Trail, PAC – Protected Activity Center, PFYC – Potential Fossil Yield Classification, RMP – Resource Management Plan, RMZ – Recreation Management Zone, ROW – right-of-way, R&PP – Recreation and Public Purposes, SITLA – School and Institutional Trust Lands Administration, SRMA – Special Recreation Management Area, TLS – Timing Limitation Stipulation, UDWR – Utah Division of Wildlife Resources, U.S.C. – U.S. Code, USFWS – U.S. Fish and Wildlife Service, VOC – volatile organic compound, WSA – Wilderness Study Area, WSR – Wild and Scenic River

References

Delaney, D. K., T. G. Grubb, and L. L. Pater. 1997. *Effects of helicopter noise on nesting Mexican Spotted Owls*. Project Order No. CE PO. 95-4. Rep. USAF 49 CES/CEV, Holloman Air Force Base, NM.

Abbreviations-Acronyms

Term	Definition
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
RMP	Resource Management Plan

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix I

Monitoring Strategy

August 2018

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Appendix I: Monitoring Strategy

Introduction

This appendix provides an overview of Grand Staircase-Escalante National Monument (GSENM) and Kanab-Escalante Planning Area Resource Management Plan (RMP) monitoring protocol to meet the established RMP objectives for resources within all four planning units and objects within GSENM. Land use plan monitoring is the process of (1) tracking the implementation of land use planning decisions (implementation monitoring) and (2) collecting data/information necessary to evaluate the effectiveness of land use planning decisions (effectiveness monitoring). Monitoring documents the Bureau of Land Management's (BLM's) progress toward full implementation of the land use plans and the achievement of desired outcomes.

Conditions may change over the life of the land use plans and such changes may require adaptive management to protect resources and minimize resource conflicts. To address changing conditions and provide management flexibility that incorporates best management practices (see also Appendix G, *Best Management Practices*), the BLM reviews effectiveness of management actions, assesses the current resource conditions and, if necessary, alters management actions.

The regulations in 43 Code of Federal Regulations (CFR) 1610.4-9 require that land use plans establish intervals and standards for monitoring and evaluations, based on the sensitivity of the resource decisions involved. Additionally, Manual 6220 (BLM 2012a) requires that land use plans for national monuments analyze and consider measures to ensure that objects and values are conserved, protected, and restored. Specifically, plans must include a monitoring strategy that identifies indicators of change, methodologies, protocols, data analysis, and time frames for determining whether desired outcomes are being achieved. The goals and objectives for the desired outcomes need to be explicitly stated and quantifiable. This appendix is also in accordance with Instruction Memorandum 2016-139 (BLM 2016), which provides guidance on the use of quantitative data to determine RMP effectiveness.

Data Collection

In cooperation with local, State and other Federal agencies, academia, and subject-matter experts, the BLM will establish monitoring protocols detailing the methodology, format, and frequency of data collection, including data analysis protocols and reporting of the monitoring data that allows for the determination of cause and effect, conditions, trends, and predictive modeling of land use authorizations. Monitoring methods are implemented to collect data that establish pre-activity conditions, current conditions, and detection of any change in the indicators following the activity. Monitoring protocols should be identified that include when, where, what to measure, and how often to sample. The data collected through monitoring provide a variety of information applicable to one or more resource uses. The *Resource Monitoring* of this document contains additional information on protocols for resources. To increase effectiveness, efficiency, and eliminate duplication, monitoring methods will address as many resources as possible. The BLM will collaborate with cooperating agencies, academia, and permittees to collect, analyze, interpret, and disseminate data.

Data Analysis

Data collected through this monitoring strategy will be statistically analyzed to determine whether changes occur as a result of management actions. Data analysis will be conducted according to the suggested frequency for each resource, subject to time and funding. Data will be analyzed to determine whether the resource conditions are meeting the quantifiable goals identified in the RMP and the monitoring protocols; whether a change has occurred, and, if so, identify the cause; and what appropriate action should be taken to achieve the desired outcome if the goal or objective is not being met. New technology and management methods will be reviewed to determine their applicability in modifying or replacing current management actions. The BLM will collaborate with cooperating agencies, contractors, and academia to assist in or perform this data analysis that is scientifically accurate.

Adaptive Management

When the data analysis and interpretation is completed, and the desired outcome is not being achieved, the causal factors must be documented. A change or modification to management actions may be warranted to address these unrealized goals. The BLM will develop recommendations to be considered by management for continuation, modification, or replacement of current management actions, subject to the National Environmental Policy Act (NEPA) and land use planning regulations. Adoption of new management actions may also require changes in the monitoring plan; the BLM will evaluate the effectiveness of the monitoring based on the results and recommend continued use, modification, or elimination of the methods proposed in this appendix. New technologies or a better understanding of information may also result in changes to this monitoring strategy.

Resource Monitoring

Table 1 identifies the indicators that will be monitored to detect changes in resource conditions, the method or technique of monitoring, the locations for monitoring, the unit of measurement for monitoring, the frequency (i.e., time frames) for monitoring, and the action triggers that indicate the effectiveness of the management action. During implementation, the BLM will rely on the indicators, methods, and frequencies listed below to demonstrate that objects within GSENM are conserved, protected, and restored. Resources or programs within the table that apply to or include identified objects within GSENM are identified **with bold text**. Refer to Appendix E (*Grand Staircase-Escalante National Monument Objects and Resource Values*) for a detailed description of objects. Footnotes in Table 1 indicate monitoring activities that are also conducted by other entities and can be used to augment the BLM's monitoring.

Table 1. Resource Monitoring Table

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Air Quality ⁽¹⁾	M-1	Air quality	Ambient air sampling of criteria air pollutants	Established air monitoring stations that are representative of the planning area airshed	Concentrations, varies by pollutant (parts per million, parts per billion, µg/m ³).	In accordance with National Ambient Air Quality Standards	Samples of criteria air pollutants exceeding or violating National Ambient Air Quality Standards
	M-2	Emissions of gaseous and particulate criteria air pollutants and their precursors	Emission inventory	Direct and indirect emissions sources from oil and gas, coal, and other mineral development projects	Pounds per hour and tons per year	With project proposals or permit applications	Emissions exceeding the RMP emissions inventory or levels of concern established in consultation with the UDAQ or EPA
	M-3	Reasonably foreseeable development	Permits or BLM development approval (APDs etc.)	Planning Area wide	Number of oil and gas wells, and other mineral projects	With project proposals or permit applications	Development exceeding the RFD used to prepare the air analysis for these RMPs
	M-4	Pace of fluid and minerals development	Permits or BLM development approval (APDs etc.)	Planning Area wide	Number of oil and gas wells, and other mineral projects	With project proposals or permit applications	Pace of development exceeding the RFD used to prepare the air analysis for these RMPs
Cultural Resources ⁽²⁾	M-5	NRHP eligible sites, including archaeological, historic, or cultural objects within GSENM	Site inspection	Planning Area wide	Number of Sites and/or Area (acres/linear feet) of disturbance	Annually, or more frequently and as needed if required by site-specific conditions	Disturbance as a result of land uses or vandalism, fire, and severe weather events such as flooding and erosion. Annual site monitoring, especially those with a history of problems or likely to be vandalized (rock art, shelters, alcoves).

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Cultural Resources ⁽²⁾	M-6	Vulnerable sites and archaeological, historic, or cultural objects within GSENM Other sites may be included if monitoring information is needed for research or consultation efforts	Comprehensive monitoring utilizing archaeologists, law enforcement, rangers, and site stewards	Planning Area wide, including cultural sites that have been previously identified as being affected; cultural sites identified on maps, brochures, or other media that bring the site into public awareness; sites that are known to be popular for public visitation; a representative sample of sites known to be prone to impacts from predictable sources	Number of sites and/or Area (acres/linear feet) of disturbance	Annually or as needed	Disturbance (e.g., from vandalism, erosion, grazing, recreation, or other); research; public concern
Fish and Wildlife ⁽³⁾	M-7	Big game seasonal habitat	Aerial and field inspections; pellet transects; use-pattern mapping	Crucial wildlife habitat areas	Habitat use during occupancy periods	Annually to establish baseline; Every 3–5 years after baseline is established	A change in numbers of animals using seasonal habitats beyond the normal fluctuations
	M-8	Big game population numbers	Aerial and field inspections	UDWR Herd Management Units	Numbers during census counts; modeling with species classification data	Every 2–3 years	A change in numbers either above or below population objectives
	M-9	Special Status Species occupancy and productivity	Field Inspections	Habitat areas and established buffer zones	Numbers during occupancy periods; reproductive status	Annually	A decline in numbers beyond the normal fluctuations
	M-10	Threatened and endangered species occupancy and productivity	Aerial and field inspections	Habitat areas and established buffer zones	Numbers during occupancy period; reproductive status	Annually	A decline in numbers beyond the normal fluctuations
	M-11	Macro-invertebrate indicator species	Collecting macro-invertebrate species	Perennial streams and springs	Species and condition of macro-invertebrates	Every 2 to 10 years	No presence of macro-invertebrates that represent good quality water in the stream

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Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-12	Neo-tropical bird habitat	Site visit; breeding bird survey; point counts	Planning Area wide	Numbers during occupancy period	Every 2 to 3 years	Declining trend in habitat occupancy
	M-13	Raptors	Site visit	Planning Area wide	Nest occupancy rate; reproductive status; recruitment	Every 2 to 5 years	Declining trend in nest site occupancy, reproduction or recruitment
	M-14	Bald eagle	Surveys conducted by BLM-approved personnel	Winter raptor or bald eagle survey routes	Detection of bald eagle presence	Annually	Declining trend in observations
	M-15	Mexican spotted owl	Surveys conducted by BLM-approved personnel	Designated critical habitat, potential habitat, identified PACs, or breeding habitats wherein it has been determined that there is a potential for take	Detection of Mexican spotted owl presence; active or passive monitoring techniques	During site-specific permitting and/or as needed	Adverse impacts on individuals or habitat of Mexican spotted owl
	M-16	Southwestern willow flycatcher	Surveys conducted by BLM-approved personnel	Within designated or potential habitat	Species occupancy data and distribution information	During site-specific permitting and/or as needed	Adverse effects on Southwestern willow flycatcher and habitat from ground-disturbing activities including but not limited to recreation, mining, oil and gas activities Species occurrence is verified Any level of anticipated take or incidental take
	M-17	Packrat middens	Survey prior to large-scale (>100 acres) soil disturbance activities and mining	GSENM	Location and size of midden	As needed	Loss or damage as a result of human or natural causes

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Geology	M-18	Geological objects within GSENM	Survey	Planning Area wide	Acres of inventoried objects	As needed	Loss or damage to geologic objects as a result of human or natural causes
Lands with Wilderness Characteristics	M-19	Presence or absence of wilderness characteristics	Inventory in accordance with Manual 6310	Planning Area wide	Acres of inventoried lands	Per Manual 6310 guidance	Loss of acres of lands with wilderness characteristics that are managed for protection of wilderness characteristics
Paleontological Resources	M-20	Significant paleontological resources and paleontological objects within GSENM	Site inspection	Site	Degradation or loss of significant fossil resources. Recovery of closed, NEPA-approved fossil excavations for 3 years	Annually	Loss or damage to significant fossil resources as a result of human or natural causes
Soil Resources	M-21	Soil erosion uplands	Visual observation; terrestrial AIM; IIRH	Area wide where land use activities are occurring	Low soil stability scores; increase in number and size of rills; movement of headcuts or increases in gully width or depth; tons per acre sediment and salt	3–5 years AIM or IIRH monitoring routine and on a priority basis	When soil loss is accelerated beyond natural levels Accelerated soil loss on saline soils
	M-22	Soil erosion on stream banks and floodplains.	Visual observation; aquatic AIM; PFC assessments	Area-wide where land use activities are occurring	Channel widening and/or incision; downward trend in PFC assessment; tons per acre sediment and salt	3–5 year aquatic AIM/PFC monitoring	Water table is shrinking beyond average precipitation fluctuations; downward trends in PFC ratings; loss of riparian areas
	M-23	Soil compaction	Penetrometer or visual inspection	Area affected by land use activities	Pounds per square inch	On a priority basis	Accelerated erosion from compaction restricting water infiltration and plant growth
	M-24	Depth to water	Monitoring wells (piezometers)	Area-wide where land use activities are occurring	Depth to water table	Annually	Accelerated stream bank soil loss; decreased developed water availability

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Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-25	Cryptoblotic soil crusts.	Visual observation and terrestrial AIM; IIRH; Vegetation Trend Monitoring	Area wide where land use activities are occurring	Area affected in square feet or acres; % cover; Soil Stability Score	3–5 years AIM; IIRH monitoring or trend monitoring and on a priority basis	Accelerated erosion due to disturbance or loss of soil crusts as a result of land use
	M-26	Carbon sequestration	Monitor soil organic carbon dynamics on surface-disturbing activities especially large-scale (>100 acres) vegetation treatments and mining	Area-wide where land use activities are occurring	Soil carbon pools: milligrams/kilograms soil carbon; carbon dioxide flux	On a priority basis	Downward trend in soil organic carbon
Water Resources	M-27	Surface water quality ⁽⁴⁾	Water sampling.	Established monitoring stations	Contaminant concentration, load, or temperature	On a priority basis	Water quality does not meet State standards
	M-28	Groundwater quality ⁽⁴⁾	Groundwater sampling	Established monitoring stations	Contaminant concentration, load, or temperature	On a priority basis	Water quality does not meet State standards and water is migrating from one aquifer to another
	M-29	Channel geometry	Aquatic AIM; PFC assessments	Priority streams	Change in stream channel (width, depth, side channel modification, and bank sloughing)	Every 3 to 5 years	Conditions are moving away from PFC
	M-30	Ground and surface water quantity	Stream flow and well level monitoring	Priority streams and aquifers	Ground and surface water quantity (absolute or rate of flow)	On a priority basis	Adequacy for BLM-managed resources and cultural/traditional uses

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-31	Rivers and streams identified as objects within GSENM	Water quality and quantity; riparian condition assessment; or aquatic AIM assessment	Where present within GSENM	Contaminant concentration; stream miles and acres along with condition rating; surface and groundwater flows	Every 3 to 5 years	Water quality does not meet state standards; conditions moving away from PFC; diminishing flows of either surface or groundwater
Vegetation	M-32	Noxious weed and invasive plant trends ⁽⁶⁾	Remote sensing or site visit	Priority areas	Acres of established weeds and potential habitat areas	Annually	Spreading or establishment of invasive species in new areas
	M-33	Wetland/springs/riparian condition	PFC and/or Spring Stewardship Institute protocol and/or aquatic AIM	All identified wetlands/springs/riparian areas	Stream miles and acres along with rating	Every 3 to 5 years	Not achieving PFC or not exhibiting an upward trend
	M-34	Vegetation treatments and large-scale invasive plant treatments	Establish monitoring plots with controls; develop standard monitoring methods, including vegetation cover, frequency, ground cover, soil aggregate stability, basal and canopy gaps, and precipitation	Within vegetation treatment areas and adjacent untreated areas	Effectiveness of vegetation treatments and large scale invasive plant treatments	Monitor pre- and post-treatment annually for 5 years	Analyze data to determine if meeting objectives prescribed for treatment
	M-35	Riparian areas, including Paria and Escalante river riparian areas within GSENM	PFC and/or aquatic AIM	Riparian areas	Area (acres/linear feet)	On a priority basis	Conditions are moving away from PFC

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Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-36	Hangng gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities within GSENM	Depends on indicator and resource	Where present within GSENM	Depends on indicator and resource	As needed	Disturbance or loss of these water resources as a result of human or natural causes
	M-37	Special Status Plants– federally listed, BLM Sensitive, rare and endemic plants	Establish monitoring plots; methods include number of individuals, cover, and population expansion	Known plant populations and potential new habitats	Population and trend	Annually	A declining trend in populations
	M-38	Drought	Local and regional weather stations; rain buckets and local and regional drought indices	Representative sample across Planning Area to detect weather patterns	Various	Monthly and annually	Decrease in monthly or annual precipitation, drought as predicted by drought indices
Fire	M-39	Wildland fuels	Site inspection	Wildland-urban interface and industrial interface areas	Tons/acre	Annually	Presence of wildland fuels that present a risk to communities and industrial sites (i.e., fuel levels that result in flamelengths of greater than 4 feet at 80th percentile weather conditions)
	M-40	Vegetation condition	Ecological site condition and trend studies	Vegetation types where there is a history of fire in the ecosystem	Representative sample	Annually	Vegetation growth trend is moving away from desired conditions for the vegetation type

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-41	Resource and property damage	Fire behavior	Individual fire	Fire temperature, flame length, burn rate, and acres burned	While the fire is burning	Acres burned and fire intensity that exceed prescription
Visual Resources - VRM Class I Areas	M-42	Change in existing character of landscape beyond natural ecological changes or very limited management activity	Visual contrast rating documentation; site visits; remote sensing	WSAs/certain Lands with Wilderness Characteristics	Acres of altered landscape	Annually via WSA monitoring	Projects that exceed thresholds for meeting VRM Class I objectives
Visual Resources - VRM Class II Areas	M-43	Change in existing character of landscape beyond low level of change	Visual contrast rating documentation; site visits; remote sensing	VRM Class II Areas	Acres of landscape that experience moderate to high levels of change to characteristic landscape; percentage of altered viewshed.	As projects are implemented in VRM Class II areas	Projects that exceed thresholds for meeting VRM Class II objectives
Visual Resources - VRM Class III Areas	M-44	Change in existing character of landscape beyond moderate level of change	Visual contrast rating documentation; site visits; remote sensing	VRM Class III Areas	Acres of landscape that experience high levels of change to characteristic landscape; percentage of altered viewshed.	As projects are implemented in VRM Class III areas	Projects that exceed thresholds for meeting VRM Class III objectives
Visual Resources - VRM Class IV Areas	M-45	Implementation of projects that do not follow BMPs, stipulations, or create unanticipated visual impacts	Visual contrast rating documentation; site visits; remote sensing	VRM Class IV Areas	Number of projects; percentage of altered viewshed	As projects are implemented in VRM Class IV areas	Projects that do not follow BMPs and/or stipulations or create unanticipated visual impacts
Wild Horses	M-46	Population numbers	Counts and HMA visits	HMAs	Number of horses	Annually	Population exceeding targets

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Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Forestry and Woodland Products	M-47	Forest health	Ecological site condition and trend	Forested lands	Representative sample area	Every 3 to 5 years	Disease, insect infestation, or encroachment of undesirable plant species threatens forest health
	M-48	Timber stands	Timber stand examination	Commercial forested areas	Board-feet, age class, and damages	Every 10 to 20 years	Basal area growth does not meet timber type standards
Lands and Realty	M-49	Realty authorization compliance	Site compliance inspection	Entire Planning Area	Number of site inspections	Annually if warranted; otherwise every 5 to 10 years	Non-compliance or non-use
Renewable Energy	M-50	Realty authorization compliance	Site compliance inspection	Entire Planning Area	Number of site inspections	Annually	Non-compliance or non-use
Livestock Grazing	M-51	Vegetation condition	BLM approved monitoring methods; monitoring plans are included in AMPs	All areas being grazed	Representative sample of grazed area	Every 5 to 10 years; on a priority basis monitor allotments before livestock turnout	Conditions are not meeting goals and objectives for vegetation due specifically to livestock grazing management
	M-52	Livestock numbers	Counts and site visits; monitoring plans are included in AMPs	Varies by allotment	Number of allotments or operators inspected	Annually or when livestock are moved on or off the allotment	Livestock numbers exceeding permitted numbers or in areas unauthorized
Minerals	M-53	Surface disturbance	Site inspection by field visit or remote sensing	Mineral development sites	Acres disturbed	As required by current policy	Acres disturbed exceeding the number permitted for the area
	M-54	Compliance with authorization	Site inspection	Planning Area wide	Compliance	As required by current policy	Non-compliance

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Recreation	M-55	General recreation use; realization of desired beneficial outcomes	Onsite inspection, visitor use data, surveys; document user conflicts or complaints	Area-wide with emphasis on SRMAs and ERMAs with high visitation; areas not managed as recreation management areas but recognized for recreational use and resources	Changes to desired recreation setting characteristics; changes in experiences and realized desired beneficial outcomes; changes in types, seasons or levels of use	Prioritize areas and monitor higher-priority areas (SRMAs and ERMAs) every 1–3 years and lower-priority areas every 3–5 years	When visitor surveys or public comments indicate that recreation area management objectives are not met; when desired settings, experiences, and beneficial outcomes are not realized; when change is causing undue or unnecessary degradation of the site or area; when change is causing goal interference and conflicts
	M-56	Concentrated recreation use	Inspect developed recreation sites or areas that have facilities	Recreation site	Condition of recreation site, facilities, visits and visitor days	Annually	When change is causing undue or unnecessary degradation of facilities and use areas; public complaints
	M-57	Compliance with permitted authorizations	Administrative review, site inspection	Activity site	Permit stipulations, resource conditions, and site restoration	During and after an event; annually for other commercial users	When non-compliance is determined or degradation of resources is occurring
Transportation	M-58	Roads and trails ⁽⁶⁾	Route management categories and maintenance levels; onsite inspection or remote sensing; traffic counter data	Planning Area wide	Miles	Per Facility Asset Management System Condition Assessment Plans	Conditions represent a hazard to life and property; route conditions do not meet identified road standards
	M-59	Seasonal closures ⁽³⁾	Aerial and field inspections	Travel Management Areas with seasonal closures for wildlife	Acres	Every 5 years	Changes in use of seasonal habitat requiring closure

Appendix I: Monitoring Strategy

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
	M-60	Off-highway vehicle disturbance; establishment of unauthorized vehicle routes	Remote sensing or site visit; traffic counter data	Travel Management Area; site-specific to area of disturbance	Miles of routes; acres of disturbance	Prioritize areas and monitor higher-priority areas every 1–3 years and lower-priority areas every 2–4 years	Disturbance exceeding the baseline, accelerated soil erosion occurring, and vegetation being removed
ACEC	M-61	See other resource sections for relevant and important values (e.g., cultural, wildlife)	As prescribed for affected resource	Designated ACECs	As prescribed for affected resource	During 5-year evaluations; Manual 1613 requires the State Director to prepare an annual report to the Director on progress in implementing and monitoring ACECs	Undue or unnecessary degradation or loss of relevant and important values as a result of human or natural causes
National Trails	M-62	Resource condition	Site visit or remote sensing	Old Spanish Trail corridor	Amount of degradation or loss of resources; impacts on important and relevant resources	BLM will monitor the impacts that RMP implementation and other approved projects have on national trail resources, qualities, values, and associated settings and the primary use or uses, including determining the effectiveness of design features, project stipulations, and mitigation measures on a regular basis as the RMP and projects are implemented	Undue or unnecessary degradation or loss of national historic trail resources as a result of human or natural causes

Resource	Record Number	Indicator	Method or Technique	Location	Unit of Measure	Frequency	Action Triggers
Wild and Scenic Rivers	M-63	Waterway-specific identified ORV	Site visits, monitoring, and project proposals	Suitable river corridors	Miles of linear human intrusions; acres disturbed, impacts on corridor-specific ORVs as observed by onsite visit, public comment, or project proposals	Annually, or when site specific issue arises	Impacts on corridor-specific identified ORVs
Wilderness Study Areas	M-64	Wilderness Characteristics (size, naturalness, outstanding opportunities for primitive and unconfined recreation or solitude, supplemental values)	Site visits; aerial monitoring	WSAs	Miles of linear human intrusions; acres disturbed; impacts on wilderness characteristics identified by onsite visit or public comment	Monthly, unless an Alternative Monitoring Strategy is adopted	Failure to meet the non-impairment standard or other objectives outlined in Manual 6330 (BLM 2012b)

Note: Rows with **bold text** identify monitoring for resources or programs that apply to or include identified GSENM objects.

¹ Utah Division of Air Quality conducts data collection.

² The State Historic Preservation Officer conducts data collection.

³ Utah Division of Wildlife Resources conducts data collection.

⁴ Utah Division of Water Resources conducts data collection.

⁵ Utah Department of Agriculture and Food conducts data collection.

⁶ The County with jurisdiction conducts data collection.

µg/m³ – micrograms per cubic meter, RMP – Resource Management Plan, UDAQ – Utah Division of Air Quality, EPA – U.S. Environmental Protection Agency, BLM – Bureau of Land Management, APD – Application for Permit to Drill, RFD – Reasonably Foreseeable Development, NRHP – National Register of Historic Places, GSENM – Grand Staircase-Escalante National Monument, UDWR – Utah Division of Wildlife Resources, PAC – Protected Activity Center, NEPA – National Environmental Policy Act, AIM – Assessment, Inventory, and Monitoring, IIRH – Interpreting Indicators of Rangeland Health, PFC – Properly Functioning Condition, WSA- Wilderness Study Area, VRM – Visual Resource Management, BMP – best management practice, HMA – Herd Management Area, AMP – Allotment Management Plan, SRMA – Special Recreation Management Area, ERMA – Extensive Recreation Management Area, ACEC – Area of Critical Environmental Concern, ORV – Outstanding Remarkable Value

Monitoring Protocols

In order to determine RMP effectiveness and the ability of the BLM to meet RMP goals and objectives (see goals and objectives for each resource in Chapter 2), the following standard protocols will be used.

Air Resources

- **Emissions Tracking** - The BLM will establish a mechanism to track annual emissions of criteria pollutant and volatile organic compound emissions from BLM-authorized oil and gas, coal, and other mineral development activities within the Planning Area. The methods for tracking emissions may be developed in collaboration with the Utah Division of Air Quality (UDAQ) and with input from the U.S. Environmental Protection Agency (EPA) and the Utah Division of Oil, Gas and Mining. The BLM will use reported emissions data to track total emissions from BLM-authorized oil and gas and other activities within the Planning Area as a component of its adaptive management strategy.
- **Review of Air Resources Data** - With oil and gas, coal, or other mineral extraction proposals or permit applications, the BLM will conduct a review of relevant air resource management data in order to implement the adaptive management strategy in this section. This review will include the following tasks:
 - a. Evaluate current air monitoring data and trends from air monitoring sites located within or representative of the Planning Area airshed or the potentially affected area to determine the status of current air quality conditions within the Planning Area including measured concentrations approaching or exceeding National Ambient Air Quality Standards (NAAQS).
 - b. Evaluate current air monitoring data and trends from air monitoring sites located within or representative of the Planning Area airshed or the potentially affected area to determine the status of current air quality conditions within the Planning Area, including measured adverse impacts on air quality–related values in Class I areas or sensitive Class II areas (as identified on a case-by-case basis by the appropriate Federal land management agency). Response to monitored exceedances may include additional modeling and mitigation requirements.
 - c. Initiate consultation with UDAQ, EPA, and other local, State, Federal, and tribal agencies with responsibility for managing air resources to address appropriate responses to monitored exceedances of a NAAQS at any regulatory air monitor located within or representative of the Planning Area airshed, or potentially affected area. Response to monitored exceedances may include additional modeling and mitigation requirements.
 - d. Review annual emissions data from BLM-authorized oil and gas activities within the Planning Area and comparison to emission levels analyzed in the RMPs/Environmental Impact Statement (EIS) and the modeling study conducted under Appendix M (*Air Quality Technical Support Document*), or the most recent interagency air impacts analysis.
 - e. Review BLM-authorized oil and gas activities within the Planning Area and compare to the level of development analyzed in the RMPs/EIS and the modeling study conducted under Appendix M (*Air Quality Technical Support Document*), or the most recent interagency air impacts analysis, including number of producing wells, and other supporting oil and gas facilities.

- f. Evaluate new oil and gas development projections received or identified within the Planning Area for the coming 3- to 5-year period and compare to the level of predicted future development analyzed in the RMPs/EIS and the modeling study conducted under Appendix M (*Air Quality Technical Support Document*), or the most recent interagency air impacts analysis.
- Review air quality modeling results from new impact analyses conducted by the BLM, UDAQ, or other agencies that affect or are affected by BLM-authorized activities within the Planning Area.
 - **Analysis of Current Air Resource Management Strategies** - Based on the review of air resources data, the BLM, with input from other agencies involved in the authorization of oil and gas development activities or the management of air resources, will determine whether the air analysis conducted for the RMPs/EIS and the modeling study conducted under Appendix M (*Air Quality Technical Support Document*), or the most recent interagency air impacts analysis, should be updated. Based on the emissions tracking, air monitoring data, air resources management modeling study, or other relevant air modeling data, and development projections, the BLM will determine whether current air resources management strategies are meeting the goals and objectives established in the RMPs/EIS. The BLM in collaboration with UDAQ and the EPA will adapt management strategies as necessary to effectively manage air resources within the Planning Area.
 - **Modification of Air Resource Management and Monitoring Protocol** - Based on the review of air resources management data and evaluation of current strategies, the BLM will determine whether this air resources management and monitoring protocol should be modified.
 - **Air Analysis for Authorized Activities** - The BLM will, prior to authorization of any oil and gas development activity or other activity with the potential to generate emissions of regulated air pollutants, conduct an air analysis to determine the magnitude of potential emissions from the activity and address potential impacts on air quality.
 - **Criteria for Informing Decisions** – The BLM will consider the following criteria and the air resource monitoring in Table 1 to identify pollutants of concern and inform decisions regarding the appropriate level of air analysis to be conducted from mineral development activities and may consider these criteria for other activities with the potential to generate emissions of regulated air pollutants:
 - a. Magnitude of potential air emissions from the proposed activity.
 - b. Duration of proposed activity.
 - c. Proximity to a federally mandated Class I area, sensitive Class II area (as identified on a case-by-case basis by UDAQ or a Federal land management agency or tribal agency), population center, or other sensitive receptor.
 - d. Location within or adjacent to a non-attainment or maintenance area.
 - e. Meteorological and geographic information.
 - f. Existing air quality conditions including measured NAAQS concentrations and measured air quality–related values.
 - g. Intensity and pace of existing and projected development in the area.
 - h. Issues identified during project scoping.
 - **Emissions Inventory** - The BLM will require the proponent of an oil and gas development activity as proposed in a permit application, plan of development, or Master Development

Plan to submit an emissions inventory of direct and indirect emissions associated with the proposed project. The BLM will require submittal of an emissions inventory for other proposed activities such as solid mineral development that have the potential to generate emissions of regulated air pollutants. The emissions inventory will include estimated emissions of regulated air pollutants from all sources related to the proposed activity, including fugitive emissions and greenhouse gas emissions, for each year for the life of the project. The BLM will review the emissions inventory to determine its completeness and accuracy. Emission control measures included in the emissions inventory assumptions and relied upon to determine project impacts will become Operator Committed Measures in the Record of Decision for the authorized activity. If such emission control assumptions do not lend themselves to mitigation measures that can be enforced via stipulations, the BLM will require other mitigation measures with a similar air quality benefit.

- **Emissions Reduction Plan** - The BLM will require the proponent of an oil and gas development project that has the potential to emit any regulated air pollutant to provide an emissions reduction plan that includes a detailed description of Operator Committed Measures to reduce project-related air pollutant emissions including greenhouse gases and fugitive dust. The BLM may require submittal of an emissions reduction plan for other proposed activities such as solid mineral development that have the potential to generate emissions of regulated air pollutants. Project proponents for oil and gas development projects should refer to Appendix G (*Best Management Practices*) for potential emission reduction technologies and strategies. The list is not intended to preclude the use of other effective air pollution control technologies that may be proposed. Details of Operator Committed Measures submitted by the applicant will be included in and enforced as a condition of the BLM-issued authorization.
- **Submission of Actual Emissions Data** - The BLM will include, as a Condition of Approval for an oil and gas authorization, a requirement that the proponent submit actual emissions data on a periodic basis for criteria pollutants, volatile organic compounds, hazardous air pollutants, and greenhouse gas emissions related to the authorized action if the air analysis results show that the project has the potential to cause adverse impacts. The BLM may request these data from all oil and gas authorizations to evaluate progress in meeting air quality goals. Emissions data submitted to UDAQ as required in applicable air permits, drilling and production data provided to Utah Division of Oil, Gas and Mining, and emissions data submitted to EPA under the Greenhouse Gas Reporting Rule (40 CFR 98(W)) will be accepted. The BLM may require or request actual emissions submittals from other emission-generating activities such as solid mineral development as determined on a case-by-case basis.
- **Air Monitoring** - The BLM recognizes that ambient air monitoring provides valuable data for determining current and background concentrations of air pollutants, describing long-term trends in air pollutant concentrations, and evaluating the effectiveness of air control strategies. The BLM will facilitate a cooperative effort with industry, UDAQ, Federal land management agencies, EPA, local counties, or other entities to establish, fund, operate, and maintain air monitoring stations within the Planning Area and potentially affected areas. The BLM will facilitate the sharing of air monitoring data collected by the air monitoring network with other agencies and the public.
- **Pre-Construction Air Monitoring** - The BLM may require project proponents of oil and gas development proposals or proponents of other emission-generating projects, such as solid mineral development, to submit pre-construction air monitoring data from a site within or

adjacent to the proposed development area. The purpose of this air monitoring is to establish baseline air quality conditions prior to development at the site. The requirement for monitoring will be determined by the BLM based on the absence of existing representative air monitoring data. If the BLM determines that baseline monitoring is necessary, the project proponent must provide a minimum of 1 year of baseline ambient air monitoring data for the pollutants of concern obtained from a site that meets UDAQ air monitoring standards within 50 kilometers of the project boundary, and that covers the year immediately prior to the proposed project submittal. The project proponent will be responsible for siting, installing, operating, and maintaining any air monitoring equipment in the absence of existing representative air monitoring data.

- **Life-of-Project Air Monitoring** - The BLM may require proponents or operators of oil and gas development projects or proponents of other emission-generating projects such as solid mineral development to conduct air monitoring for the life of the project based on the absence of representative air monitoring. The purpose of this air monitoring is to determine impacts attributable to the project over time and to determine the effectiveness of the BLM's management actions related to the project. The project proponent will be responsible for siting, installing, operating, and maintaining any air monitoring equipment in the absence of existing representative air monitoring.
- **Collaboration with UDAQ on Air Monitoring Data** - The BLM will work cooperatively with UDAQ to determine a mechanism to submit, track, and approve pre-construction and life-of-project air monitoring siting and operation and monitoring data. The BLM will work with UDAQ to ensure that ambient air monitoring data collected as a condition of approval for BLM-authorized activities will be made publicly available.
- **Modeling and Adaptive Management** - The BLM has identified air modeling as a significant component of its adaptive management strategy for managing air resources. The BLM will use regional air modeling and project-specific modeling if determined necessary in conjunction with other air analysis tools for developing air resource management strategies as part of its approach to fulfill responsibilities under the Federal Land Policy and Management Act and to evaluate direct, indirect, and cumulative impacts under NEPA.
- **Project-specific Modeling** - The BLM may require that project-specific air quality modeling be conducted to analyze potential impacts from a proposed oil and gas development project or other proposed activities such as solid mineral development that have the potential to emit regulated air pollutants. Air quality modeling may be required for pollutants of concern in the absence of other available data to ensure compliance with laws and regulations or to determine the effectiveness of air emission control strategies. The BLM may allow project proponents to provide results from other modeling analyses that include the proposed project upon review and approval by the BLM. The BLM will not require an air modeling analysis when the project proponent can demonstrate that the project will result in no net increase in emissions of the pollutants of concern.
- **Modeling Protocol** - The BLM will determine the parameters required for a project-specific modeling analysis through the development of a modeling protocol for each analysis.
- **Mitigation** - The BLM recognizes that many of the activities that it authorizes, permits, or allows generate air pollutant emissions that have the potential to adversely affect air quality, either individually or cumulatively. The primary mechanism to reduce air quality impacts is to reduce emissions (mitigation). Identification and implementation of appropriate emission reduction measures is effective at the project authorization stage

where the proposed action is defined in terms of temporal and spatial characteristics and technological specifications. The project-specific information allows for the development of an emissions inventory and impact analysis, which are used to determine effective mitigation in response to identified project-specific or cumulative adverse impacts.

- **Project-specific Mitigation** - The BLM will require air quality mitigation measures and strategies within its authority (and in consultation with local, State, and Federal agencies with responsibility for managing air resources and Federal land managers responsible for potentially affected areas) in addition to regulatory requirements and proponent-committed emission reduction measures, and for emission sources not otherwise regulated by UDAQ or EPA, if the air quality analysis shows potential future impacts on NAAQS or impacts above specific levels of concern for air quality related values in Class I or sensitive Class II areas (as identified on a case-by-case basis by UDAQ or a Federal land management or tribal agency) due to the proposed project.
- **Minimizing Air Emissions** - The proponent of an oil and gas development project will be required to minimize air pollutant emissions by:
 - a. Complying with all applicable State and Federal regulations (including application of best available control technology)
 - b. Submitting an emissions reduction plan
 - c. Applying mitigation including but not limited to best management practices, emissions offsets, and other control technologies or strategies identified in an air quality analysis or comprehensive interagency air resources management strategy
- **Contingency Plan** - The BLM may require project proponents for oil and gas development projects, or other proposed activities with the potential to generate substantial air emissions, to submit a contingency plan that provides for reduced operations in the event of an air quality episode such as a monitored exceedance. Specific operations and pollutants to be addressed in the contingency plan will be determined by the BLM on a case-by-case basis taking into account existing air quality and pollutants emitted by the project. Examples of temporary episode response control measures that could be included in operator-committed contingency plans and that may be appropriate to implement immediately after an air quality episode include:
 - Temporarily reducing drilling operations during specified periods
 - Temporarily reducing completion or well stimulation operations during specified periods
 - Limiting or controlling blowdowns during specified periods
 - Limiting other non-essential emission generating operations during specified periods

The BLM may require project proponents to include in the contingency plan emission control measures that could be implemented in the event of a monitored ozone violation. Examples of violation response control measures that may be appropriate to implement within 1 year of a monitored NAAQS violation include:

- Using Tier 4 engine technology or other improved (low emission) engine technology on drill rig, completion, compressor, and other non-road engines
- Constructing centralized gathering facilities for product treatment and storage
- Installing plunger lift systems with smart automation
- Employing a monthly FLIR program to reduce volatile organic compound emissions and leaks
- Enhancing a direct inspection and maintenance program

- Employing tank load-out vapor recovery
- Using enhanced volatile organic compound emission controls on production equipment

Cultural Resources

- National Register of Historic Places eligible sites, including archaeological, historic, or cultural objects within GSENM, will have site inspection annually, or more frequently and as needed if required by site-specific conditions.
- Site Stewards (i.e., citizens performing site stewardship) will be trained by BLM archaeologists. Cultural sites that are relevant and important values in Areas of Critical Environmental Concern and other selected sites (e.g., cultural sites that have been identified on maps, brochures, or other media that bring the site into public awareness; sites that are known to be popular for public visitation) will be monitored by the BLM or Site Stewards at least annually or as possible. Sites with heavier traffic will have a goal of four visitations per year.
- Sites that are prone to vandalism and/or unauthorized camping will receive regular patrols by BLM law enforcement rangers.
- Monitoring methodologies will be conducted as described in the Kanab Field Office Resource Management Plan (BLM 2008).

Fish and Wildlife (Non Special Status Species)

Big Game

- Training for browse study data collection will be provided by BLM specialists.
- For big game monitoring, the browse conditions protocol will be a supplemental method (“add on”) generally collected by Assessment, Inventory, and Monitoring (AIM) crews.
- Browse data will only be collected if a designated shrub falls on any of the three AIM transects.
- A 1-meter belt along the transect will be read and documented by AIM crews. Pellets or animal tracks found will be noted.

Raptors

- For cliff-nesting species, the American Peregrine Falcon Monitoring Plan Protocol (USFWS 2003) will be conducted primarily through volunteers as time and funding allow.

Special Status Species - Wildlife

- Mexican Spotted Owl survey protocol (USFWS 2012)
- Southwestern Willow Flycatcher survey protocol (Sogge et al. 2010)
- Greater sage-grouse pellet transects
- If an AIM point falls on greater sage-grouse habitat, supplemental height information along with sagebrush shape will be collected following the protocols found in the *Sage-Grouse Habitat Assessment Framework* (Stiver et al. 2015).

For all project-related survey and monitoring actions:

- Provide reports to affected field offices within 15 days of completion of a survey or monitoring effort. Reports would follow field office guidance for BLM-specified formats for written and automated databases.
- Report any detection of bald eagle presence during survey or monitoring efforts to the authorized officer within 48 hours of detection.

Forestry & Woodland Products

- To determine forest health, the AIM core indicators would be monitored and compared to the Ecological Site Description to determine condition and trends.
- Manual 5300 Timber Measurement (BLM 2017a) and MS-5000 Forest Management (BLM 2017b)
- Timber stand examination would be conducted to determine amount of board feet and available amounts of fuelwood.

Geological and Paleontological Resources:

- Paleontological survey protocols are as follows:
 - a. Review proposed activity plans/projects and associated maps.
 - b. Determine location and cross reference existing geologic maps to determine Potential Fossil Yield Classification of underlying bedrock. Note if known paleontological resource localities exist near proposed activity.
 - c. If Potential Fossil Yield Classification of underlying bedrock is 4 to 5, a site survey must be completed by a BLM official or BLM-permitted paleontologist where ground will be disturbed, with a 25-meter buffer surrounding the proposed disturbance. If fossils are found, locality forms should be filed with the BLM Utah State Field Office and GSENM or BLM Kanab Field Office with all information that can be determined about the fossil (location, rock formation, type of fossil, description, map, and photos if possible).
 - d. If no significant fossils are discovered in survey, a stipulation for inadvertent discovery should be added to the proposal (basically, if a fossil is uncovered during a proposed action, all activity must cease until a BLM official or BLM-permitted paleontologist can get to the site and determine what and if any mitigation must occur; once mitigation is completed, activity can resume).
 - e. If significant fossil(s) are discovered in survey, a BLM official and/or BLM-permitted paleontologist determine what and if any mitigation must occur, and begin mitigation. This can include rerouting trails/roads/other infrastructure, or collecting/excavating the resource.
 - f. All paleontological surveys will be documented regardless of whether or not a fossil is found.

Livestock Grazing/Rangeland Management

- Frequency and Apparent Trend methods (BLM 1999a) will continue to be collected at a subset of legacy sites as time and funding allow.
- AIM core methods (MacKinnon et al. 2011) will be collected at additional points according to an intensified design or at targeted sites when overarching AIM sites are not sufficient for local data needs.
- Points will be chosen by a stratified random design to meet local data needs.
- Allotment monitoring will be prioritized by designated Improve, Custodial, and Maintain categories; land health assessments; permit renewals; and existing data, and completed as time and funding allow.
- To determine short-term grazing use, the Key Species Method (BLM 1999b) will be used.
- Utilization monitoring will be conducted at each allotment within the Planning Area, as funding and staff time allow.
- Monitoring of allotments will be prioritized based on land health assessments, permit renewals, and existing monitoring data.

- Compliance checks on allotments will be documented. Frequency of compliance checks will be determined primarily on past non-compliance.
- Qualitative methods found in *Interpreting Indicators of Rangeland Health* (IIRH) (see Pellant et al. 2005 or most recent version in draft at time of writing) will be completed at targeted sites and used along with AIM data to make land health assessments. IIRH methods will be conducted by an interdisciplinary team when a land health assessment is scheduled.
- If an allotment falls on sage-grouse habitat, AIM core methods (MacKinnon et al. 2011) in conjunction with Site-Scale (Fourth-Order) Measuring Techniques from the *Sage Grouse Habitat Assessment Framework* method (Stiver et al. 2015) will be collected.

Recreation & Travel Management

- Campsite monitoring, traffic counter data, and sign inventory will be conducted as time and funding allow.
- Visitor and site data collected for recreation sites will be input into the Recreation Management Information System.
- Information collected at visitor facilities will be entered into the Facilities Assessment Management System, Inventory and Deferred Maintenance Report.
- Social trail monitoring will be targeted for every 3 to 5 years, as time and funding allow.
- A baseline route inventory will be completed as part of the Travel Management Plan process. Once vetted, this baseline will serve as the basis for comparison to determine future social or unauthorized use (except in open off-highway vehicle areas).

Soil Resources, Vegetation, Special Status Species-Plants, Fire and Fuels

- AIM methods (MacKinnon et al. 2011) will be implemented for soil and vegetation (fuels) for routine, project-specific, and post-fire monitoring.
- To determine longer-term trends in vegetation, AIM core methods (MacKinnon et al. 2011) will replace previous methods as the baseline monitoring method.
- IIRH (Pellant et al. 2005) or most recent version will be implemented for routine monitoring of soils and vegetation.
- Frequency and Apparent Trend methods (BLM 1999a) will continue to be collected at a subset of legacy sites as time and funding allow to support soils and vegetation (fuels) monitoring.
- USFWS recovery plans for threatened and endangered plants, including:
 - *Recovery Outline for the Jones Cycladenia (Cycladenia humilis var. jonesii)* (USFWS 2008)
 - *Ute Ladies'-tresses (Spiranthes diluvialis) Draft Recovery Plan* (USFWS 1995)
 - *Revised Recovery Outline for the Kodachrome bladderpod (Lesquerella tumulosa)* (USFWS 2009)
 - *Monitoring Plant and Animal Populations* (Elzinga et al. 2001)

Visual Resources

Visual contrast ratings analysis will be conducted (using BLM Worksheet 8400-4; BLM 1985) for all surface-disturbing projects in Visual Resource Management Class I and II areas, Class III areas with high sensitivity, and Class IV areas where inventoried values could potentially change. Exceptions to conducting visual contrast analysis in the Class I, II, and III areas noted include when scale of project is minimal (e.g., single-track trail, small pond, wire fencing) or is completely hidden from view.

Water

- AIM National Aquatic Monitoring Framework: Technical Reference 1735-1 (BLM 2015) will be used to collect hydrological data for water quality monitoring.
- Riparian Proper Functioning Condition (Prichard et al. 2003) may supplement AIM aquatic data when needed (i.e., long-term monitoring sites) with trending Proper Functioning Condition data.
- Laboratory analysis of water samples will generally follow standard methods outlined in *Standard Methods for the Examination of Water and Wastewater*, 23rd Edition (Rice et al. 2017) unless otherwise specified.
- Monitor riparian conditions, as needed, for any surface-disturbing activity that could affect riparian areas.
- Prioritize monitoring in functioning at risk and then non-functioning riparian areas. Additional monitoring would occur on an as-needed basis (e.g., to assess impacts of specific projects or to establish reference conditions).

Wild Horse Management

- Qualitative methods found in *Interpreting Indicators of Rangeland Health* (Pellant et al. 2005 or most recent version in draft at time of writing) will be completed at targeted sites and used along with AIM data to make land health assessments. IIRH methods will be conducted by an interdisciplinary team when a land health assessment is scheduled.
 - Manual MS-4700, Wild Free-Roaming Horses and Burros Management (BLM 2010)
 - Horse counts would be conducted periodically to determine the number of horses that are in Wild Horse Herd Unit.

Wilderness Study Areas

- Wilderness Study Areas are required to be monitored monthly when accessible by the public (Manual 6330), unless an Alternative Monitoring Strategy is adopted.

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Abbreviations-Acronyms

Term	Definition
AIM	Assessment, Inventory, and Monitoring
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
GSENM	Grand Staircase-Escalante National Monument
IIRH	Interpreting Indicators of Rangeland Health
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
RMP	Resource Management Plan
UDAQ	Utah Division of Air Quality

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix J

Cultural Resources

August 2018

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Cultural Resource Site Use Categories

Cultural resource sites are to be categorized as to their allowable uses, as per Bureau of Land Management (BLM) Handbook H-1601-1, Appendix C, Page 9. Supplemental guidance for defining cultural resource use allocations and corresponding management actions is found at M-8130.21D and M-8130.21E. These categories include:

- A. Scientific use
- B. Conservation for future use
- C. Traditional use
- D. Public use
- E. Experimental use
- F. Discharged from management

Under direction for this environmental impact statement (EIS), category F (discharged from management) would not be utilized. In addition, Category D (public use) would be further subdivided into *public use, developed* and *public use, undeveloped*. Categorization of the many sites found across the Planning Area is beyond the scope of the current document, and sites would instead be classified on an as-needed basis or when future conditions of time and personnel permit. Generalized site types, use categories, and assignment criteria are included in the following table.

Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Prehistoric: Architectural (Sheltered and open)	Allow excavation or other investigative techniques subject to approved research design and consultation with appropriate Native American tribes.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use through consultation with Native American tribes.	Allow public use in accordance with development features. Consult with Native American tribes to find if site is appropriate for public use. Monitor site on a regular and frequent basis.	Do not suggest visitation to the site but offer information if requested. Consult with Native American tribes to find if site is appropriate for public use. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development.	Protect until need for use arises. Consult with Native American tribes to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.
Prehistoric: Artifact/Lithic Scatter with Features	Allow excavation or other investigative techniques subject to approved research design and consultation with appropriate Native American tribes.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use through consultation with Native American tribes.	N/A	N/A	Protect until need for use arises. Consult with Native American tribes to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.

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Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Prehistoric: Open Lithic/Artifact Scatter	Allow excavation or other investigative techniques subject to approved research design and consultation with appropriate Native American tribes.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use through consultation with Native American tribes.	N/A	N/A	Protect until need for use arises. Consult with Native American tribes to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.
Prehistoric: Lithic Source/Quarry	Allow excavation or other investigative techniques subject to approved research design and consultation with appropriate Native American tribes.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use through consultation with Native American tribes.	N/A	N/A	Protect until need for use arises. Consult with Native American tribes to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.

Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Prehistoric: Rock Art	Document to Utah Archaeology Site Form standards. Allow excavation or other investigative techniques subject to approved research design and consultation with appropriate Native American tribes.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use through consultation with Native American tribes.	Allow public use in accordance with development features. Consult with Native American tribes to find if site is appropriate for public use. Monitor site on a regular and frequent basis.	Do not suggest visitation to the site but offer information if requested. Consult with Native American tribes to find if site is appropriate for public use. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development.	Protect until need for use arises. Consult with Native American tribes to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.
Historic: Architectural	Document standing architectural resources to appropriate Utah Division of State History standards. Allow investigative techniques subject to approved research design.	Preserve until conditions for categorization and use become apparent.	Determine appropriate traditional use in consultation with descendant communities.	Allow public use in accordance with development features. Monitor site on a regular and frequent basis.	Do not suggest visitation to the site but offer information if requested. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development.	Protect until need for use arises. Consult with descendant communities to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.

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Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Historic: Artifact Scatter	Document to scientific and applicable standards. Allow excavation or other investigative techniques as applicable.	Preserve until conditions for categorization and use become apparent.	N/A	N/A	N/A	Protect until need for use arises. Consult with descendant communities to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.
Historic: Rock or Dendroglyph	Document to scientific and applicable standards.	Preserve until conditions for categorization and use become apparent.	N/A	Allow public use in accordance with development features. Monitor site on a regular and frequent basis.	Do not suggest visitation to the site but offer information if requested. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development.	Protect until need for use arises. Consult with descendant communities to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.

Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Historic: Trail/Road	Document to scientific and applicable standards.	Preserve until conditions for categorization and use become apparent.	Open to general public use not necessarily strictly for traditional use.	Allow public use in accordance with development features. Monitor site on a regular and frequent basis.	Do not suggest visitation to the site but offer information if requested. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development.	Protect until need for use arises. Allow experimentation following appropriate research design.
Historic: Mining	Document to scientific and applicable standards. Allow excavation or other investigative techniques as applicable.	Preserve until conditions for categorization and use become apparent.	N/A	Allow public use in accordance with development and safety features. Monitor site on a regular and frequent basis. Visitor safety should be a priority consideration.	Do not suggest visitation to the site but offer information if requested. Monitor site on a regular and frequent basis. Consider movement to D, Public Use, Developed, if warranted and with appropriate development. Visitor safety should be a priority consideration.	Protect until need for use arises. Allow experimentation following appropriate research design.

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Site Type	A: Scientific Use	B: Conservation for Future Use	C: Traditional Use	D: Public Use, Developed	D: Public Use, Undeveloped	E: Experimental Use
Historic: Artifact Scatter	Document to scientific and applicable standards. Allow excavation or other investigative techniques as applicable.	Preserve until conditions for categorization and use become apparent.	N/A	N/A	N/A	Protect until need for use arises. Consult with descendant communities to find if site is appropriate for experimentation. Allow experimentation following appropriate research design.

N/A - not applicable

The management of cultural resources on federal lands is dictated, in large part, by Federal laws and regulations. Although there are many addressing cultural resource concerns, the most applicable laws and regulations for the BLM are the following:

- National Environmental Policy Act (NEPA)
- National Historic Preservation Act (NHPA)
- Antiquities Act
- Historic Sites Act
- American Indian Religious Freedom Act
- Religious Freedom Restoration Act
- Archaeological Resources Protection Act
- Native American Graves Protection and Repatriation Act
- Federal Lands Policy Management Act
- Code of Federal Regulations (CFR) 36 800

Cultural resources are nonrenewable; that is, any loss or degradation of cultural resources is permanent. Archaeological and historic sites that are eligible for listing on or that are listed on the National Register of Historic Places (NRHP) are termed historic properties. It is important that there is no net loss of scientific information potential or integrity for historic properties and that they are managed to prevent or minimize adverse impacts on integrity or any of the qualities that are character defining. Preservation and protection are the primary goals of any Federal cultural resource program.

Chapter 3, Section 3.2, *Cultural Resources*, of this EIS presents the background information on cultural resources in the Planning Area. A brief description of the types of properties found in the Planning Area and the various forms of impacts that could affect these sites is included in this appendix. A description of the resource types felt to be most susceptible to adverse effects is included below. Also included in this section is the criteria by which determinations of effect are made, and a discussion of potential mitigation options for sites being adversely affected.

Sites and Adverse Effects

Cultural resource concerns regarding adverse effects focus on site type and the potential for effects caused by a variety of sources. Site types felt to be most susceptible are as follows:

1. *Rock shelters*. These locations often contain complex sites with a variety of features that can include delicate and perishable materials not found in open settings, and very complicated natural and cultural sedimentary stratigraphy. Shelter and alcove settings can suffer from the immediate and cumulative physical effects of livestock, and are also often subject to looting and vandalism. Grazing-related adverse effects and vandalism in rock shelters in the Kanab Field Office were noted as early as 1919 (Judd 1926:118). Currently, it is difficult to find sheltered sites in the Planning Area that have not been vandalized or looted. Although rare in rock shelters, range improvements and other recent man-made features can also adversely affect sheltered sites.
2. *Sites with standing architecture, including historic and prehistoric sites, and sites with exposed architectural features*. These sites may have architectural features that can suffer from recreational use, development projects, and livestock impacts. As with rock shelters, remains of prehistoric and historic structures are often subject to vandals and looters. Even

sites with only a few courses of intact masonry or rubble mounds would be included in this category, because any adverse effects would be considered unacceptable levels of damage.

3. *Open sites in sensitive locations, such as in erosive soils, in areas that tend to concentrate recreational use or the presence of livestock, and those sites with discreet features such as hearths, slab features, soil staining, middens, and other features that are susceptible to disturbance.* Sites in erosive sediments suffer from natural weathering effects that are exacerbated by trampling, off-highway vehicle (OHV) use, and erosion. Features such as middens, hearths, and fire-cracked rock, lithic debitage, and artifact concentrations are easily disturbed, and once disturbed, they can lose integrity and scientific value. In certain contexts, cumulative effects due to disturbance and erosion can quickly and irreversibly affect these features, especially in sensitive soils and on slopes. Buried slab features, such as slab-lined hearths, storage features, and pit houses, may at first seem impervious to such impacts; however, observation has shown that this is not always the case, especially with softer sandstones. Hard sandstone slabs may help to enclose and protect some features, but softer sandstones may weather quickly. As the upper margins of soft sandstone slabs are exposed through erosion and weathering, these slabs can be quickly broken down by exposure to the elements, trampling, and vehicles. Without the slabs to help protect and define the features, they can be rapidly lost to additional direct impacts, exposure, and erosion.

This category may exclude sites based on their lack of potential for additional adverse effects. For example, a lithic scatter found on sandy sediments or slopes open to recreational use or cattle trailing and increased erosion would be included in this category, while a lithic scatter on stable, gravelly sediments with little depth potential, light impacts, and not prone to increased erosion might not be included.

4. *Rock art sites and historic inscriptions.* Vandalism is by far the most important factor concerning adverse impacts on rock art, but livestock can adversely affect these sites, as well. Instances of both petroglyphs and pictographs suffering from livestock rubbing have been noted in the Planning Area, and cases of dung splattering on rock art panels have been documented in the Planning Area and noted in nearby areas.

All readily accessible sites can be subject to various degrees of human or grazing-related influences, but the above sites are considered to be more easily damaged or more often targeted by looters and collectors than most other site types. These conclusions are based on field observations, reviews of literature (see for example Geib et al. 2001), and conversations with other area archaeologists. While site type is important with regard to adverse effects, site location is also a factor. Observation has shown that sites in the immediate vicinity of recreation areas, OHV routes, and range improvements that focus livestock-related activity suffer more than those in outback situations.

Findings of Effect

Findings of effect represent a measured analysis of the state of an archaeological or historic site in relation to the agents in question or a proposed activity. Identification of factors leading to any finding of effect will need to be based on professional observations, data collection, and judicious application of national guidance. Direction at 36 CFR 800.5 provides for adverse effect and no adverse effect. Also considered in this appendix are two additional subcategories: a finding of no effect and a finding of beneficial effect. These are not part of 36 CFR 800.5, but

have been added to this analysis to better describe potential effects and management options. They are described under *Finding of No Adverse Effect*, below.

A finding of adverse effect means that the site is being affected or will be adversely affected by the agents in question, as defined in 36 CFR 800.5(a)(1):

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the [NRHP] in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

The BLM will make findings of effect for previously recorded sites based on existing data, at least until such time as the agencies can revisit the sites and prepare an updated site form (if necessary). The BLM will also apply findings for cultural resource sites identified in the future. Future data will come from research-driven inventories and from NHPA Section 106 inventories related to implementation actions, in addition to an active, ongoing monitoring and management program. Thresholds for making findings of effect follow the description of each category. Findings for all sites, whether previously documented or newly discovered, are made on an individual, case-by-case basis.

After more than 140 years of historic use of the Planning Area, it is often difficult to find archaeological sites that have not been affected to some degree. However, under specific conditions on some sites, any adverse effects may have reached their most detrimental levels decades before. Numbers of livestock, for example, were significantly higher prior to 1935 than they are now, suggesting that grazing-related pressures to sites were probably greater at that time. It also suggests that they have probably somewhat diminished since that time. This trend has been noted by other archaeologists (see, for example, Popelish 2001). Looting and wholesale destruction of sites were common occurrences in the past, but have diminished greatly in recent decades. While looting and vandalism have diminished, the numbers of recreationalists has recently increased dramatically and with that rise in popularity comes unintentional impacts. Specific sites in certain areas are getting "loved to death."

Finding of No Adverse Effect

At stable sites not prone to erosion or excessive visitation, additional adverse effects might not be expected. In some cases, the architectural features of a site, either through natural forces or through other impacts, may have been adversely affected to the point that additional recreational or livestock would not further damage them. Although some sites may have suffered adverse effects in the past, the basic question still revolves around site integrity. If the site is losing integrity, affecting its eligibility under the relevant NRHP criteria, it will not fit into the *no adverse effect* category. If, on the other hand, the site is not suffering adverse effects in addition to those already inflicted by earlier activities, then a determination of *no adverse effect* may be applicable.

- **Thresholds:** Sites with a finding of *no adverse effect* may show indications of past or ongoing use or visitation but will show no indications that use is contributing to adverse effects. Care must be exercised when assigning sites to this category, making a *no adverse effect* determination, as it may be difficult to determine if current use is not contributing to ongoing adverse effects. The *no adverse effect* category should be used with caution and reserved for sites where it is demonstrated through careful analysis that current practices

are not adversely affecting any of the multiple site components or its potential eligibility for listing on the NRHP.

Two additional subcategories have been added to this discussion to help clarify this discussion about *no adverse effect*. While the *no effect* and *beneficial effect* categories are not included in 36 CFR 800 regulations, they would be included in the larger finding of *no adverse effect*. These are presented here for discussion and are described below.

- **No Effect:** Sites applicable to a determination of this category would primarily include those sites that are inaccessible to livestock, receive very little recreational use or visitation, or have been otherwise hardened or protected from human- or grazing-induced impacts.
 - **Thresholds:** Sites in this category show no evidence of ongoing disturbance, or no potential for disturbance by current use, project proposals, or predictable factors.
- **Beneficial Effect:** A beneficial effect is one that will have a positive effect, usually on the site itself; however, it can also include actions that will further interpretive and educational aspects of cultural resources and cultural resource management. An example of beneficial effects is the use of historic trails and trail systems. In the Planning Area, there are numerous historic trails associated with early ranching and grazing. Most of these trails have not been used in decades and are fast fading from the ground and the collective memory of local inhabitants. Such trails are a class of linear cultural resources that often are considered eligible for listing on the NRHP. Allowing continued use and, to a practical extent, promoting the use and maintenance of these trails is a means by which these types of sites can be preserved, while allowing for good public education and interpretation possibilities. Similar arguments could be made for certain historic roads or historic structures (such as line cabins), where maintenance under 36 CFR 67 (Secretary of the Interior's Standards for Rehabilitation) and appropriate use would have a beneficial effect on a structure that might otherwise fall into disrepair and neglect. Stabilization of prehistoric structures such as cliff-side granaries is another example of a beneficial effect.

Finding of Adverse Effect

These findings are based on observations regarding the site type, condition, ongoing impacts, use, and compounding factors, such as increased erosion, vandalism, and visitation. Mitigation for these sites can include a variety of approaches, as outlined in the following sections.

- **Thresholds:** Factors of site condition and ongoing effects will need to be considered prior to a finding of adverse effect. Cultural resource specialists should focus on key points regarding site integrity and the NRHP criteria. Because cultural resource sites are nonrenewable resources, if potential adverse effects are suspected but not conclusively identified, it may be prudent to assume these effects are indeed ongoing and to proceed accordingly until such adverse effects are positively verified or refuted to preserve sites for future research.

The following are suggestions of thresholds for a finding of adverse effect:

- Indications of actively ongoing erosion at a historic property that is caused by, or exacerbated by, human or livestock use of the site area.
- Indications of direct, indirect, or cumulative adverse effects, where it is apparent that the effects of humans or the environment are adversely affecting portions of the historic

property or features within that property that were not previously adversely affected by earlier use of the site area.

- Indications of direct or indirect adverse effects, where it is observed through scientific investigation that the levels of adverse effect are beyond those previously suffered by the site (or portion of the site) prior to NEPA and NHPA requirements, and intact areas are now losing integrity and research potential, or where adverse effects are impinging on any of the qualities that make a site eligible for listing on the NRHP.

Tools for Site Protection and Management

Land managers must “seek ways to avoid, minimize, or mitigate ... adverse effects,” as outlined at 36 CFR 800.6(b).

Following are brief discussions of Class I overviews and ethnographies, important documents that set the stage for the many of the “tools” in the cultural “toolbox.” Subsequent sections are detailed explanations of the various protective measures for cultural resources in relation to this EIS. Which option or options are chosen would depend on several factors, including site type; characteristics that relate to its eligibility for listing on the NRHP; location, access, and use for and by humans and livestock; nearby rangeland improvements; soil type; site condition; results of any Native American or other consultations; and likelihood for continued adverse effects. The tools are presented below in two primary sections: *Non-Cultural Tools for Site Protection* and *Cultural Tools for Site Protection*. Each tool is examined and detailed in regard to adverse effects. These tools may be used singly or in combination to meet the required objectives.

Archaeological and Historical Synthesis of the Planning Area (Class I Overview)

An archaeological and historical synthesis (commonly referred to as a Class I overview) is a synthesis of all known relevant information regarding the archaeology and history of a specified area. An overview of this sort is a must before the history and prehistory of an area can be understood and the area sites tied into a meaningful background. Often the archaeological and historical syntheses are produced as separate volumes, but each should be considered as important as the other. These set the stage by which sites can be evaluated in context to nearby sites as well as the larger cultural or physiographic area. While not a mitigation or protective action in itself, the development and use of these documents provides the setting in which much of the following actions should be considered.

Grand Staircase-Escalante National Monument (GSENM) currently has on file a prehistoric Class I written in 2000. Depending on factors such as new research, boundary changes, land acquisitions or disposals, and other actions, a Class I overview should be periodically updated to reflect the most recent information available. GSENM is currently in the process of updating the original Class I Overview including Kanab-Escalante Planning Area (KEPA) lands. The BLM Kanab Field Office is currently also producing a Class I Overview specifically for the Kanab Field Office non-KEPA lands. Both of these documents include cultural resource predictive models.

Cultural Ethnographies

Ethnographies document the current cultural groups that have vested interests in the Planning Area. Before meaningful government-to-government consultations can occur, the BLM must have a good knowledge of how these cultural groups utilized the landscape in the past and continue to do so, where culturally important locations such as Traditional Cultural Properties

are found, where traditional practices are taking place, and what resources are utilized. Above all else, ethnographies are necessary to document the ties of a cultural group to the landscape from that culture's point of view. While usually applied to Native American groups, the need for ethnographies can be extended to other cultural groups, as well. As with the Class I overview, an ethnography is not a mitigation or protective action but a necessary source of information and reference material while considering the following actions.

Non-Cultural Tools for Site Protection

Avoidance

The simplest and most effective way to protect a historic property is to avoid any adverse effects. While this can be relatively easy in some cases (such as moving a proposed activity location to avoid a historic property), it becomes more difficult with livestock that are relatively free to move on their own or unrestricted human use of the landscape. This avoidance option is best used with fixed objects, such as a proposed corral, road, campground, water improvement, or certain other physical improvements. Many of the following tools are more applicable and can work both in the minimization and mitigation aspects.

Access Restriction

Restricting access, as considered here, generally refers to restrictions on a site-by-site basis. In some settings, human restrictions may be accomplished with signage, or, if needed, fencing or other physical restriction barriers. Where possible, regarding livestock, brush barriers could be used. They would have the advantages of appearing more natural, would not call attention to the site, and would not generally require much in the way of tools or artificial materials. Where such natural barriers could not be used, traditional fencing or other restrictive options may be necessary. Closures through legal channels (i.e., making a location "off limits") are also an option, but such closures affect only humans and are often difficult to enforce reliably.

Closures as a Scientific Control

Closure of certain areas can act as a scientific control for comparison to areas left open to free access. This would be an important aspect when considering livestock or OHV effects, both direct (livestock or OHVs on the sites) and indirect (such as erosion exacerbated by livestock or OHV use), as compared to other adverse effects. Restrictions for scientific purposes should be planned to take full advantage of the research potential. Areas with a variety of site types should be considered, but the restricted and open portions of the research areas should be as similar in the geographic and cultural landscapes as possible. This allows the researcher to make a parallel comparison.

Location of Facilities and Range Improvements

Livestock are controlled by the use of a whole series of range improvements, such as fence lines, corrals, water sources, salt licks, and drive ways. All of these improvements have the tendency to focus livestock use into certain areas, concentrating the related adverse effects. When cultural resource sites are found in the vicinity of these improvements, the adverse impacts on these sites can rise significantly.

In many cases, these effects can be mitigated by moving through project design by relocating the range improvement prior to implementation (see *Avoidance*, above). Fences can be constructed around, rather than through, sites. Watering troughs can be constructed or moved

away from sites, as can corrals and other improvements. Removing the reason for livestock congregation would have a positive effect on any site in the vicinity.

Livestock congregation at a watering source not only intensifies livestock use of the source area itself, but also increases livestock use of the surrounding area. Data from Glen Canyon National Recreation Area indicate that cattle tend to stay within a 2-mile radius of their water source (NPS 1999:22), meaning that livestock would affect sites within that 2-mile radius to a greater degree than outside that area. If a watering source or corral is found within or proposed for an area of high site density, it may be prudent to move that improvement to an area of lesser site density.

Similar issues regarding concentrations of human use in certain areas may result from placing recreational facilities such as campgrounds, parking lots, picnic areas, and trail systems near archaeological and historic sites. This is appropriate in situations where the archaeological or historic site is the focus for interpretive or educational purposes, but in other situations it would be prudent to consider moving the proposed facility to a different location.

Off-Highway Vehicles and Related Vehicles

Unregulated use of OHVs has been recognized as a serious problem on BLM-administered surface lands. Increasing accessibility to distant parts of the landscape has also increased the accessibility of cultural resource sites on that landscape. OHV use on cultural resource sites has an immediate destructive effect and increases the overall rate of secondary erosion. Limiting the use of OHVs and similar vehicles where such activities are affecting cultural resource sites removes a serious threat to these sites. Restricting OHV use to authorized, “open” routes and designated “play” areas that have appropriate Section 106 clearance will provide additional protections. Off-road livestock herding and driving should be restricted to equestrian or pedestrian methods.

Changes in Range Management Practices

Seedings and large-scale vegetation projects: Such practices as clearing and seeding to increase the forage in a given area eventually draw livestock to these areas. The clearing operations themselves, such as chaining and bulldozer pushes, can have immediate and significant adverse effects for cultural resource sites. Subsequently, as the seeding matures and cattle are drawn to the project area, additional grazing-related adverse impacts on sites in that area may increase. If cultural resource sites were protected during the clearing operations by leaving them in undisturbed tree islands, cattle may later be drawn to them for the shade they provide in an otherwise open setting. The sites are then open to adverse effects by not just a few cattle wandering by, but by larger numbers of cattle drawn by the very factors designed to protect the site. These islands could also draw unwanted human attention to cultural resource sites.

Future large-scale range improvement projects, such as seedings, should be planned in conjunction with cultural resource specialists. This should be done to ensure that cultural resource sites are taken into consideration and that potential adverse effects can be mitigated prior to project implementation. In the seeding example noted above, initial avoidance of archaeological sites followed by hand-thinning the remaining tree cover to match the surrounding vegetation density would not adversely affect the site and would leave no reason for livestock to concentrate in that location.

Consideration of animal unit months (AUMs): AUMs reflect the number of head of livestock that are permitted to graze in a certain location for a certain time span. Recent investigation and research (Zweifel 2016) has shown that stocking rates are only one of a suite of factors influencing adverse impacts on cultural resource sites. However, the amount of impact a cultural resource site might suffer from livestock is, to a certain degree, proportional to the number of livestock on that site at any given time. Reducing the number of livestock would therefore reduce livestock-related adverse effects, although direct measurements of potential adverse effect reduction would depend on a variety of factors and would be specific to the sites in question. AUM reduction would probably not completely avoid adverse effects. Although adverse effects would be minimized with the reduction of livestock, as long as some livestock remain, there is potential for adverse effects.

Area closures: Closure to livestock, either on a temporary or permanent basis, is the only mitigation strategy that would remove all potential for grazing-related adverse effects on anything above a site-by-site basis. Closures would be used as a form of mitigation only when it is apparent that no other potential mitigation actions would meet protection requirements or where all other attempts had failed to realize the necessary levels of protection.

Closures would generally be considered as a last line of defense for areas where multiple sites or cultural landscapes are being adversely affected. Any closures of areas large enough to reduce AUMs would require a land use plan amendment and consultation with the permittees and other interested parties. Such closures, even when intended for cultural resource protection, could serve as scientific control areas for a wide variety of other resources (see *Research*, below, for additional details and discussion).

Changes in season of use: It is at first difficult to see how changes in season of use could be used as mitigation for a cultural resource site, but this tool should be considered as a possibility. Livestock tend to congregate in sheltered areas, such as alcoves, overhangs, and rock shelters. Part of this behavioral pattern is in response to weather conditions; in the summer, livestock “shade up” in shelters; in the winter, they move to these shelters for protection from wind, rain, and snow. In either weather extreme, livestock seek the sheltered areas. Vegetation has a stabilizing effect on sediments and soils. A change in season of use that reduces adverse effects on vegetation would also increase site stability by lessening erosion.

In wet weather, such as the monsoon season, there is a more abundant water supply in areas that might not usually have available water, such as natural tanks in slick rock areas. Under these conditions, livestock may tend to wander farther from their traditional water source than they would under normal conditions, entering areas and affecting sites that only rarely see livestock. Under such conditions, a seasonal restriction may be all that is needed to protect a whole series of sites.

Certain types of soils and sediments may also be more prone to livestock effects under specific weather conditions. Soft sediments and clay soils may be much more susceptible to the hoof action of livestock in wet conditions. Sites found in these areas, within these sediment types, would be more open to adverse effects, as the sediments themselves become more susceptible. Again, a seasonal restriction may be all that is necessary to protect sites in these settings.

Cultural Tools for Site Protection

Inventory

Approximately 5 to 7 percent of the Decision Area has been comprehensively surveyed for cultural resources. While many project areas are included in this figure, some older improvements and development projects were implemented or established prior to standard cultural resource surveys. Inventory is needed at those activity locations that have never been surveyed and would be needed at proposed project locations. Certain projects, such as campgrounds or livestock watering locations, tend to concentrate usage. With such projects, inventory should not be limited to the specific development location but must take into account the effect of recreational, development, or livestock concentration in the area surrounding the improvements.

Future inventory across the Decision Area will generally be in response to NHPA Section 106 compliance or Section 110 obligations. The extent and location of Section 106 inventories would be largely determined by the specifics of the project generating the need for inventory. Section 110 inventories should be directed at locations or topographic features likely to harbor site types known to be at risk from adverse effects, locations that tend to attract livestock, areas of known or suspected high site density, or locations that address certain research topics and information needs. Larger areas that have seen little or no inventory should be surveyed to identify at-risk sites and to establish the cultural resource character of the area.

Detailed Site Recording and Collection

Cultural resource sites are generally documented by recording certain data on specially prepared site forms. Many factors can influence what kind and the amount of information that is included on a site form. Early site forms often lacked many categories that today are considered to be required information. An example of this is impacts on sites. Most site forms from 30 or 40 years ago did not include a category or space for noting specific adverse effects and instead may have had only a check box for site condition: good, fair, or poor. The rare comments on specific adverse effects, if any, would be added in the narrative portion of the site form, and these narratives themselves were often not as detailed as modern procedures require.

In some specific cases, detailed recording or re-recording of a site may be all that is necessary for mitigation. For example, sites that have been heavily affected in the past and retain little integrity may be adequately documented by a thorough recording process and possibly artifact collection and curation. Recording and collection as mitigation should be reserved for sites where it is apparent that these actions alone would retrieve any remaining scientific information left at those sites.

At the least, detailed site recording should be seen as the beginning of the first step of the documentation process and it is a requirement prior to any collection, testing, or full excavation. If any reasonable form of scientific monitoring is to be accomplished, a detailed record of the site before the monitoring process begins is a must. Only then can changes in site condition, artifact counts and dispersal patterns, and future adverse effects be accurately tracked.

Archaeological Testing and Data Recovery Excavation

Archaeological testing of a site refers to test excavations to determine its character, depth, cultural affiliation, and eligibility for listing on the NRHP. Test excavations are usually restricted in scope and involve a few small test plots or trenches. Testing can provide a host of information without the destruction and cost involved in larger-scale excavations. It can often provide the level of information needed to make informed decisions regarding management direction for that site. Testing and excavation can often provide information not just about that specific site, but about other nearby sites in similar settings and apparent cultural affiliation. Therefore, the testing of one site may provide insight to the management needs of numerous sites. While testing, like excavation, is a destructive process, it is performed on a scale small enough that the overall integrity of the site is not impaired.

Data recovery excavation of cultural resource sites is a destructive process, and once a site has been excavated it cannot be re-assembled and protected. Excavation is generally used in situations where the site is in imminent danger of destruction and some form of data retrieval is necessary, or in situations where important scientific research questions cannot be answered by other, non-destructive means. As a mitigation tool, excavation should be considered a last resort. Excavation can provide a host of scientific information that cannot be had otherwise, but it is costly, can be time consuming, and results in the loss of some, or all, of the cultural resource site. Excavation may be the most suitable form of mitigation at sites that have been heavily affected or at sites that may suffer significant loss of integrity from a development project. Any proposed excavations must be preceded by Native American and State Historic Preservation Officer consultation, would include other consulting parties as appropriate, and would require the development of a specific treatment plan.

Monitoring

Monitoring is a necessary component of any cultural resource program. Cultural Resource Programs have monitoring programs in place, but these are generally site specific, are performed on an as-needed or when-possible basis, and respond to a variety of projects and effects. There is a recognized need for a more comprehensive inventory and monitoring program designed to identify, quantify, assess, and monitor impacts on cultural resource sites. Site Steward programs have become an effective tool in providing wider monitoring coverage than would otherwise be possible.

Baseline data on the condition of sites are generally collected at the time the site is recorded. However, many older site forms did not adequately address impacts on the sites. Within the past two or three decades, this has begun to change as archaeologists gain a broader understanding of the nature of various impacts. Monitoring provides baseline data where necessary and allows tracking of resource conditions over time. While inventory provides a first look and recording episode for cultural resource sites, monitoring provides the basic information by which changes to the site can be measured. Monitoring is also necessary to track the effectiveness of different mitigation measures applied to various cultural resource sites.

Management must have the information necessary to make informed decisions in the future as to what forms of mitigation may better apply to various site types, including which techniques have been shown to work and which did not prove effective. Although inventory and monitoring

are not mitigation measures in themselves, they are a vital part of an overall mitigation plan. The importance of monitoring cannot be overemphasized.

Research

Continuing research is an important aspect of any cultural resource program. Effective land management is only possible if an agency has adequate knowledge of the resources being managed. This involves more than just what is present, but how the resource is affected by natural and human-induced processes and actions.

A fair amount of research has been accomplished, for example, over the past two or three decades into grazing-related adverse impacts on cultural resources, but most of these studies have been relatively small and short term. Research at GSENM includes an ongoing, long-term monitoring study, begun in 2005, comparing two specific sets of sites, one ungrazed and the other grazed annually. This is an ambitious 15-year project that, when completed, will result in the most comprehensive study of its kind to date.

Research on any given parcel of land is a local affair but can have far-reaching applications. The above-noted grazing research can provide insights that may be applied across the American Southwest and perhaps farther. Other recent GSENM research has produced archaeological reports and publications that apply to wide areas and extensive time depth, and will prove to be extremely valuable for the next several generations of archaeologists and other researchers.

The continuing collection of local oral histories is another example of an ongoing research program. Interviews conducted with long-time area residents can address the history of the ranching and livestock industry in the Decision Area and can help describe range conditions and how they have changed over the past several decades. Also included in research is the current development a comprehensive grazing and ranching history of the Planning Area; this may be particularly important in that the ranching lifestyle of the past decades is quickly becoming a thing of the past, and no such grazing history of any detail has yet been accomplished.

Consultation

While consultation is required under several laws and regulations, some cases may require more in-depth or widespread consultation efforts. An example would be Tribal Consultation regarding the viewshed from a particular rock art site. In many instances, the placement of the rock art is in relation to its location on the landscape and the view had from that location. Likewise, prehistoric and ethnographic shrine locations are often landscape and viewshed dependent. In such cases, impacts on the surrounding landscape may be considered an impact on the site or sites in question. While regulations regarding consultations were generally crafted with United States and Native American government-to-government efforts in mind, consultation may be applied wherever special interest, ethnographic, or religious groups or political entities come into play.

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Abbreviations-Acronyms

Term	Definition
AUM	Animal unit month
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EIS	Environmental impact statement
GSENM	Grand Staircase-Escalante National Monument
KEPA	Kanab-Escalante Planning Area
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHV	Off-highway vehicle

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix K

Lands Identified for Disposal

August 2018

Appendix K: Lands Identified for Disposal

Lands can be considered for disposal if they meet criteria described in Section 203 of the Federal Lands Policy and Management Act of 1976. Lands designated for potential disposal via Federal Land Policy and Management Act Section 203 are identified in Table 1 for each alternative.

Table 1. Lands Designated for Potential Disposal via Federal Land Policy and Management Act, Section 203, Sale

Legal Description	Acres	Alternative A	Alternative B	Alternative C	Alternative D
T. 35 S., R. 3 E., Sec 29, W1/2SW1/4	80	-	-	X	X
T. 35 S., R. 4 E., Sec 20, public land south of Highway 12	68.5	-	-	X	X
T. 36 S., R. 2 W., Sec 29, NE1/4SW1/4	40	-	-	-	X
T. 36 S., R. 2 W., Sec 30, SE1/NE1/4 and NE1/4SE1/4	80	-	-	-	X
T. 37 S., R. 2 W., Sec 33, NW1/4NE1/4 and N1/2SE1/4NE1/4	60	-	X	X	X
T. 37 S., R. 2 W., Sec 34, NW1/4NW1/4 and N1/2SW1/4NW1/4	60	-	X	X	X
T. 38 S., R. 2 W., Sec 6, Lot 6 (public land northwest of road)	20.5	-	-	-	X
T. 39 S., R. 4 W., Sec 27, Deer Springs Ranch Lot 105	19.98	-	X	X	X
T. 39 S., R. 4 W., Sec 27, Deer Springs Ranch Lot 106	19.98	-	X	X	X
T. 40 S., R. 4 W., Sec 11, SE1/NW1/4 (area northwest of road)	8.5	-	-	X	X
T. 42 S., R. 2 W., Sec 1, Lots 3-4, S1/2NW1/4, W1/2SW1/4, SE1/4SW1/4	277.78	-	-	-	X
T. 42 S., R. 2 W., Sec 12, all public land east of Highway 89	109	-	-	-	X
T. 42 S., R. 4.5 W., Sec 31 (all)	591.6	-	-	-	X
T. 43 S., R. 4.5 W., Sec 5, Lot 4	37.86	-	-	-	X
T. 43 S., R. 4.5 W., Sec 18, NE1/4SE1/4, S1/2SE1/4	120	-	-	-	X
T. 44 S., R. 4 W., Sec 2, Lot 1	40	-	-	X	X

T. - township, S. - south, R. - range, E. - east, Sec - Section, W - west, SW - southwest, SE - southeast, NE - northeast, NW - northwest

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix L

Coal Unsuitability Report

August 2018

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Appendix L: Coal Unsuitability Report

Introduction

Regulations regarding coal management on public lands are found in Title 43 of the Code of Federal Regulations (CFR), Part 3400. The BLM is required in Part 3420.1-4 to review Federal lands and assess whether there are areas unsuitable for all or certain stipulated methods of coal mining. Part 3461, *Federal Lands Review: Unsuitability for Mining*, defines the criteria to be used during this review. This report addresses the twenty criteria of coal unsuitability as defined in 43 CFR 3461.5.

Consistent with regulations outlined in 43 CFR 3461.2-1(a)(2), on January 16, 2018 the BLM published a Notice of Intent (NOI) in the Federal Register requesting information from the public regarding coal suitability for lands now excluded from Grand Staircase-Escalante National Monument (GSENM). The BLM now refers to these lands as the Kanab-Escalante Planning Area (KEPA). The scoping period formally ended on April 13, 2018. The BLM has reviewed all comments received and determined that there were no comments specifically related to coal unsuitability that would revise or augment the BLM unsuitability determination.

Lands Considered

Map 53 (Coal Unsuitability) displays the area evaluated and found to be unsuitable for certain mining methods. This evaluation provides an unsuitability determination for the 15-year BLM land use planning process.

The coal unsuitability evaluation area was formerly part of GSENM. These Federal lands were excluded from GSENM boundaries by Presidential Proclamation 9682. From September 1996 to February 2018, these lands were withdrawn from mineral location, entry, and leasing. Currently, no Federal coal leases are authorized on these public lands.

The BLM defined the evaluation area based on the coal reasonably foreseeable development scenario included in the KEPA Mineral Potential Report. If a coal lease by application is submitted for lands in KEPA that are outside of the unsuitability analysis area, the BLM would make an assessment of suitability prior to finalizing the environmental analysis for the area being studied for coal leasing.

Prior to establishment of GSENM, the BLM was considering authorization of an underground coal mine in the southern Kaiparowits area known as the Smoky Hollow Mine. This area includes high quality low-sulfur coal, nearly ideal underground mining conditions, and ready outcrop access to a world-class coal deposit. Because a configuration of this tract is the most likely area to be applied for in the term of this planning cycle, this suitability determination centers on this coal energy resource.

Because it is not yet known if a coal energy lease by application will be submitted to the BLM and if submitted, where the exact location will be, the unsuitability analysis is for the most likely area of interest. The analysis also includes a wide enough area to provide for possible competitive applications and BLM offerings.

Geologic Setting

Coal in the analysis area is located within Late Cretaceous sedimentary strata of the Dakota and Straight Cliffs formations. The Kaiparowits field is in the John Henry Member of the Straight Cliffs Formation. The depositional environment for both the Dakota and Straight Cliffs coals were a coastal plain setting along the Western Interior Seaway. The Dakota coals were deposited approximately 95 million years ago during the onset (transgression) of the Western Interior Seaway known as the Greenhorn cyclothem. Kaiparowits coals were deposited approximately 85 million years ago during the Niobrara cyclothem. Rivers originating along the Sevier mountain belt provided a steady supply of sediment for burial of the rich coastal mires.

Coal Resources

On an annualized, as-received basis, the projected coal quality for relinquished Smoky Hollow coal leases (weighted averages)¹ has relatively low sulfur (0.51 percent) and ash content (7.23 percent). The sulfur as combusted (0.82 pounds per million BTUs) is less than the level allowed of 1.2 lb/MBtu. Further, the heating value at 11,480 Btus per pound is relatively high compared to most western coals. However, in the Kaiparowits field, the coal rank does decrease from high volatile C bituminous to subbituminous B from south to north in the broader analysis area.²

Evaluation of the Coal Unsuitability Criteria

The coal resources with development potential are assessed for the unsuitability criteria as outlined at 43 CFR 3461.5. Underground mining of coal deposits is exempt from the criteria, where there would be no surface coal mining operations as stated at 3461.1(a). Surface mining operations include surface mining open-cast operations and underground mining with surface effects such as primary access ways, personnel escape ways, and servicing supply systems incident to an underground mine as stated at 43 CFR 3400.0-5(mm).

Where underground mining will include surface operations and surface impacts on Federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless an exception or exemption applies (43 CFR 3461.1(b)).

Each criterion is subject to exceptions and/or exemptions as prescribed in the regulations.³

¹Appraisal of Andalex (AMCA Coal Leasing) Federal Coal Leasehold Rights in the Kaiparowits Coal Field, Kane County, Utah, Including 20 Federal and State leases in T. 40 & 41 South, R 3 & 4 East, as of September 17, 1996." March 16, 1999:

- Heating value (Btu/lb) 11,480 (10,805 to 11,709)
- Sulfur: 0.51 percent (0.41 to 0.65 percent)
- lbSO₂/MBtu: 0.82 (0.69 to 1.09)
- Ash: 7.23 percent (5.13 to 11.48 percent)
- Moisture: 9.79 percent (9.19 to 10.96 percent)

² Kanab Field Office Mineral Potential Report (UGS 2006)

³§ 3461.2 Unsuitability assessment procedures.

§ 3461.2-1 Assessment and land use planning.

(a)(1) Each of the unsuitability criteria shall be applied to all coal lands with development potential identified in the comprehensive land use plan or land use analysis. For areas where 1 or more unsuitability conditions are found and for which the authorized officer of the surface management agency could otherwise regard coal mining as a likely use, the exceptions and exemptions for each criterion may be applied...

Criterion Number 1.

All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.

Exceptions. (i) A lease may be issued within the boundaries of any National Forest if the Secretary finds no significant recreational, timber, economic or other values which may be incompatible with the lease; and (A) surface operations and impacts are incident to an underground coal mine, or (B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those National Forests west of the 100th Meridian, that surface mining may be in compliance with the Multiple-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977. (ii) A lease may be issued within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted.

Exemptions. The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977.

There are no units of the National Park System, National Wildlife Refuge System, component of the National System of Trails, designated Wilderness areas (National Wilderness Preservation System), designated Wild and Scenic River segments, National Recreation Areas, or National Forests within the lands analyzed for coal unsuitability.

The nearest incorporated community is Big Water, Utah. There are no Federal lands in incorporated cities, towns, and villages within the south Kaiparowits coal suitability evaluation area.

After Presidential Proclamation 6920 designated the monument, the Federal government acquired coal leases within the monument with money derived from the Land and Water Conservation Fund. Some of these formerly leased areas were excluded from the monument by Presidential Proclamation 9862. The BLM interprets Criterion 1 to apply to lands actually acquired using Land and Water Conservation Funds, not leasehold interests in the coal rights. The BLM interprets Criterion Number 1 to apply only to “lands,” not both “lands” and “interests

(3) The authorized officer of the surface management agency shall describe in the comprehensive land use plan or land use analysis the results of the application of each unsuitability criterion, exception and exemption. The authorized officer of the surface management agency shall state in the plan or analysis those areas which could be leased only subject to conditions or stipulations to conform to the application of the criteria or exceptions. Such areas may ultimately be leased provided that these conditions or stipulations are contained in the lease.

(b)(1) The authorized officer shall make his/her assessment on the best available data that can be obtained given the time and resources available to prepare the plan. The comprehensive land use plan or land use analysis shall include an indication of the adequacy and reliability of the data involved. Where either a criterion or exception (when under paragraph (a) of this section the authorized officer decides that application of an exception is appropriate) cannot be applied during the land use planning process because of inadequate or unreliable data, the plan or analysis shall discuss the reasons therefor and disclose when the data needed to make an assessment with reasonable certainty would be generated...

in lands.” As defined by the BLM regulations at 43 CFR 3400.0-5(r), a coal lease is a contract between the United States and the holder to explore and mine the United States’ mineral estate (or coal estate). At most, a coal lease constitutes a leasehold or interest in land; therefore, if Land and Water Conservation Funds are used to acquire a coal lease, it does not make those lands subject to Criterion 1.

Summary: Under Criterion 1, 0 acres are determined to be unsuitable.

Criterion Number 2.

Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, on federally owned surface shall be considered unsuitable.

Exceptions. A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that: (i) All or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or (ii) The right-of-way or easement was granted for mining purposes; or (iii) The right-of-way or easement was issued for a purpose for which it is not being used; (iv) The parties involved in the right-of-way or easement agree, in writing, to leasing; or (v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

One communication site lease (UTU-82085) granted to Glen Canyon National Recreation Area for 0.025 acre is authorized within the evaluation area, however, an exemption applies because all or certain types of coal development (e.g., underground mining) may not interfere with the purpose of the right-of-way.

Summary: Under Criterion 2, approximately 0.025 acre is determined to be unsuitable for surface coal mining, however, an exemption applies because all or certain types of coal development (e.g., underground mining) may not interfere with the purpose of the right-of-way.

Criterion Number 3.

The terms used in this criterion have the meaning set out in the Office of Surface Mining Reclamation and Enforcement regulations at Chapter VII of Title 30 of the Code of Federal Regulations. Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

Exceptions. A lease may be issued for lands: (i) Used as mine access roads or haulage roads that join the right-of-way for a public road; (ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated; (iii) If after public notice and opportunity for public hearing in the locality, a written finding is made by the authorized officer that the interests of the public and the landowners affected by mining within

100 feet of a public road will be protected. (iv) For which owners of occupied dwellings have given written permission to mine within 300 feet of their buildings.

Exemptions. *The application of this criterion is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977.*

No areas within the evaluation area meet the conditions identified in the criteria.

Summary: Under Criterion 3, no acres are determined to be unsuitable.

Criterion Number 4.

Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.

Exemptions. *The application of this criterion to lands for which the Bureau of Land Management is the surface management agency and lands in designated wilderness areas in National Forests is subject to valid existing rights.*

The South Kaiparowits Coal Suitability Evaluation Area includes approximately 46,071 acres of the Burning Hills WSA.

The exemptions for valid existing rights do not apply.

Summary: Under Criterion 4, approximately 46,071 acres in the Burning Hills WSA are unsuitable while under review by Congress for possible wilderness designation.

Criterion Number 5.

Scenic Federal lands designated by visual resource management analysis as Class I (an areas of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable.

Exceptions. *A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.*

Exemptions. *This criterion does not apply to lands: to which the operator has made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977, or which include operations on which a permit has been issued.*

The only land managed as VRM Class I within the south Kaiparowits coal suitability evaluation area is the Burning Hills Wilderness Study Area. Although this area was not designated as VRM Class I in the 2000 Grand Staircase-Escalante National Monument Management Plan, subsequent updates to the BLM's policy (IM-2000-096; Manual 6330) require the agency to manage WSAs as VRM Class I. These lands are not on the National Register of Natural Landmarks.

Summary: Under Criterion 5, approximately 46,071 acres in the Burning Hills WSA are unsuitable because these lands are managed as Visual Resource Management Class I.

Criterion Number 6.

Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

Grand Staircase-Escalante National Monument has issued numerous research permits for scientific studies, including for lands in the evaluation area that are now managed by the Kanab Field Office. Each permit is usually valid for up to five years and can be renewed.

Within the South Kaiparowits coal suitability evaluation area, there are approximately 10,751 acres (mostly Tropic Shale and Wahweap Formations) rated as Potential Fossil Yield Class (PFYC) 5 (highest sensitivity) and 251 documented paleontological sites. Most of the significant sites in the evaluation area are vertebrate fossil sites in the Wahweap Formation along the Head of Creeks road and across Tibbett Bench, and also in the Tropic Shale. Examples of highly significant sites in the analysis area include the Pilot Knoll ceratopsian skull (new species), the Tibbett Spring Bonebed, the Tibbett Spring Deinosaurs site, and the type locality for *Palmulasaurus quadratus* (plesiosaur). Two of these sites are currently being excavated and there is ongoing scientific survey and research in this area. Most of the potential for additional significant sites is in the same two formations, but there is also potential in the Straight Cliffs and Naturita Formations.

Currently there are 7 research projects with a geology or paleontology emphasis specifically in the South Kaiparowits coal suitability evaluation area. Additionally there are 8 research projects with biological or other areas of emphasis.

Many researchers are interested in continuing similar research under permit renewals. However, currently permitted research schedules will conclude prior to the anticipated timeline for coal leasing. Therefore, lands under current permits are not considered to be unsuitable under this criterion.

Summary: Under Criterion 6, no acres are determined to be unsuitable.

Criterion Number 7.

All publicly or privately owned places listed on or eligible for the National Register of Historic Places shall be considered unsuitable. This shall include any areas that the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, are necessary to protect the inherent values of the property that made it eligible for listing in the National Register.

Exceptions. All or certain stipulated methods of coal mining may be allowed if, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, they are approved by the surface management agency, and, where appropriate, the State or local agency with jurisdiction over the historic site.

Exemptions. This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

This criterion applies to districts, sites, objects, etc., of historical, architectural, archaeological, or cultural significance listed on or eligible for the National Register of Historic Places. No sites within the south Kaiparowits coal suitability evaluation area have been included in the National Register, although there are a large number of known and documented archaeological sites that have been determined eligible.

It is possible that Native American sacred sites are present in the analysis area, and in recent consultations for a different undertaking, the Navajo Nation have indicated that the Kaiparowits Plateau is considered a traditional cultural property. The Hopi Tribe have concerns with potential coal mining in the study area, and have stated that Ancestral Puebloan sites are considered their tribal footprints as well as traditional cultural properties (see National Register Bulletin 38). The Hopi Tribe also reiterated their concerns for springs and riparian areas. The Kaibab Band of the Paiute Indians have responded with comments based on a landscape view as to the significance of the Kaiparowits area, and placed great emphasis on the importance of water.

Summary: Under Criterion 7, no acres are determined to be unsuitable.

Criterion Number 8.

Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

Exceptions. A lease may be issued and mining operation approved in an area or site if the surface management agency determines that: (i) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or (ii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which includes operations on which a permit has been issued.

There are no designated natural areas or National Natural Landmarks within the south Kaiparowits coal suitability evaluation area.

Summary: Under Criterion 8, no acres are determined to be unsuitable.

Criterion Number 9.

Federally designated critical habitat for listed threatened or endangered plant and animal species, and habitat proposed to be designated as critical for listed threatened or endangered

plant and animal species or species proposed for listing, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Exceptions. *A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.*

Exemptions. *This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.*

There is no federally designated critical habitat or proposed critical habitat for listed threatened or endangered plants or wildlife, including fish, or species proposed for listing within the South Kaiparowits coal suitability evaluation area. The coal suitability area is within the ranges of three listed wildlife species—Mexican spotted owl, southwestern willow flycatcher, and California condor. The habitat in the project area was evaluated for suitability for these species and was determined not to be of essential value and the presence of these species has not been scientifically documented. The coal suitability area is not within the ranges of any federally threatened or endangered plants and it does not contain the geological formations that support Utah threatened or endangered plants in southeastern Utah.

The exemption for substantial legal and financial commitments and ongoing mining operations does not apply, because there are no active leases or operations within the evaluation area.

Summary: Under Criterion 9, no acres are determined to be unsuitable.

Criterion Number 10.

Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

Exceptions. *A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.*

Exemptions. *This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.*

The State of Utah does not have a state designation of threatened, endangered or candidate (TEC) species list. The evaluation area does include approximately 16,000 wintering habitat for the Northern Goshawk, which is a conservation agreement species. Northern Goshawk are currently managed in accordance with a conservation agreement between the BLM, USFWS, USFS, and UDWR. The BLM is required to manage Goshawk habitat according to the conservation agreement.

The BLM and State of Utah have determined that certain stipulated methods of coal mining will not adversely affect the Northern Goshawk. If surface facilities incident to underground mining

are proposed within mapped habitat, surveys would be required to verify the presence of goshawk and mitigation may be required to minimize effects.

As stated in Criterion 9, there are no federally designated or proposed critical habitats for plants within the south Kaiparowits coal suitability evaluation area and no suitable habitat for listed plants.

Summary: Under Criterion 10, no acres are determined to be unsuitable.

Criterion Number 11.

A bald or golden eagle nest or site on Federal lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Exceptions. A lease may be issued if: (i) It can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or (ii) The surface management agency, with the concurrence of the Fish and Wildlife Service, determines that the golden eagle nest(s) will be moved. (iii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

Exemptions. This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

There are no records or observations of bald eagle nests in the area. However, there are two recorded golden eagle nests and an additional 3 nests that have an undetermined species of raptor.

Summary: Under Criterion 11, there are two golden eagle nests that will require a buffer of 0.5 mile from 1/1-8/31 which is 1,005 acres. There are three additional nests that are likely golden eagles but positive species identification needs to occur. If they are golden eagles that would be an additional 1,505 for a total of 2,510 acres that would be unsuitable for surface coal mining operations.

Criterion Number 12.

Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

Exceptions. A lease may be issued if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.

Exemptions. This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

There are no records of or known roosting or concentration areas.

The exemption for substantial legal and financial commitments and ongoing mining operations does not apply, because there are no active leases or operations within the evaluation area.

Summary: Under Criterion 12, no acres are determined to be unsuitable.

Criterion Number 13.

Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Exceptions. A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the falcon habitat during the periods when such habitat is used by the falcons.

Exemptions. This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

At that time the lands would be designated unsuitable unless exceptions or exemptions apply.

There are four recorded cliff nesting sites in the analysis area. Species identification has not occurred. They are likely golden eagles, but perhaps falcons. If they are golden eagles that would require 1,506 acres to be unsuitable for surface activity. Peregrine falcons require a one mile buffer and prairie falcons require 0.25-mile buffers. The maximum area unsuitable to surface coal mining operations would be 1,506.

Summary: Under Criterion 13, approximately 1,506 acres are determined to be unsuitable.

Criterion Number 14.

Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

Exceptions. A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

Exemptions. This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

There are records of blue-grosbeaks, black-rosy finch, Swanson's hawks, and 24,681 acres of substantial spring and early fall band-tailed pigeon habitat. There is suitable habitat for Pinyon Jays which are an emerging concern at the national level.

Summary: Under Criterion 14, 502 acres surrounding a Swainson's hawk would be unsuitable to surface coal mining operations. The substantial band-tailed pigeon habitat is not designated as crucial. Having only observations of a black-rosy finch and a blue grosbeak does not indicate this is high priority habitat. It would be advisable to survey for nesting colonies of pinyon jays prior to construction of the surface facilities incident to underground mining, otherwise no acres would be unsuitable.

Criterion Number 15.

Federal lands which the surface management agency and the state jointly agree are habitat for resident species of fish, wildlife and plants of high interest to the state and which are essential for maintaining these priority wildlife and plant species shall be considered unsuitable.

Examples of such lands which serve a critical function for the species involved include: (i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken; (ii) Winter ranges crucial for deer, antelope, and elk; (iii) Migration corridor for elk; and (iv) Extremes of range for plant species; and a lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

There are no known leks for sage grouse, sharp-tailed grouse, and prairie chicken project area. There are 20,385 acres of crucial year-long habitat for pronghorn and 127,594 acres of crucial year-long habitat for desert bighorn sheep. The pronghorn habitat overlays the desert bighorn habitat. There are no elk documented in the project area. No known migration routes for any big game species. Mule deer do use the area, but the habitat is not designated.

The State of Utah does not currently have a sensitive plant species list; however, there are three plant species that the BLM, in coordination with the Utah Division of Natural Resources agree are of high interest. These species are Hole-in-the-rock prairie clover (*Dalea flavescens* var. *epica*), Utah spurge (*Euphorbia nehradenia*), and Smoky Mountain globemallow (*Sphaeralcea grossulariifolia* var. *fumariensis*). The coal suitability area contains geological formations that these species depend upon and locations have been scientifically documented within the area. Hole-in-the-rock prairie clover occurs on Straight Cliffs Formation, John Henry Member and on Mixed eolian and alluvial sand deposits (total 58,310 acres in the project area). Utah spurge occurs on Tropic Shale (7,729 acres in the project area). Smoky Mountain globemallow occurs on Straight Cliffs, Tropic Shale, and Dakota Formations and is confined to thermally modified coal-bearing members of the Cretaceous Straight Cliffs Formation, with the thermal modification resulting from natural fires in the coal seams exposed along the margins of Smoky Mountain. These geological formations for Smoky Mountain globemallow occupy the entire coal suitability area (141,173 acres).

Summary: Under Criterion 15, no area would be unsuitable to all mining methods because after consultation with the state, the BLM has determined that certain stipulated methods of coal mining will not have a significant long-term impact on wildlife or plant species of high interest. The agency has determined that the evaluation area is only suitable for underground mining. Certain surface mining types (e.g., open pit mining) would be prohibited. Surface facilities

incident to underground mining operations would be allowed so long as impacts to species of high interest could be avoided or mitigated.

For the three plant species, no acres are determined to be unsuitable for underground mining. 58,310 acres are unsuitable for surface ground disturbance for Hole-in-the-rock clover, 7,729 acres for Utah spurge, and 141,173 acres for Smoky Mountain globemallow. These species will not occur across their entire areas of suitable habitat. Since they are rare species, they likely only occur in scattered small locations; however, the BLM has not conducted surveys to narrow identify those locations. Surveys for these species would need to be conducted prior to construction of surface facilities incident to underground mining and protection measures determined by the BLM would need to be incorporated into the proposed work and implemented during project activities.

Criterion Number 16.

Federal lands in riverine, coastal and special floodplains (100-year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

Limited special floodplains maps are available for the assessment area through FEMA's National Flood Hazard Layer Viewer. Approximately 14 stream miles of Last Chance Creek are within the assessment area and are classified as "Zone A" by FEMA. Zone A areas have a 1 percent annual chance of inundation (i.e., the 100 year floodplain). Base Flood Elevations for the area are not given, so a more detailed hydraulic analysis will be required at the time of coal leasing to adequately address this criterion.

Summary: Under Criterion 16, approximately 251 acres of Last Chance Creek floodplain are unsuitable to surface coal mining operations pending a more detailed hydraulic analysis at the time of coal leasing.

Criterion Number 17.

Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

Exceptions. A lease may be issued where the surface management agency in consultation with the municipality (incorporated entity) or the responsible governmental unit determines, as a result of studies, that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

Kane County Water Conservancy District owns the deed to Water Right Number 89-1498 (01/15/1964 Priority Date) within the assessment area. Water Right 89-1498 is a 325 acre-

feet water right, proposed as four underground water wells for development of municipal water for the towns of Big Water, UT and Page, AZ. In 2015, the Kane County Water Conservancy District filed for an Extension of Time to File Proof For Beneficial Use on the water right, citing that the District will need the water right to meet future public water requirements over the next 40 years.

The proposed underground wells are located in T41S R04E Sections 19 and 30 along Smokey Hollow Road. Drawdown of the potentiometric surface in the Navajo Sandstone from mine water use was analyzed in the 1995 Warm Springs PDEIS. The cone of depression was estimated to be approximately 8 miles in diameter (50 sq. miles), with the maximum lowering of the potentiometric surface near the vicinity of the proposed wells assuming 550 acre-feet of water used per year. Because the proposed Kane County Water Conservancy District water right is an underground well that has not been drilled yet, the number of acres potentially affected by mining is unknown; therefore, a more detailed hydraulic analysis will be required at the time of coal leasing to more adequately address this criterion.

There are eight Public Water Reserve 107 withdrawals totaling approximately 325 acres within the assessment area. Order of Withdrawal, Public Water Reserve No. 107, April 17, 1926, withdrew from settlement, location, sale, or entry, and reserved the sites for public use in accordance with the provisions of Sec. 10 of the Act of December 29, 1916.

Summary: Under Criterion 17, 325 acres are determined to be unsuitable due to Public Water Reserve Withdrawals, however these areas will need to be inventoried to verify if these withdrawals are still needed. Additionally, a detailed hydraulic analysis will be required at the time of coal leasing to determine unsuitability for mining operations near municipal water rights deeded to the Kane County Water Conservancy District for use in Big Water, UT and Page, AZ.

Criterion Number 18.

Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands $\frac{1}{4}$ mile from the outer edge of the far banks of the water, shall be unsuitable.

Exceptions. The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

Exemptions. This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

In the State of Utah, the designation “High Quality Waters” is equivalent to National Resource Waters, and therefore receives additional regulatory protection (including all waters of the State within the designated drainage).

Consistent with Criteria 18 and State rules, the BLM has determined that protection of High Quality Waters can be achieved through the use of the unsuitability determination, BMPs, and the State permitting process. Buffers were established for springs and perennial and intermittent streams, as follows:

- Perennial streams: ¼ quarter mile (1320 feet; 402 meters) slope distance from the outer edge of the bank;
- Intermittent streams: 330 feet (100 meters) slope distance from the outer edge of the bank; and
- Springs: 330 feet (100 meters) slope distance from the edge of the saturated area.

The locations of springs and perennial and intermittent stream reaches were determined based on review of BLM GIS data. Five known lentic sites (i.e., still water/wetlands) were identified in the assessment area. The total area unsuitable for surface coal mining operations for lentic locations is approximately 39 acres for the known lentic locations. Approximately 22 stream miles of known lotic sites (i.e., flowing waters) were identified in the assessment area. The total area unsuitable for surface coal mining operations for known lotic locations is approximately 7,440 acres. Additionally, there are approximately 532 stream miles within the assessment area classified as “intermittent” by the National Hydrography Dataset. The total area unsuitable for surface coal mining operations for intermittent streams is approximately 40,939 acres based on the 330 foot buffer criteria. It is likely that additional perennial/intermittent streams and springs are present that were not mapped. In the event that such waterways are determined to exist after the publication of this report, they would be buffered and protected as identified above.

Summary: Under Criterion 18, approximately 48,418 acres are determined to be unsuitable for surface coal mining operations.

Criterion Number 19.

Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in §3400.0–5(a) of this title, the standards in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

Exemptions. This criterion does not apply to surface coal mining operations which produced coal in commercial quantities in the year preceding August 3, 1977, or which had obtained a permit to conduct surface coal mining operations.

The Office of Surface Mining Alluvial Valley Floor (AVF) guidelines (1983) provide a sequential procedure for identifying AVFs. In Phase I potential AVFs are identified using available regional or generalized data. A more detailed inventory is conducted in Phase II which involves mapping of geological, vegetation, and soils data, and test drilling to determine if an area meets the criteria of an AVF. Finally, in Phase III a more detailed analysis may be used to resolve discrepancies about the AVF determinations.

Approximately 4,343 acres of alluvium and/or alluvial gravel, located in several different drainage systems, exist within the evaluation area based on analysis of BLM GIS geologic data. Range improvements, including water developments, are also common in the analysis area and are used by livestock permittees in their operations. Additionally, impacts to water

resources (quality and quantity) cannot be adequately assessed until the locations of surface mining operations are known. Livestock grazing is dispersed within the assessment area and impacts between mining, farming operations, and AVF will need to be assessed during leasing analysis to determine unsuitability. Therefore, no lands within the area are considered unsuitable under this criterion until a more detailed analysis is conducted to evaluate the interaction between AVF and farming operations.

The exemption for ongoing mining operations does not apply because there are no active leases or operations within the analysis area.

Summary: Under Criterion 19, no acres are determined to be unsuitable. However, a more detailed analysis of AVFs will be required at the time of lease analysis.

Criterion Number 20.

Federal lands in a state to which is applicable a criterion (i) proposed by the state or Indian tribe located in the Planning Area, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

***Exceptions.** A lease may be issued when: (i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft comprehensive land use plan or land use analysis, plan, or supplement to a comprehensive land use plan, for the area in which such land is included, or (ii) After consultation with the state or affected Indian tribe, the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the value which the criterion would protect.*

***Exemptions.** This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.*

No new criterion proposed by the state or Indian tribes and adopted by rulemaking by the Secretary is applicable to the evaluation area.

Summary: Under Criterion 20, no acres are determined to be unsuitable.

Summary of the Unsuitability Evaluation

The coal resources with development potential within the south Kaiparowits coal unsuitability evaluation area have been evaluated in consideration of the 20 unsuitability criteria. In total, 75,075 acres are determined to be unsuitable. Approximately 66,097 acres have are determined to be not unsuitable.

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix M

Air Quality Technical Support Document

August 2018

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Appendix M: Air Quality Support Document

Introduction and Background

This Air Quality Technical Support Document supports the assessment of impacts on ambient air quality and air quality-related values from reasonably foreseeable development on lands in the Kanab-Escalante Planning Area (KEPA) for Grand Staircase-Escalante National Monument (GSENM) and KEPA Resource Management Plans (RMPs) and Environmental Impact Statement (EIS). Impacts are assessed for the three units of GSENM (Grand Staircase, Kaiparowits, and Escalante Canyons Units), nearby Class I areas, population centers, and Sensitive Class II areas. The combined reasonably foreseeable development activities are referred to as the Project and the area where effects are assessed is referred to as the Planning Area. The reasonably foreseeable developments consist of one new underground coal mine and the development of a small oil field and associated infrastructure.

This Air Quality Technical Support Document outlines the procedures and analyses the Bureau of Land Management (BLM) used in conducting the air quality assessment. The impact assessment examines and quantifies the impacts from potential emissions sources that may be developed in KEPA. Under all alternatives, major emissions sources (i.e., mining activities) would generally be limited in GSENM. As a result, emissions sources and associated impacts in the GSENM units are assumed to be negligible and are therefore not addressed quantitatively.

Requirements

The BLM is required under the National Environmental Policy Act (NEPA) to analyze the environmental impacts on air quality and other components of the human environment from major Federal actions, which includes the development of RMPs. Other relevant laws and regulations include: the Federal Land Policy and Management Act (FLPMA); the Clean Air Act and Amendments; Council on Environmental Quality regulations for implementing NEPA; and the Utah Department of Environmental Quality (DEQ) – Division of Air Quality regulations.

Overview of the Study

This assessment examines potential future impacts on air quality resulting from emissions from mineral and non-mineral development activities in KEPA. Activities addressed in the air quality analysis are based on the BLM's *Mineral Potential Report* and reasonably foreseeable development scenario (BLM 2018a). As indicated in the *Mineral Potential Report* and the reasonably foreseeable development scenario, the BLM anticipates up to one new coal mine, four new exploratory oil and gas wells, and ten new oil and gas production wells during the planning period.

Because of the limited potential for development activities that could affect air quality in KEPA (BLM 2018a), the air quality study only examines a single scenario under which the maximum reasonably foreseeable development is anticipated (Alternative D). Alternative D is most likely to result in development of all reasonably foreseeable projects within KEPA, and is therefore the only alternative for which air quality modeling was completed. Other alternatives are anticipated to result in fewer emissions than the modeled alternative. Refer to Section 3.1, *Air Resources*, in the GSENM and KEPA RMPs/EIS for the comparative analysis of impacts that could result from the management alternatives.

Air quality impacts are evaluated using the Environmental Protection Agency's (EPA's) guideline model AERMOD in the near field (fewer than 50 kilometers) to evaluate criteria pollutants and hazardous air pollutants (HAPs). In addition, the VISCREEN model is used to assess the potential for near-field visibility impacts. The latest version of AERMOD (version 18081), along with the latest versions of all supporting software, are used for this application. The analysis focuses on criteria air pollutant (CAP) concentrations, HAPs, and greenhouse gas (GHG) emissions.

Modeling Analysis Components

The air quality assessment considers the near-field air quality impacts for reasonably foreseeable development projects within KEPA. The focus of the near-field air quality modeling appears below.

Criteria pollutants, including particulate matter (particulate matter less than or equal to 10 microns in size [PM₁₀] and particulate matter less than or equal to 2.5 microns in size [PM_{2.5}]), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and carbon monoxide (CO). Both Federal and State regulations require that ambient concentrations for these criteria pollutants not exceed applicable National Ambient Air Quality Standards (NAAQS). Particulate matter, including dust from construction and operations, wind erosion, and traffic on paved and unpaved roads, is a criteria pollutant of particular concern for this analysis, as the region's visibility is particularly sensitive to particulate matter impacts.

The near-field assessment examines impacts on the three national monument units, Class I and Sensitive Class II areas that are close to KEPA, and publicly accessible areas in the immediate vicinity. All of the reasonable foreseeable development projects are from low-level emission releases, with maximum impacts expected to be close to the project. The modeling methodology is discussed below. Three Class I areas are within 50 kilometers of KEPA: Bryce Canyon, Zion, and Capitol Reef National Parks. Visibility impacts at the three Class I areas are included in the assessment using VISCREEN.

Impact analysis modeling was conducted using emissions inventory data developed for this effort. The activities included in the emissions inventory are provided in *Emission Inventory, Oil and Gas Emissions*, and *Coal Mine Emissions* sections of this document. The modeling scenarios were designed to capture the maximum impacts of the reasonably foreseeable development projects.

Emission Inventory

Grand Staircase Escalante National Monument and Kanab-Escalante Planning Area Emission Inventory

The Project emission inventory addresses field-wide oxides of nitrogen (NO_x), SO₂, CO, PM₁₀, PM_{2.5}, volatile organic compounds (VOCs), and HAPs (benzene, toluene, ethyl benzene, xylene, and n-hexane) for well development activities and production activities. Lead emissions are expected to be negligible and were not calculated in the inventory. In addition, methane (CH₄), nitrous oxide (N₂O), and carbon dioxide (CO₂) emissions were included in the Project inventory for the purpose of quantifying GHG emissions. CO₂ equivalents for all three GHGs are reported.

The Project emission inventory includes emissions from the following reasonably foreseeable sources:

- Well development phase (i.e., construction, drilling, and completion activities)
- Well production phase (i.e., emissions from active, producing wells)
- Underground coal mine (i.e., an active large-scale mine operation)

Key Regulations Affecting the Project Emissions Inventory Development

In the development of the emission inventory, current Federal and State regulations that would affect the emissions projections were considered in calculating the emissions. The following sections summarize key regulations affecting the estimation of Project emissions.

New Source Performance Standards

Under Section 111 of the Clean Air Act, the EPA has promulgated technology-based emissions standards that apply to specific categories of stationary sources. These standards are referred to as New Source Performance Standards (NSPS) (40 Code of Federal Regulations [CFR] Part 60). In the Project emission inventory, NSPS are assumed to apply to all stationary engines. NSPS requires new engines of various horsepower classes to meet increasingly stringent NO_x and VOC emission standards over the phase-in period of the regulations. The emission inventory was evaluated for compliance with NSPS 0000, which affects oil and gas production emissions sources at hydraulically fractured wells and was determined to comply with all applicable tenets of the regulation. It was not assumed that the Project would use new engines during the oil and gas development phase.

Non-Road Engine Tier Standards

The EPA sets emissions standards for non-road diesel engines for hydrocarbons, NO_x, CO, and particulate matter. The emissions standards are implemented in tiers by year, with different standards and start years for various engine power ratings. The new standards do not apply to existing non-road equipment. Only equipment built after the start date for an engine category (1999–2006, depending on the category) is affected by the rule. Over the life of the reasonably foreseeable development activities, the fleet of non-road equipment is expected to turn over and higher-emitting engines will be replaced with lower-emitting engines. Non-road fleet turnover is not accounted for in the Project emissions inventory; therefore, the Project emissions represent a conservative estimate for this source category.

Greenhouse Gases

GHGs present in the Earth's atmosphere trap outgoing longwave radiation and warm the Earth's atmosphere. Increased concentrations of GHGs in the atmosphere result in more heat being absorbed and increase global temperatures on average. Some GHGs, such as water vapor, occur naturally in the atmosphere, and some GHGs (e.g., CO₂ and CH₄) occur naturally and are also emitted by human activities. The global atmospheric concentration of CO₂ has increased by about 36 percent over the last 130 years, and far exceeds pre-industrial values determined from ice cores spanning many thousands of years (Walsh 2014).

The impacts of climate change are expected to vary by region, and there is significant uncertainty regarding the effects of climate change on any particular region. Although the National Climate Assessment identified specific risks for North America (e.g., warming and decrease in snowpack in western mountains), it is unknown how climate change will affect the Planning Area or its surrounding environment.

The U.S. Supreme Court ruled in 2007 that the EPA has the authority to regulate GHGs such as CH₄ and CO₂ as air pollutants under the Clean Air Act. However, there are currently no ambient air quality standards for GHGs, nor are there currently any emissions limits on GHGs that would apply to reasonably foreseeable development sources. While GHG permits may be required for sources that are permitted under the Prevention of Significant Deterioration (PSD) program, the reasonably foreseeable development sources are not anticipated to trigger the need for a PSD permit. Both the exploration/construction and production phases of the reasonably foreseeable development Project will cause emissions of GHGs. CH₄ comprises much of the chemical composition of natural gas, and N₂O, CO₂, and CH₄ are emitted by engines used for drill rigs, fracking engines, and other equipment. As part of the development of the Project emission inventory, an inventory of CO₂, CH₄, and N₂O was prepared for all emissions source categories. GHGs were not modeled in the near-field impact analyses, but the GHG emission inventory results are presented in Table 8, Table 9, and Table 12 for informational purposes.

Modeled Emissions Control Measures

Table 1 provides the emissions control measures for each emissions source category included in the modeling analysis.

Table 1. Modeled GSENM Oil and Gas Project Emissions Control Measures

GSENM Emission Source Category	Type of Control Applied
Construction, Drilling, and Completion of Project Wells	
Well Pad Construction Equipment (diesel internal combustion engine) – New Pads	None (Tier 2 and Tier 3 engines assumed over the development period)
Construction Traffic, Road and Well Pad	Change in emissions due to fleet turnover
Construction Traffic, Road and Well Pad – Fugitive Dust	Watering
Drilling Equipment (diesel internal combustion engine)	None (Tier 2 engines assumed over the development period)
Drilling Traffic	Change in emissions due to fleet turnover
Drilling Traffic – Fugitive Dust	Watering
Completion Equipment (diesel internal combustion engine)	None (Tier 2 engines and engines certified to 2007 on-road standards assumed over the development period)
Completion Traffic	Change in emissions due to fleet turnover
Completion Traffic – Fugitive Dust	Watering
Initial Completion Venting	100% green completions, no flaring or venting to atmosphere
Well Pad Construction Fugitive Dust	Watering
Construction Fugitive Dust, Wind Erosion	Watering
Producing Project Wells	
Heaters	None, but negligible well-site emissions
Pneumatic Devices	100% low-bleed devices
Pneumatic Pumps	None, but negligible well-site emissions
Tank Loadout (vapor losses)	None, but negligible well-site emissions
Production Traffic	Change in emissions due to fleet turnover

GSENM Emission Source Category	Type of Control Applied
Production Traffic – Fugitive Dust	Watering
Condensate Tanks	None, but negligible well-site emissions
Dehydrators	None, but negligible well-site emissions

Source: The control measures applied in this analysis were based on those used in the recent *Greater Chapita Wells Project Environmental Impact Statement* (Alpine Geophysics and Environ 2016). The Chapita Wells Project is a larger sized project but uses the most recent technology for oil and gas extraction.
 GSENM – Grand Staircase-Escalante National Monument

Project Emission Inventory

This section describes the approach used to compile the emission inventory for the reasonably foreseeable coal mine and oil and gas wells that compose the Project.

Coal Mine Emissions

The emissions for the underground coal mine were calculated using the methodology in the Colorado Underground Coal Mine Emission Inventory Tool (V1.0), a tool sponsored by the BLM.

For the categories that are not included in the tool, the BLM completed emissions calculations in separate spreadsheets. This includes worker commute and exhaust emissions from the haul trucks and indirect operational emissions (“Emission Calculation Table” tab in Project emission inventory) and GHG emissions using an assumption that mined coal is combusted and not used for metallurgical purposes (“mining underground coal ghg-calc-final” tab in Project emission inventory).

The emissions estimated from the reasonably foreseeable coal mine include the following:

- Particulate matter emissions (PM₁₀ and PM_{2.5}) from mine venting, above-ground material handling and coal processing operations, and fugitive road dust from transport of the coal
- Fuel combustion emissions (CO, VOCs, NO_x, sulfur oxides [SO_x], PM₁₀, PM_{2.5}, and three primary GHGs) from above- and underground equipment, as well as the transport of the coal to the unit-train loading facility
- GHG emissions from CH₄ desorption as well as reporting the GHG emissions associated with the combustion of the coal

The development of the equipment activity and duration of operation of activities at the coal mine were based on information for a proposed 3.0 million tons per year underground coal mine in Utah. The major assumptions for the 3.0 million tons per year coal mine are as follows:

- Average production of 3.0 million tons per year with 650 feet of coal seam
- 45 acres of surface disturbance
- A 400-mile round trip (200 miles direct) along designated truck routes from the proposed mine to a unit-train loading facility near Cedar City, UT with an average capacity of 46 tons of coal per truck, and a maximum of 7.3 trucks per hour
- Coal loading and hauling operations would occur 24 hours per day, 365 days per year
- Workforce commute distance is all from Page, AZ for 200 employees and is a distance of 36 miles one way; all commuting is done with personal vehicles
- All equipment below ground is electric or electric-hydraulic—no emissions
- Equipment above ground includes emissions from coal handling/unloading and the coal stockpile

- Conveyor is electrically powered and enclosed as a best practice measure—no emissions
- Coal stockpile includes emissions from wind erosion and operation of dozers for stockpile shaping; this includes emissions from tailpipe exhaust and material handling
- Crusher is electrically powered and all enclosed, so no fugitive dust emissions
- Each dozer at the mine operates 4 hours per day; a total of three dozers operate daily at the mine
- Two backup diesel generators operating two times per month for 4 hours on those 2 days as testing for these emergency backup diesel generators to support the underground mine

The Project *Mineral Potential Report* (BLM 2018a) projected a 5.5-million-tons-per-year coal mine in KEPA, so the 3.0-million-tons-per-year coal mine described above was scaled up.

Oil and Gas Construction Emissions

Based the Project *Mineral Potential Report* (BLM 2018a), the BLM assumed one new oil and gas well pad would be constructed each year for 14 years.

Emission-generating activities during field development include well pad and access road construction, vehicle traffic, and wind erosion. Fugitive PM₁₀ and PM_{2.5} emissions will result from (1) construction activities and (2) traffic to and from the construction site. On roads within the Planning Area, water will be used for fugitive dust control, with a control efficiency of 50 percent. Emissions of criteria pollutants will occur from exhaust due to diesel combustion from haul trucks and heavy construction equipment.

Emission sources identified for the well pad construction phases of the Project include well pad construction equipment, well pad and access road construction traffic, well pad construction fugitive dust, and construction wind erosion.

Well Pad Construction Equipment Exhaust Emissions

The BLM estimated vehicle emissions during construction using data provided in the BLM Vernal Field Office's Greater Chapita Wells Project EIS Air Quality Technical Support Document (Alpine Geophysics and Environ 2016); refer to pages 26–49 of that EIS for detailed equipment and emission information. The BLM emissions inventory incorporated the description of equipment types and engines used during well construction. Engine data for each engine type included horsepower rating, hours of operation, fuel type, engine technology, and load factors. NO_x, VOC, CO, and PM₁₀ emission rates have been assumed equivalent to applicable Federal off-road engine emission standards (40 CFR Parts 9, 69, et seq.). There are no Federal off-road emission standards for other pollutants. SO₂, CO₂, and CH₄ emission factors have been estimated consistent with methodology used in the EPA's NONROAD model (EPA 2009). PM_{2.5} emission rates were assumed to be 97 percent of PM₁₀ emission estimates, consistent with the NONROAD model. N₂O emission factors are not available in the NONROAD model and were taken from Climate Registry guidance (The Climate Registry 2008).

Emissions were estimated on a per-event (new well pads) basis for a given engine type, *k*, according to Equation 1:

$$\text{Equation (1): } E_{\text{engine } k} = EF_i \times HP_k \times LF_k \times t_{\text{event}} \times n_k / 907,185$$

where:

*E*_{engine *k*}, are emissions of pollutant *i* from an engine type *k* [tons/pad]

EF_i is the emissions factor of pollutant i (gram per horsepower-hour [g/hp-hr])

HP_k is the horsepower of the engine k (horsepower [hp])

LF_k is the load factor of the engine k

$tevent$ is the number of hours the engine is used for per well pad construction (hour per pad [hr/pad])

$907,185$ is the mass unit conversion (gram per ton [g/ton])

nk is the number of type k engines

Well Pad and Access Road Construction Traffic

Emissions were developed following the methodology of the Greater Chapita Wells EIS Emissions (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49) result from light-duty and heavy-duty vehicle traffic on paved and unpaved roads during well pad construction. Emission factors were developed using the MOVES2010a model (EPA 2010) for Uintah County in the State of Utah. The emission factors were prepared for two vehicle classes: combination short-haul trucks (heavy duty) and light commercial trucks (light duty). The emission factors represent annual averages for the duration of the Project. In MOVES, running and idling emissions from evaporative, exhaust, brake wear, and tire wear processes were modeled; running emission factors were calculated using mean vehicle speeds. Paved and unpaved emissions were developed separately for in-oil field and outside-oil field road traffic. In-oil field distances primarily feature unpaved road surfaces, while outside-oil field distances are mostly on paved surfaces. The percentage of travel on each type of surface was used to estimate the overall per trip emissions for both in-oil field and outside-oil field travel. Fugitive dust emissions from vehicle travel on paved and unpaved roads were estimated based on the AP-42 technical guidance (EPA 2006a).

Road dust emission factors for PM_{10} and $PM_{2.5}$ for vehicles traveling on publicly accessible unpaved roads were individually estimated using Equation 2.

Equation (2): $EF = (k(s/12)^a(S/30)^d)/(M/0.5)^{c-C}$

where:

EF is the size-specific emission factor (pound per mile [lb/mile])

k is the particle size multiplier or “k-factor” [lb/mile]

s is the surface material silt content (percentage)

M is the surface material moisture content (percentage)

S is the mean vehicle speed (miles per hour [mph])

C is the emission factor for vehicle fleet exhaust, brake wear, and tire wear [lb/mile]

a , b , c and d are empirical constants

Variables k , C , a , b , c , and d may differ depending on whether fugitive dust calculations are for PM_{10} or $PM_{2.5}$.

To account for natural suppression of road dust emissions due to precipitation, Equation 3 was applied.

Equation (3): $EF_{\text{suppressed}} = EF \times ((365 - P) / 365) \times ((100 - CE) / 100)$

where:

$EF_{\text{suppressed}}$ is the annual average road dust emission factor including the effect of natural mitigation via precipitation [lb/mile]

EF is the uncontrolled road dust emission factor (from Equation 2) [lb/mile]

P is number of precipitation days (fewer than 0.01 inch rainfall) at the site (precipitation days at Escalante, UT from National Centers for Environmental Information climatology)

CE is the control efficiency for watering on unpaved roads (Cowherd 1988)

Road dust emission factors for PM_{10} and $PM_{2.5}$ for vehicles traveling on paved roads were individually estimated using Equation 4, which accounts for natural suppression of road dust emissions due to precipitation.

Equation (4): $EF = [k(sL)^{0.91} \times (W)^{1.02}] (1 - P/4N)$

where:

EF is the size-specific emission factor [lb/mile]

k is the particle size multiplier or “k-factor” [lb/mile]

sL is the road surface silt loading (grams per square meter [g/m^2])

W is the average weight (tons) of the vehicles traveling the road

P is number of days with at least 0.254 millimeter (0.01 inch) of precipitation, annually

N is the number of days per year (i.e., 365)

Annual vehicle miles traveled (VMT) to the well site as well as the percentage of unpaved and paved road traveled on in-field and outside-field roads were based on assumptions used in the Greater Chapita Wells EIS for each vehicle type (light duty and heavy duty) (Alpine Geophysics and Environ 2016). Exhaust emissions for each fleet type were calculated using the MOVES2010a emission factors on a grams per mile basis, as shown in Equation 5. Fugitive dust road emissions for paved and unpaved roads were calculated using the emissions factors from Equations 3 and 4.

Equation (5): $E_{\text{traffic}, i} = (EF_i \times VMT) / 2000$

where:

$E_{\text{traffic}, i}$ is traffic emissions for pollutant i per well pad [ton/pad]

EF_i is the average emission factor of pollutant i [lb/mile] (estimated from MOVES for exhaust or from the AP-42 based methodology for fugitive dust)

VMT are the annual vehicle miles traveled by a fleet to a well pad site [miles/pad]

2000 is the mass conversion [lb/ton]

Construction Fugitive Dust

Fugitive dust emissions from surface disturbance due to well pad construction equipment were estimated based on the AP-42 guidance for estimation of emissions from western surface coal

mining (EPA 1998b), as no estimation methodology specific to oil and gas well sites was available. Construction fugitive dust emission factors were estimated according to Equations 6 and 7.

Equation (6): $EFPM_{10} = ((1.0 \times s^{1.5})/M^{1.4}) \times (1 - C) \times r$

where:

$EFPM_{10}$ is the emissions factor from construction dust for PM_{10} [lb/hr]

s is the material silt content (percentage)

M is the material moisture content (percentage)

C is the control efficiency

r is the PM_{10} scaling factor, assumed to be 0.75 lb/hr per AP-42 guidance

Equation (7): $EFPM_{2.5} = ((5.7 \times s^{1.2})/M^{1.3}) \times (1 - C) \times r$

where:

$EFPM_{2.5}$ is the emissions factor from construction dust for $PM_{2.5}$ [lb/hr]

r is the $PM_{2.5}$ scaling factor, assumed to be 0.105 lb/hr per AP-42 guidance

The default AP-42 guidance values (EPA 1998b, Table 11-9.3) for material moisture content (2.4 percent) and material silt content (5.1 percent) were used. The control efficiency for watering was assumed to be 50 percent.

Fugitive dust emissions for individual construction equipment-types were estimated according to Equation 8.

Equation (8): $Edust, equipment, i = EFi \times tevent \times n / 2000$

where:

$Edust, equipment, i$ are dust emissions of pollutant i per equipment type per well pad [tons/pad]

EFi is the emissions factor from of pollutant i [lb/hr]

n is the total units for the type of construction equipment being analyzed

$tevent$ is the equipment time of operation per well pad [hours/pad]

2000 is a mass unit conversion [lb/ton]

Construction Wind Erosion

Wind erosion dust emissions associated with well pad construction operations were estimated based on AP-42 guidance for estimation of emissions from industrial wind erosion (EPA 2006b). Wind erosion emissions were estimated based on Equations 9, 10, and 11.

Equation (9): $Edust, i = (P \times A \times r) / 907,185$

where:

$Edust, i$ are dust emissions for pollutant i from construction wind erosion [ton/pad]

A is the well pad construction (disturbed) area [m²/pad]

r is the particle size multiplier for PM₁₀ or PM_{2.5}

907,185 is a mass unit conversion [g/ton]

P is the erosion potential [g/m²] as calculated by Equation (10)

Equation (10): $P = 58 \times (u^* - ut)^2 + 25 \times (u^* - ut)$

where:

u^* is the friction velocity (meter per second [m/s])

ut is the threshold friction velocity (m/s)

58 and 25 are empirical constants in units of [g s²/m⁴] and [g s/m³] respectively.

Equation (11): $P = 0$ for $u^* \leq ut$

Friction velocity estimates were made by multiplying the average annual fastest wind speed from Bryce Canyon meteorological data for the years 2012–2017 by 0.053 per AP-42 guidance (EPA 2006b). Particle size multipliers of 0.5 and 0.075 were assumed for PM₁₀ and PM_{2.5}, respectively, per AP-42 guidance.

Oil and Gas Drilling and Completion Emissions

After the well pad is prepared, well drilling and then well completions can begin. Emissions from well drilling include exhaust and fugitive dust emissions from vehicle travel to and from the drilling site on unpaved and paved roads, and exhaust emissions from drilling engines. Emissions from well completion and testing include vehicle exhaust and fugitive dust emissions from traffic, exhaust emissions from completion equipment engines, and emissions from completion venting. One new well is assumed to be constructed during each year of the 14 years of Project duration.

Drilling and Completion Equipment

Emissions associated with off-road engines used during drilling and completion activities were calculated separately but the methodology followed was consistent with Equation (1) above. Detailed data based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26-49) for each drilling and completion engine including horsepower rating, hours of operation, fuel type, engine technology, and load factors were used. Modifications were made to the Chapita Wells EIS data based on EPA recommendations (ICF 2018).

NO_x, VOC, CO, and PM₁₀ emission rates have been assumed equivalent to applicable Federal off-road engine emission standards (40 CFR Parts 9, 69, et seq.) or on-road engine emission standards (40 CFR Parts 69, 80, and 86) for the 13 engines used during completions that are on-road engines. There are no Federal off-road emission standards for other pollutants. SO₂, CO₂, and CH₄ emission factors have been estimated consistent with methodology used in EPA's NONROAD model (EPA 2009). PM_{2.5} emission rates were assumed to be 97 percent of PM₁₀ emission estimates, consistent with the NONROAD model. N₂O emission factors are not available in the NONROAD model and were taken from Climate Registry guidance (The Climate Registry 2008).

Emissions on a per-well-pad basis for each engine type were estimated similar to construction emissions according to Equation (1) above.

Drilling and Well Completion Traffic

This section refers to traffic emissions from light-duty and heavy-duty vehicle traffic during drilling and completion operations. The method to estimate traffic emissions from these source categories was similar to that of the *Well Pad and Access Road Construction Traffic* source categories.

Average exhaust emission factors from MOVES2010a model for Uintah County in the State of Utah from calendar years 2013 to 2033 were used. Fugitive dust emissions from vehicle travel on paved and unpaved roads were estimated based on the AP-42 guidance (EPA 2006a) using Equations 2 and 3 for unpaved road distances and Equation 4 for paved road distances. The percentage of mileage on paved and unpaved roads followed the percentage distribution of the *Well Pad and Access Road Construction Traffic* category. In-oil field traffic travels predominantly on unpaved roads, while outside-oil field traffic distances are mostly on paved roads.

VMT to the drilling site were estimated for each vehicle type based on the in-oil field and outside-oil field travel distances (light duty and heavy duty). Exhaust emissions for each fleet type were calculated using the MOVES2010a emission factors on a grams per mile basis similar to construction traffic, as shown in Equation 5. Fugitive dust road emissions were calculated using Equation 4 for paved road traffic or the suppressed emissions factor ($EF_{suppressed}$) from Equation 3 for unpaved road traffic.

Initial Completion Venting

All completions were assumed to be green completions.¹ Emissions from initial completion venting were estimated using information based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26-49) including the volume of natural gas unable to be captured by green completion technology per completion, the VOC molar fraction present in the gas, and the weight percentage of each pollutant species present in the gas. The emissions calculation for VOC is based on the ideal gas law and is shown in Equation 12.

Equation (12): $E_{venting,VOC} = ((V \times Y_{VOC} \times 28.317) \times P) / (R \times T) \times (MW_{VOC} / 907.185)$

where:

$E_{venting,VOC}$ is VOC emissions per completion [tons]

V is the volume of gas vented per completion (thousand cubic feet [MCF])

Y_{VOC} is the molar fraction of VOC in the vented gas [percentage]

28.317 is the volume unit conversion (thousand liters per thousand cubic feet [1000L/MCF])

P is the pressure of the gas (atmosphere [atm])

R is the ideal gas constant (liter-atmosphere per mole-Kelvin [L-atm/mol-K])

T is the temperature of the gas (Kelvin [K])

MW_{VOC} is the average molecular weight of VOCs in the gas (gram per mole [g/mol])

¹ Green completions recover natural gas and condensate produced during well completions or workovers.

907.185 is the mass unit conversion (kilogram per ton [kg/ton])

CO₂ and CH₄ emissions were calculated based on Equations 13 and 14.

Equation (13): $E_{venting,CH_4} = E_{venting,VOC} \times \text{weight fraction}_{CH_4} / \text{weight fraction}_{VOC}$

Equation (14): $E_{venting,CO_2} = E_{venting,VOC} \times \text{weight fraction}_{CO_2} / \text{weight fraction}_{VOC}$

where:

$E_{venting,CO_2}$ is the total loading CO₂ emissions per well pad [ton/well pad]

$E_{venting,CH_4}$ is the total loading CH₄ emissions per well pad [ton/well pad]

Weight fractions per pollutant of vapor losses were based on Chapita Wells EIS vapor loss data.

Production Emissions

Well site production activities involve dehydration units, heaters, pneumatic devices, traffic, workover equipment, pneumatic pumps, condensate load-out, condensate storage tanks, condensate combustion, associated gas flaring, and associated gas venting.

Combustion emissions of CAPs and HAPs will result from separator heaters, dehydration heaters, condensate combustion, associated gas flaring, and combustion controls on VOC emissions. In addition, fugitive VOC and HAP emissions will result from process leaks, pneumatics, dehydration overhead vents, and condensate tank flashing losses. Table 2. includes the emission sources identified for the production phase of the Project. Pollutant emissions are estimated on a per-event basis (event type varies by source category) and then scaled with the projected number of events per year to obtain Project-wide annual emissions from each source.

Table 2. Production Source Categories and Scaling Surrogates

Equipment Source Category	Event	Scaling Surrogate
Workover Equipment	Wells	Active Well Counts
Production Traffic (Heavy Duty)	Barrels	Annual Condensate Production & Annual Water Production
Production Traffic (Light Duty)	Wells	Active Well Counts
Heaters	Wells	Active Well Counts
Fugitives	Wells	Active Well Counts
Pneumatic Devices	Wells	Active Well Counts
Chemical Injection Pneumatic Pumps	Wells	Active Well Counts
Tank Loadout	Barrels	Annual Condensate Production
Condensate Tank Flashing Flaring	Barrels	Annual Condensate Production
Dehydrator Flaring	Wells	Active Well Counts
Produced Condensate Combustion	Barrels	Annual Condensate Production
Associated Gas Flaring	Produced Natural Gas	Annual Associated Gas Production
Associated Gas Venting	Produced Natural Gas	Annual Associated Gas Production

Workover Equipment

This category refers to emissions from off-road engines used during well workover operations. The list of all engines used for this activity as well as engine-specific data such as horsepower rating, hours of operation, fuel type, engine technology, and load factors are all based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49). NO_x, VOC, CO, and PM₁₀ emission rates have been assumed equivalent to applicable Federal off-road engine emission standards (40 CFR Parts 9, 69). There are no Federal off-road emission standards for other pollutants. SO₂, CO₂, and CH₄ emission factors have been estimated consistent with the methodology used in the EPA's NONROAD model (EPA 2009). PM_{2.5} emission rates were assumed to be 97 percent of PM₁₀ emission estimates, consistent with the NONROAD model. N₂O emission factors are not available in the NONROAD model and were taken with Climate Registry guidance (The Climate Registry 2008).

Emissions on a per well basis for each engine type were estimated according to Equation 15.

$$\text{Equation (15): } E_{engine\ k,i} = \frac{EF_i \times HP_k \times LF_k \times t_{event} \times n_k}{907,185}$$

where:

E_{engine} are emissions of pollutant i from an engine type k [ton/well]

EF_i is the emissions factor of pollutant i [g/hp-hr]

HP_k is the horsepower of the engine k [hp]

LF_k is the load factor of the engine k

t_{event} is the number of hours the engine is used per event [hr/well]

$907,185$ is the mass unit conversion [g/ton]

N_k is the number of type- k engines

Annual emissions from well pad construction equipment by pollutant were estimated from the sum of engine emissions of various types (k) ($E_{engine\ TOTAL,i} = \sum E_{engine\ k,i}$) according to Equation 16.

$$\text{Equation (16): } E_{workover\ equip,i} = E_{engine\ TOTAL,i} \times S_{well\ count}$$

where:

$E_{workover\ equip}$ are annual emissions of pollutant i from workover equipment [ton/yr]

$E_{engine\ TOTAL,i}$ is sum of all engine emissions per well [ton/well]

$S_{well\ count}$ is the scaling surrogate for workover equipment emissions [wells/yr]

Production Traffic

This section refers to on-road emissions from light-duty and heavy-duty vehicle traffic during production. The methodology for estimating traffic emissions from these source categories is based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49). However, there are differences due to length of trips for vehicles traveling within each individual project site and to and from the nearest oil refinery.

Average exhaust emission factors were taken from the Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49). Fugitive dust emissions from vehicle travel on paved and unpaved roads were estimated based on the AP-42 guidance (EPA 2006a) using Equations 2 to 4. Separate assumptions for travel in-oil field and outside-oil field were used to develop per-trip emissions for each type of vehicle and destination. Trip activity estimates were then used to estimate the annual traffic emissions.

For both light-duty and heavy-duty in-oil field traffic, a 25 mph mean vehicle speed and 10 mile round-trip distance was used to develop transit exhaust emissions per trip. An idling time of 30 minutes was also used for each vehicle in-oil field to estimate idling exhaust emissions per trip. Fugitive road dust emissions were estimated using an assumption of 95 percent of the travel occurring on unpaved roads and the remaining 5 percent occurring on paved roads.

The outside-oil field traffic emissions were estimated for light-duty traffic using a mean vehicle speed of 55 mph and a round-trip distance of 674 miles. 95 percent of outside-oil field light-duty traffic occurs on paved roads with the remaining 5 percent occurring on unpaved roads. Fugitive road dust was estimated accordingly.

For light-duty traffic, per-trip emissions estimates were multiplied by an assumed 9.125 trips per well-year to estimate annual emissions at one well. This figure was then multiplied by the total number of wells in the maximum project year to calculate the total annual light-duty traffic emissions.

Heavy-duty traffic includes trucks carrying either condensate or produced water. Trucks carrying produced water have a round-trip distance of 10 miles, with 95 percent of travel on unpaved roads and 5 percent of travel on paved roads. Trucks carrying condensate travel 674 miles round trip (nearest refinery, Eagle Springs, NV round-trip travel distance) and do so on 95 percent paved roads and 5 percent unpaved roads. Both types of trucks travel at a mean average speed of 40 mph.

Because heavy-duty traffic trips are dependent on the volume of produced water and condensate, an annual per-well emissions estimate could not be made for the reasonably foreseeable development Project wells. Instead, overall annual heavy-duty traffic emissions were estimated based on (1) the capacity that each type of truck carries per trip and (2) condensate and produced water projections based on historical production data of oil and gas wells in the surrounding Upper Valley oil field. It was assumed that condensate trucks carry 180 barrel (bbl)/trip and water trucks carry 95 bbl/trip. The annual production of water and oil condensate was divided by the average liquid hauled per trip of the corresponding truck type to estimate the number of produced water and condensate trips needed in each Project year. These trips counts were then used to scale the per-trip emissions for each type of truck to estimate the total annual heavy-duty traffic emissions.

On-road vehicle emissions were estimated per well according to Equation 17.

$$\text{Equation (17): } E_{\text{traffic},i} = \frac{EF_i \times VMT}{2000}$$

where:

$E_{\text{traffic},i}$ are traffic emissions for pollutant i per well [ton/well]

EF_i is the average emission factor of pollutant i [lb/mile]. For exhaust emissions, $EF_i =$ MOVES emission factors. For fugitive dust emissions, $EF_i = EF_{\text{suppressed}}$ as in Equation 3.

VMT are the annual vehicle miles traveled by fleet to well site [miles/well]

2000 is the mass unit conversion [lb/ton]

Annual emissions for production traffic by pollutant were calculated with the appropriate scaling surrogate (active well counts) according to Equation 18.

Equation (18): $E_{category\ traffic,i} = E_{traffic,i} \times S_{well\ count}$

where:

$E_{category\ traffic, i}$ are annual emissions of pollutant i from production traffic [tons/yr]

$E_{traffic, i}$ are the emissions of pollutant i per well [tons/well]

$S_{well\ count}$ is the scaling surrogate for production traffic [wells/yr]

Heaters

This source category refers to emissions from separator heaters and dehydrator burners located at well sites. Heater activity data are based on the Chapita Wells EIS, including local gas heating value (British thermal unit [Btu] per standard cubic foot [scf]), heater size (Btu/hr), number of units per well, usage time and cycle fraction. The Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49) assumed that heaters would be natural gas-fired; therefore, AP-42 emission factors for an uncontrolled small boiler for natural gas were used for all inventoried pollutants (EPA 1998a). The basic methodology for estimating emissions for a single heater of type k (k = dehydrator burner or separator heater) is shown in Equation 19.

Equation (19): $E_{heater\ k,i} = \frac{EF_i \times Q_{heater} \times t_{annual} \times hc}{HV_{local} \times 10^6 \times 2000}$

where:

$E_{heater\ k}$ is the emissions from pollutant i from a given heater [tons/unit]

EF_i is the emission factor for pollutant i for natural gas fired small boilers (pounds per million standard cubic feet [lbs/MMscf])

Q_{heater} is the heater size [Btu/hr]

HV_{local} is the local natural gas heating value [Btu_{local}/scf]

t_{annual} is the annual hours of operation of each unit [hrs/unit]

hc is a heater cycling fraction of operating hours that the heater is firing

10^6 is a volume conversion factor [scf/MMscf] and 2000 is the conversion factor [lb/ton]

Emissions by pollutant for all heaters operated were estimated according to Equation 20.

Equation (20): $E_{heater\ TOTAL,i} = \sum E_{heater\ k,i} \times N_{heaters\ k}$

where:

$E_{heater\ TOTAL, i}$ is the total per-well emissions from all heaters for pollutant i [ton/well]

$E_{heater\ k, i}$ is the emissions from a single heater (of type k) [tons/unit]

$N_{heater,k}$ is the total number of heaters (of type k) per well [units/well]

Annual heater emissions were calculated using Equation 21. The scaling surrogate was the active well count.

$$\text{Equation (21): } E_{HEATERS,i} = E_{heaterTOTAL,i} \times S_{well\ count}$$

where:

$E_{HEATERS,i}$ are the annual emissions for pollutant i from heaters [tons/yr]

$E_{heaterTOTAL,i}$ is the total emissions from all heaters operated per well [tons/well]

$S_{well\ count}$ is the number of active wells for a particular year [wells/yr]

Fugitives

This source category refers to fugitive emissions or leaks from well equipment such as pump seals, valves, connectors, and flanges. VOC, CO₂, and CH₄ emissions were estimated using device-specific total organic carbon (TOC) emission factors for oil and gas production (EPA 1995) and equipment counts provided in the survey responses. Total device counts per well by type of equipment and by the type of service to which the equipment applies—gas, light oil, heavy oil, or water/oil mix, as well as the vented gas composition, were based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49).

Fugitive VOC emissions for an individual device were estimated according to Equation 22.

$$\text{Equation (22): } E_{fugitiveVOC,k} = EF_{TOC} \times N \times t_{annual} \times Y$$

where:

$E_{fugitive\ VOC,k}$ is the fugitive VOC emissions for a given device k [tons/well]

EF_{TOC} is the emission factor of TOC [ton/hr/device]

N is the total number of devices type- k per well [devices/well]

t_{annual} is the total annual hours of operation [hrs]

Y is the ratio of VOC to TOC in the vented gas

Total VOC fugitive emissions are equal to the sum of all fugitive emissions from devices per Equation 23.

$$\text{Equation (23): } E_{fugitiveVOC} = \sum_k E_{fugitiveVOC,k}$$

where:

$E_{fugitive\ VOC}$ is the total fugitive VOC emissions per well [ton/well]

CO₂ and CH₄ fugitive emissions were estimated according to Equations 24 and 25.

$$\text{Equation (24): } E_{fugitiveCH_4} = E_{fugitiveVOC} \times \frac{\text{weight fraction}_{CH_4}}{\text{weight fraction}_{VOC}}$$

$$\text{Equation (25): } E_{fugitiveCO_2} = E_{fugitiveVOC} \times \frac{\text{weight fraction}_{CO_2}}{\text{weight fraction}_{VOC}}$$

where:

$E_{fugitive\ CO_2}$ is the total fugitive CO₂ emissions per well [ton/well]

$E_{fugitive\ CH_4}$ is the total fugitive CH₄ emissions per well [ton/well]

Weight fractions per pollutant are based on the Chapita Wells EIS

Annual fugitive emissions were calculated using Equation 26, and the scaling surrogate was the active well count.

$$\text{Equation (26): } E_{fugitive\ dev.,i} = E_{fugitive\ i} \times S_{well\ count}$$

where:

$E_{fugitive\ dev., i}$ are the annual emissions for pollutant i [tons/yr]

$E_{fugitive\ i}$ are fugitive emissions of pollutant i per well [ton/well]

$S_{well\ count}$ is the number of active well counts for a particular year [wells/yr]

Pneumatic Devices

Pneumatic devices present at wells are assumed to be liquid level controllers, snap pilot, and trace pumps. Activity data and bleed rates (in cubic feet per hour) for each of these were based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49). The snap pilot is a no-bleed device, and the trace pump emissions are routed to the heater. Therefore, emissions are only estimated for the liquid level controller. VOC emissions were estimated using the annual volume of vented gas, the VOC molar fraction present in the gas, and the weight percentage of each pollutant species present in the gas.

The emissions calculation for VOC is based on the ideal gas law and is shown in Equation 27.

$$\text{Equation 27: } E_{pneum.device,VOC} = \frac{(V \times Y_{VOC} \times 28.317) \times P}{R \times T} \times \frac{MW_{VOC}}{907.185}$$

where:

$E_{pneum.device,VOC}$ is the annual VOC emissions per well [tons/yr]

V is the annual volume of gas vented per well [MCF/yr]

Y_{VOC} is the molar fraction of VOC in the vented gas [percentage]

28.317 is the volume unit conversion [1000L/MCF]

P is the pressure of the gas [atm]

R is the ideal gas constant [L-atm/mol-K]

T is the temperature of the gas [K]

MW_{VOC} is the average molecular weight of VOCs in the gas [g/mol]

907.185 is the mass unit conversion [kg/ton]

CO₂ and CH₄ emissions were calculated based on Equations 28 and 29.

$$\text{Equation (28): } E_{pneum.device,CH_4} = E_{pneum.device,VOC} \times \frac{\text{weight fraction}_{CH_4}}{\text{weight fraction}_{VOC}}$$

$$\text{Equation (29): } E_{pneum.device,CO_2} = E_{pneum.device,VOC} \times \frac{\text{weight fraction}_{CO_2}}{\text{weight fraction}_{VOC}}$$

where:

$E_{pneum.device,CO_2}$ is the total pneumatic device CO₂ emissions per well [ton/well]

$E_{pneum.device,CH_4}$ is the total pneumatic device CH₄ emissions per well[ton/well]

Weight fractions per pollutant of vapor losses are based on the Chapita Wells EIS

Field-wide annual pneumatic device emissions were derived using Equation 30.

$$\text{Equation (30): } E_{pneum.device} = E_{pneum.device,i} \times S_{well\ count}$$

where:

$E_{pneum.device}$ are the annual completion venting emissions of pollutant i [tons/yr]

$E_{pneum.device, i}$ is the venting emissions of pollutant i per activity [tons/well]

$S_{well\ count}$ is the scaling surrogate for initial completions [wells/yr]

Chemical Injection Pneumatic Pumps

No emissions have been estimated for chemical injection pneumatic pumps, as all pump emissions are assumed routed to the separator burner.

Tank Load-out

This source category corresponds to condensate load-out emissions, which were estimated based on the loading loss methodology outlined in AP-42 guidance (EPA 2008). Condensate is loaded to trucks for each well pad. The loading loss rate was estimated following Equation 31:

$$\text{Equation (31): } L = 12.46 \times \left(\frac{S \times V \times M}{T} \right)$$

where:

L is the loading loss rate [lb/1000 gal]

S is the saturation factor taken from AP-42 default values based on operating mode

V is the true vapor pressure of liquid loaded (pound per square inch absolute [psia])

M is the molecular weight of the vapor [lb/lb-mole]

T is the temperature of the bulk liquid (degrees Rankine [°R])

12.46 is an empirical factor in units of [lb-mol. °R/psia.10³ gal]

VOC tank loading emissions per barrel of condensate loaded were then estimated by Equation 32.

$$\text{Equation (32): } E_{loading,VOC} = L \times Y_{VOC} \times \frac{42}{2000}$$

where:

$E_{loading}$ are the VOC tank loading emissions [ton/barrel]

L is the loading loss rate [lb/1000gal]

Y_{VOC} is the molar fraction of VOC in the vapor

42 is a unit conversion [gal/bbl]

2000 is a unit conversion [lbs/ton]

CO₂ and CH₄ emissions per barrel of condensate loaded were calculated based on Equations 33 and 34.

Equation (34): $E_{loading,CH_4} = E_{loading,VOC} \times \frac{weight\ fraction_{CH_4}}{weight\ fraction_{VOC}}$

Equation (35): $E_{loading,CO_2} = E_{loading,VOC} \times \frac{weight\ fraction_{CO_2}}{weight\ fraction_{VOC}}$

where:

$E_{loading,CO_2}$ is the total loading CO₂ emissions per barrel of condensate [ton/bbl]

$E_{loading,CH_4}$ is the total loading CH₄ emissions per barrel of condensate [ton/bbl]

Weight fractions per pollutant of vapor losses are based on Chapita Wells EIS

Annual emissions per pollutant *i* from truck loading were scaled by annual condensate production using Equation 36.

Equation (36): $E_{tank\ loadout,i} = E_{loading,i} \times S_{bbl\ condensate}$

where:

$E_{tank\ loadout, i}$ are the annual emissions for pollutant *i* from tank load-out [ton/yr]

$E_{loading, i}$ are the emissions for pollutant *i* from loading per barrel [ton/bbl]

$S_{bbl\ condensate}$ is the total annual amount of barrels condensate produced for wells [bbl/yr]

Production Flaring

Production flaring emissions result from the control of losses from condensate tank flashing and dehydrators via combustion. Emissions estimations are based on AP-42 guidance (EPA 1991), condensate tank data for flashing loss rates (scf/bbl), Gas Research Institute glycol units (GLYCalc) model was used for regenerator stream losses, and venting gas heat content. Emission factors for NO_x and CO are based on AP-42, Chapter 13, Section 13.5, Table 13.5-1. The natural gas flaring speciation profile (0051) from EPA’s SPECIATE database was used to determine the weight fractions of CH₄/total hydrocarbon (THC) and VOC/THC in the flared gas; emissions factors for VOC and CH₄ were calculated with the AP-42 emission factor for THC multiplied by the appropriate fraction. The SPECIATE profile was also used to determine the VOC speciation. The N₂O emission factor was obtained from the API *Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry* (API 2009). The activity or event basis differs among production flaring sources as shown in Table 3.

Table 3. Activity Metric and Scaling Surrogates for Production Flaring Sources

Flaring Source	Activity (metric)	Scaling surrogate
Condensate Tank Flashing Flaring	Barrels	Annual Condensate Production
Dehydrator Flaring	Number of dehydrators	Number of dehydrators

To estimate flaring emissions by pollutant and source, condensate tank and dehydrator losses per activity (scf/activity) were combined with the heat content of the flared gas (million British thermal units [MMBtu]/scf) and the appropriate emission factor (lb/MMBtu) to determine NO_x, VOC, particulate matter, CO, CH₄, and N₂O emissions according to the AP-42 methodology,

following Equation 37. Flared volume from condensate tanks was estimated based on emissions data from the E&P Tank model for condensate tanks and from Gas Research Institute GLYCalc model output for dehydrators.

$$\text{Equation (37): } E_{source\ flare,i} = \frac{EF_i \times Q \times HV \times PC}{2000}$$

where:

$E_{flashing\ flare}$ is the flaring emissions of pollutant i per activity metric [ton/activity]

EF_i is the emissions factor for pollutant i [lb/MMBtu]

Q is the volume of gas flared per activity [scf/activity]

HV is the heating value of the gas (~ 2.0E-03) [MMBtu/scf]

2000 is a unit conversion [lbs/ton]

PC is the fraction of the production losses that are controlled by flaring

Because no flaring emission factor for CO₂ was available, CO₂ completion flaring emissions were calculated from CO₂ emissions potential of the flared gas, according to Equations 38 through 40.

$$\text{Equation (38): } E_{source\ flare_{CO_2}} = (Total\ CO_2\ Emissions\ Potential\ of\ Entire\ Gas - CO_2\ Emissions\ Potential\ of\ THC - CO_2\ Emissions\ Potential\ of\ CO) \times Production\ Control$$

where:

$E_{source\ flare_{CO_2}}$, $Total\ CO_2\ Emissions\ Potential\ of\ Entire\ Gas$, $Total\ CO_2\ Emissions\ Potential\ of\ THC$ and $Total\ CO_2\ Emissions\ Potential\ of\ CO$ are in units of [tons/activity]

$E_{source\ flare_{CO_2}}$ is carbon dioxide emissions from a specific production flaring source

$Production\ Control$ is the fraction of production gas that is flared over gas that is vented

Equation (39):

$$CO_2\ Emissions\ Potentials\ from\ THC \left(\frac{tons}{activity} \right) = \sum \frac{\left(\frac{lb\ emitted\ of\ compound\ i}{activity} \right)_i \times \frac{No.\ of\ Moles\ of\ C\ in\ compound\ i}{No.\ of\ Moles\ of\ C\ in\ CO_2} \times MW\ of\ CO_2 \left(\frac{lb}{lb - mol} \right)}{MW\ of\ compound\ (lb/lb - mol) \times 2000}$$

Equation (40):

$$CO_2\ Emissions\ Potentials\ from\ CO \left(\frac{tons}{activity} \right) = \frac{CO\ emissions\ from\ flaring \left(\frac{lb}{activity} \right) \times \frac{No.\ of\ Moles\ of\ C\ in\ CO}{No.\ of\ Moles\ of\ C\ in\ CO_2} \times MW\ of\ CO_2 \left(\frac{lb}{lb - mol} \right)}{MW\ of\ CO\ (lb/lb - mol) \times 2000}$$

where:

$Compound\ i$ refers to each compound identified in flaring gas speciation profile: (lb emissions emitted/activity) = total organic gas emissions (lb/activity) from flaring x weight fraction of the compound

Production flaring emissions by source were scaled according to Equation 41 to calculate annual flaring emissions.

Equation (41): $E_{prod.flaring,source,i} = E_{source flare,i} \times S_{activity}$

where:

$E_{prod.flaring, source,i}$ are the annual production flaring emissions by source of pollutant i [ton/yr]

$E_{source flare}$ is the flaring emissions of pollutant i per activity [ton/activity]

$S_{activity}$ is the scaling surrogate for the flaring source category according to Table 3 [activity/yr]

Associated Gas Flaring

This source category refers to the emissions that would result during the flaring of associated natural gas with production. When petroleum crude oil is extracted, raw natural gas associated with the petroleum is also brought to the surface of the well. It is assumed that half (seven) of the constructed wells would flare associated gas. The volume (MCF) of gas flared per year is based on historical gas production data for the surrounding Upper Valley oil field (BLM 2018b). Emission factors for CAPs and GHGs were taken from the Wyoming Department of Environmental Quality's *Oil and Gas Production Facilities – Chapter 6, Section 2, Permitting Guidance* as well as AP-42, Table 1.4-2 (WDEQ 2013; EPA 1998a). Emission factors for these pollutants were converted to tons per MCF and then multiplied by the gas flared per well (MCF per year) to calculate the associated gas flaring emissions for each well, as shown in Equation 42.

Equation (42): $E_{flaring,i} = \frac{EF_i \times Q_y}{2000 \times 1.037}$

where:

$E_{flaring, i}$ are flaring emissions of pollutant i per well [tons/yr]

EF_i is the emission factor of pollutant i [lb/MMBtu]

Q is the volume of gas flared in y year of production [MCF]

2000 is the mass unit conversion factor [lb/ton]

1.037 is the natural gas conversion factor [MMBtu/MCF]

Annual flaring emissions were calculated using Equation 43. The scaling surrogate was the active flaring well count.

Equation (43): $E_{flaringTOTAL,i} = E_{flaring,i} \times S_{flaring well count}$

where:

$E_{flaringTOTAL, i}$ are the annual flaring emissions for pollutant i from all wells [tons/yr]

$E_{flaring, i}$ are flaring emissions of pollutant i per well [tons/yr]

$S_{flaring well count}$ is the number of active flaring wells for a particular year [wells/yr]

Associated Gas Venting

This source category refers to the emissions that would result during the venting of associated natural gas with production. In contrast to gas flaring, gas venting is the intentional safe release, without combustion of associated gas into the Earth's atmosphere. It is assumed that half (seven) of the constructed wells would vent associated gas. The volume (MCF) of gas vented per year is based on historical gas production data for the surrounding Upper Valley oil field (BLM 2018b). Emission factors for CAPs and GHGs were taken from the Wyoming Department of Environmental Quality's *Oil and Gas Production Facilities – Chapter 6, Section 2, Permitting Guidance* as well as AP-42, Table 1.4-2 (WDEQ 2013; EPA 1998a). Emission factors for these pollutants were converted to tons per MCF and then multiplied by the gas vented per well (MCF per year) to calculate the associated gas venting emissions for each well in a particular year, as shown in Equation 44.

$$\text{Equation (44): } E_{venting,i} = \frac{EF_i \times Q_y}{2000 \times 1.037}$$

where:

$E_{venting,i}$ are venting emissions of pollutant i per well [tons/yr]

EF_i is the emission factor of pollutant i [lb/MMBtu]

Q is the volume of gas vented in y year of production [MCF]

2000 is the mass unit conversion factor [lb/ton]

1.037 is the natural gas conversion factor [MMBtu/MCF]

Annual venting emissions were calculated using Equation 45. The scaling surrogate was the active venting well count.

$$\text{Equation (45): } E_{ventingTOTAL,i} = E_{venting,i} \times S_{venting\ well\ count}$$

where:

$E_{ventingTOTAL,i}$ are the annual venting emissions for pollutant i from all wells [tons/yr]

$E_{venting,i}$ are venting emissions of pollutant i per well [tons/yr]

$S_{venting\ well\ count}$ is the number of active venting wells for a particular year [wells/yr]

Produced Condensate Combustion

This source category refers to the emissions that would result during the downstream consumed combustion of produced condensate. Because produced oil could be combusted anywhere, the precise location of combustion emissions is not able to be determined. Accordingly, emissions of localized CAPs and HAPs are not calculated for produced condensate combustion. However, given that GHGs have a global impact and are non-localized pollutants, GHG emissions from produced condensate combustion are included in the GHG inventory. The amount of barrels of condensate produced per year is based on historical gas production data for the surrounding Upper Valley oil field. GHG emission factors for condensate combustion were taken from Climate Registry guidance (The Climate Registry 2017). Emission factors for these pollutants were converted to tons per bbl and then multiplied by the condensate produced per year to calculate the annual condensate combustion emissions for a particular year, as shown in Equation 46. The scaling surrogate was the annual condensate production.

$$\text{Equation (46): } E_{\text{condensate},i} = \frac{EF_i \times S_{\text{bbl condensate},y} \times 6,287,000}{907,185}$$

where:

$E_{\text{condensate},i}$ are emissions of pollutant i [tons/yr]

EF_i is the emission factor of pollutant i [g/MMBtu]

$S_{\text{bbl condensate}}$ is the total annual amount of barrels condensate produced for all wells in a particular year y [bbl/yr]

$6,287,000$ is the residual fuel conversion factor (Btu/bbl) (Energy Information Administration 2017)

$907,185$ is the mass unit conversion [g/ton]

Near-Field Modeling Analyses

Air Quality Modeling Methodology

A near-field ambient air quality impact assessment was performed to quantify maximum pollutant impacts within and near the Planning Area resulting from reasonably foreseeable development-related construction and production emissions. Air quality impacts due to CAP emissions of PM₁₀, PM_{2.5}, NO_x, SO₂, and CO, and emissions of HAPs (benzene, toluene, ethyl benzene, xylene, and n-hexane), were evaluated as part of the near-field study. Potential air quality impacts resulting from emissions associated with Project drilling and production activities were compared to applicable ambient air quality standards and significance thresholds. All modeling analyses were performed in general accordance with the GSENM Air Quality Impact Assessment Modeling Protocol (ICF 2018), which was developed with input from the Utah Division of Air Quality, BLM, and other stakeholders, including the EPA.

Based on review of the emissions inventory and the relatively small estimate of oil and gas development, far-field modeling was not performed at this time. If development activity exceeds what was anticipated in the EIS, additional cumulative far-field modeling will be required per the lease notice (Appendix H, *Stipulations and Exceptions, Modifications, and Waivers*) and BLM's adaptive management strategy (Appendix I, *Monitoring Strategy*).

In accordance with the EPA's *Guidelines on Air Quality Models* (Appendix W to 40 CFR Part 51; EPA 2017), this near-field ambient air quality impact assessment was carried out using the latest available version of AERMOD (version 18081). Maximum pollutant impacts within and near the Planning Area due to emissions of CAPs were determined. These modeled near-field Project impacts were added to background concentrations of the criteria pollutants to calculate total ambient air quality impacts for comparison with the NAAQS, which have been adopted by the State of Utah as the Utah Ambient Air Quality Standards (UAAQS).

Ozone is also a criteria pollutant and may form from NO_x, VOC, and CO emissions in the presence of sunlight. Similarly, some portion of fine particulate matter, PM_{2.5} is formed in the atmosphere from the gas-phase emissions of SO₂ and NO_x forming sulfate and nitrate particles. The analyses for the ozone impacts and secondary particulate matter formation have been made following the EPA's Modeled Emissions Rates for Precursors (MERP) guidance (EPA 2016). While this guidance was developed under the PSD permitting program, the methodology is applicable as a screening level tool for this study.

Short- and long-term impacts due to HAPs (benzene, toluene, ethyl benzene, xylene, and n-hexane) were also evaluated. Emissions of each pollutant analyzed were examined to determine: (1) the maximum emissions during well/field development and (2) the maximum emissions during production. The maximum criteria pollutant (CO, NO_x, SO₂, PM₁₀, and PM_{2.5}) impacts would occur during well development and production activities and from combinations of these activities. The maximum HAP impacts would occur during production activities.

Model Configuration

AERMOD was applied using 5 years of meteorological data and incorporating emissions separately from each of the three reasonably foreseeable project locations. Modeling scenarios examine the impacts of emissions from the maximum emission for the coal mining and oil and gas development.

Within AERMOD, sources can be treated as point, volume, or area sources. For this analysis, stacks associated with equipment with an hp rating greater than 600 such as drilling rigs were modeled as point sources. Operations such as crushing and conveyor transfer are treated as volume sources. Emission sources related to construction zones, unpaved roadways, and areas subject to wind erosion (stockpiles) are treated as area or volume sources. Similarly, grading, loading, and unloading operations are treated as area or volume sources. Vehicles on roadways are modeled as line sources.

For Tier III NO_x to NO₂ screening modeling, use of hourly ozone concentrations for the same time period as the meteorological data is ideal. These data were not readily available; however, the last 6 months of hourly ozone data from 2017 were available from Escalante, along with the highest measured 4 hours per year from Zion and Capitol Reef National Park (2014–2017). In 2017, only 4 hours were higher than 70 parts per billion (ppb) at Escalante, and Zion has only 2–3 hours per year (2014–2017) that exceeded 70 ppb. We have therefore assumed that 70 ppb is a reasonably conservative ozone value to use in the Tier III NO_x to NO₂ screening modeling.

Topographical Data

The terrain in the Planning Area consists of canyons and mesas with wide variations in elevation. As locations for the sources are not known, digital topographical data (in the form of 7.5 minute Digital Elevation Model files) at 1 arc second ~ 90-meter horizontal resolution were used for the analysis region as available from the U.S. Geological Survey and processed for use in AERMOD using the AERMAP preprocessor program (version 18081) (EPA 2018a).

Meteorology Data and Land-Use Data

For the reasonably foreseeable oil and gas well development near Bryce Canyon National Park, 5 years of hourly meteorological data were used for the near-field analysis. All 5 years of surface observations were collected at the Bryce Canyon Airport National Weather Service (NWS) meteorological station (37.706° N, 112.145° W, elevation 7,585 feet) (Figure 1), and includes using 1-minute Automated Surface Observing System wind data to better account for calm wind conditions. Upper-air data for the same time period from Grand Junction, CO were used in developing the vertical atmospheric profile. This was considered more representative than the Flagstaff, AZ upper-air station. This site has a strong dominant wind direction from the west with a high percentage of calm conditions.

For the reasonably foreseeable oil and gas well development near Escalante, UT, onsite surface wind data (2012–2016) from Spooky Gulch, UT (Figure 2) (37.51468° N, 111.26189° W, elevation 5,340 feet) were used in lieu of wind data from Bryce Canyon Airport, as this site is closer to the potential oil and gas play near Escalante. Precipitation data are available for Spooky Gulch from 2014–2016. The wind rose shows two prevailing wind directions (Figure 2) from the north-northwest and southeast direction. The prevailing winds from north-northwest and southeast are likely driven by mesoscale wind patterns resulting from terrain thermal differences. There is a third mode from the southwest with higher wind speeds, which is likely synoptic winds driven by pressure gradients from storm systems.

For the reasonably foreseeable coal mine development, surface observational data (2012–2016) from Page, AZ (36.926° N, 111.448° W, elevation 4,316 feet) were used in lieu of Bryce Canyon surface data (Figure 3). This dataset was developed by Arizona DEQ for use in air quality modeling studies. The wind rose shows a very different wind flow pattern with a much less distinct prevailing wind direction.

The meteorological inputs for AERMOD were generated using the AERMOD Meteorological Processor (AERMET) program (EPA 2018b) for the Spooky Gulch and Bryce Automated Surface Observing System data. AERMET requires additional information about the land-use characteristics of the area in which the surface meteorological monitoring site is located. This information was obtained using the AERMOD preprocessor program AERSURFACE preprocessor extracting digital U.S. Geological Survey land-use National Land Cover Dataset 1992 (NLCD92) format.

Further details on the site-specific processing for Bryce Canyon Airport and Spooky Gulch are provided as follows.

Bryce Airport AERMET Processing

Meteorological data used in the creation of the Bryce Airport AERMET meteorological dataset for input to AERMOD are summarized in Table 4.

Table 4. Meteorological Data for AERMET Processing at the Bryce Airport Site

Site ID	Site Name	Latitude	Longitude	Elevation (meters)	Source of Data
23159/KBCE	Bryce Canyon Airport	37.706	-112.145	2,313	Hourly Data: 2013–2017: ftp://ftp.ncdc.noaa.gov/pub/data/noaa/
23293/KBCE	Bryce Canyon Airport	37.706	-112.145	2313	1-minute ASOS data: ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/
23066/GJT	Grand Junction	39.12	-108.53	1472	http://esrl.noaa.gov/raobs/
046336	Bryce Canyon National Park Headquarters	37.65	-112.167	2410	https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ut1008

ASOS – Automated Surface Observing System

The NWS surface data at the Bryce Canyon Airport for the period 2013–2017 were used to represent the surface meteorological conditions near Bryce Canyon modeling. The 1-minute Automated Surface Observing System (ASOS) data were processed using AERMINUTE to

provide the equivalent of onsite wind data and the remaining surface meteorological data were obtained from the 1-hour standard, Integrated Hourly Surface Data files. The precipitation data from the Bryce Canyon National Park Headquarters Climate Station were used to determine surface moisture conditions to be used in AERSURFACE, and the data from the Grand Junction upper air radiosonde site were used to represent conditions aloft.

For AERSURFACE

NLCD92 was downloaded from <http://landcover.usgs.gov/natl/landcover.php> and used with version 13016 of AERSURFACE to provide the surface parameters needed for the third stage of AERMET.

The coordinates of the Bryce Canyon Airport site were used in the determination of surface characteristics in AERSURFACE. AERSURFACE was run with the specifications that the area was not arid, there were one or more months with snow cover, and the site was at an airport. Twelve sectors were used for processing to account for variations in land cover near the measurement site.

The study radius for surface roughness was set at 1 kilometer. The monthly seasonal profile used is provided in Table 5.

Table 5. Monthly Seasonal Profile at the Bryce Canyon Airport Site

Months	Season
November, December	Late autumn after frost and harvest, or winter with no snow
January, February, March	Winter with continuous snow
April, May, June	Transitional spring with partial green coverage or short annuals
July, August	Midsummer with lush vegetation
September, October	Autumn with unharvested cropland

AERSURFACE was run separately specifying dry, average, and wet surface moisture and the results were later used to create composite surface characteristics for the third stage of AERMET.

Determination of Dry, Average, and Wet Months for the Analysis Period

Based on information provided in the AERSURFACE User's Guide, each month in the modeling period was classified as either dry, average, or wet, and this information was later used in Stage 3 of AERMET.

The rainfall data for the Bryce Canyon National Park Headquarters for the 30-year period ending 2017 were gathered and 30-year monthly averages were computed for each month from 2013 through 2017. The monthly statistics for a given month were not used in the average if more than 5 days were missing in a given month. The next step was to compute the ratio of the monthly precipitation total for a given month during the modeling period and the corresponding 30-year monthly average. If the ratio was less than 0.5, the month was designated as dry. If the ratio was greater than or equal to 0.5 but less than 2, then the month

was designated as average. If the ratio was greater than or equal to 2, then the month was designated as wet.

Table 6 provides the information for the moisture classification of the region.

Table 6. Monthly Moisture Classification at the Bryce Canyon National Park Headquarters Site

Year	Moisture Classification											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	dry	dry	avg	dry	avg	dry	wet	wet	wet	dry	avg	dry
2014	dry	avg	dry	dry	avg	dry	avg	avg	wet	dry	dry	dry
2015	avg	avg	avg	dry	avg	dry	avg	avg	avg	wet	avg	wet
2016	avg	avg	dry	avg	avg	avg	avg	avg	wet	dry	avg	dry
2017	avg	avg	dry	dry	dry	dry	wet	avg	avg	dry	dry	dry

avg - average

Insufficient data for January 2017 were available to compute the monthly average; as such, based on the classification of the month prior and the month following, an average classification was assigned to that month.

AERMINUTE

AERMINUTE Version 15272 was run using the 1-minute ASOS data for the Bryce Canyon Airport to create the hourly average wind data for input to AERMET in Stage 2.

AERMET

Version 18081 of AERMET was used in the analysis.

Stage 1

Data from the Grand Junction upper-air station were used for the upper air portion of the processing. Data from the Bryce Canyon Airport were used for the surface portion of the processing. Stage 1 was run for the entire period from 2013–2017.

Stage 2

This step was a simple merging of the quality assurance files produced from Stage 1 as well as the hourly wind data created by AERMINUTE. Stage 2 was run for the entire period from 2013–2017.

Stage 3

The flags for this step were set as follows:

- Substitute NWS option was turned on, which allows for the processing and substitution of NWS data.
- Wind direction was randomized when NWS wind directions were used.
- Cloud cover substitution from the NWS site was used in the analysis.
- Temperature substitution from the NWS site was used in the analysis.

Stage 3 was run separately for each of the 5 years. The surface characteristics portion of the input files was created by using the AERSURFACE output corresponding to the moisture characteristics of each month/year.

Quality Assurance/Quality Control

The message and report files were checked for error messages. The cause of any error message was corrected and the model was rerun. For the final runs, no error messages remained. Warning messages were also reviewed and noted. There were no data modifications made based on warning messages.

Spooky Gulch AERMET Processing

Meteorological data used in the creation of the Spooky Gulch AERMET data for input to AERMOD are summarized in Table 7.

Table 7. Meteorological Data Used for AERMET Processing at Spooky Gulch Site

Site ID	Site Name	Latitude	Longitude	Elevation (meters)	Source of Data
23159/KBCE	Bryce Canyon Airport	37.706	-112.145	2,313	Hourly Data: 2012–2016: ftp://ftp.ncdc.noaa.gov/pub/data/noaa/
23293/KBCE	Spooky Gulch	37.514	-112.261	1,627	Provided by BLM (5/14/2018). Data available for download from https://mesowest.utah.edu .
23066/GJT	Grand Junction	39.12	-108.53	1,472	http://esrl.noaa.gov/raobs/
422592	Escalante	37.767	-112.60	1,771	https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ut2592

BLM – Bureau of Land Management

The onsite wind speeds and wind directions at the Spooky Gulch site for the period from 2012–2016 were used to represent the onsite wind conditions. The NWS surface data at the Bryce Canyon Airport for the period from 2012–2016 were used to represent the remaining surface meteorological conditions. During the AERMET processing, these data were also used to fill in for any missing wind data from the Spooky Gulch site. The precipitation data from the Escalante climate station were used to determine surface moisture conditions to be used in AERSURFACE, and the data from the Grand Junction upper air radiosonde site were used to represent conditions aloft.

For AERSURFACE

NLCD92 was downloaded from <http://landcover.usgs.gov/natl/landcover.php> and used with version 13016 of AERSURFACE to provide the surface parameters needed for the third stage of AERMET.

The coordinates of the Spooky Gulch site were used in the determination of surface characteristic in AERSURFACE. AERSURFACE was run with the specifications that there were one or more months with snow cover, and the site was not at an airport. Twelve sectors were used for processing to account for variations in land cover near the measurement site.

The study radius for surface roughness was set at 1 kilometer. The monthly seasonal profile used is provided in Table 8.

Table 8. Monthly Seasonal Profile for Spooky Gulch

Months	Season
November, December	Late autumn after frost and harvest, or winter with no snow
January, February, March	Winter with continuous snow
April, May, June	Transitional spring with partial green coverage or short annuals
July, August	Midsummer with lush vegetation
September, October	Autumn with unharvested cropland

AERSURFACE was run separately specifying dry, average, and wet surface moisture and the results were later used to create composite surface characteristics for the third stage of AERMET.

Determination of Dry, Average, and Wet Months for the Analysis Period

Based on information provided in the AERSURFACE User's Guide, each month in the modeling period was classified as either dry, average, or wet, and this information was later used in Stage 3 of AERMET.

The rainfall data for the Escalante Climate site for the 30-year period ending 2016 were gathered and 30-year monthly averages were computed for each month from 2012 through 2016. The monthly statistics for a given month were not used in the average if more than 5 days were missing in a given month. The next step was to compute the ratio of the monthly precipitation total for a given month during the modeling period and the corresponding 30-year monthly average. If the ratio was less than 0.5, the month was designated as dry. If the ratio was greater than or equal to 0.5 but less than 2, then the month was designated as average. If the ratio was greater than or equal to 2, then the month was designated as wet.

Table 9 provides the information for the moisture classification of the region.

Table 9. Monthly Moisture Classification at the Escalante Climate Site

Year	Moisture Classification											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	avg	dry	dry	dry	dry	dry	wet	avg	avg	avg	dry	avg
2013	avg	dry	avg	dry	avg	dry	avg	wet	wet	dry	wet	dry
2014	dry	dry	avg	dry	avg	dry	avg	avg	wet	dry	dry	dry
2015	avg	avg	avg	dry	avg	avg	avg	wet	avg	wet	dry	dry
2016	avg	avg	dry	avg	dry	dry	avg	avg	wet	dry	avg	avg

avg – average

AERMET

Version 18081 of AERMET was used in the analysis.

Stage 1

Data from the Grand Junction upper-air station were used for the upper air portion of the processing. Data from the Bryce Canyon Airport were used for the surface portion of the processing, and the wind data from Spooky Gulch were used for the onsite portion of the processing. Stage 1 was run for the entire period from 2012–2016.

Stage 2

This step was a simple merging of the quality assurance files produced from Stage 1. Stage 2 was run for the entire period from 2012–2016.

Stage 3

The flags for this step were set as follows:

- Substitute NWS option was turned on, which allows for the processing and substitution of NWS data.
- Wind direction was randomized when NWS wind directions were used.
- Cloud cover substitution from the NWS site was used in the analysis.
- Temperature substitution from the NWS site was used in the analysis.

Stage 3 was run separately for each of the 5 years. The surface characteristics portion of the input files was created by using the AERSURFACE output corresponding to the moisture characteristics of each month/year.

Quality Assurance/Quality Control

The message and report files were checked for error messages. The cause of any error message was corrected and the model was rerun. For the final runs, no error messages remained. Warning messages were also reviewed and noted. There were no data modifications made based on warning messages.

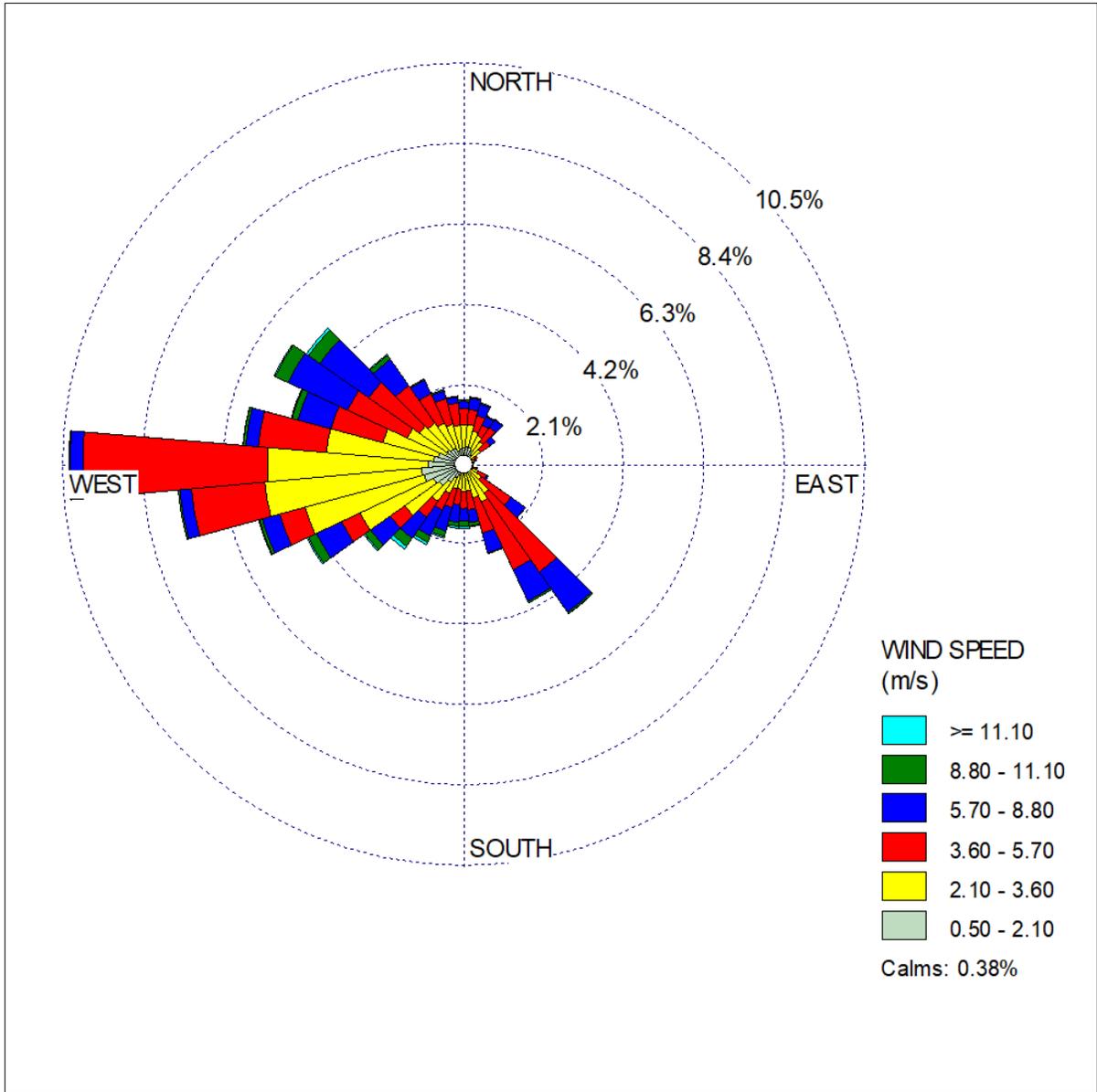


Figure 1. Wind Rose for Bryce Canyon Airport, UT Monitoring Site 2013-2017

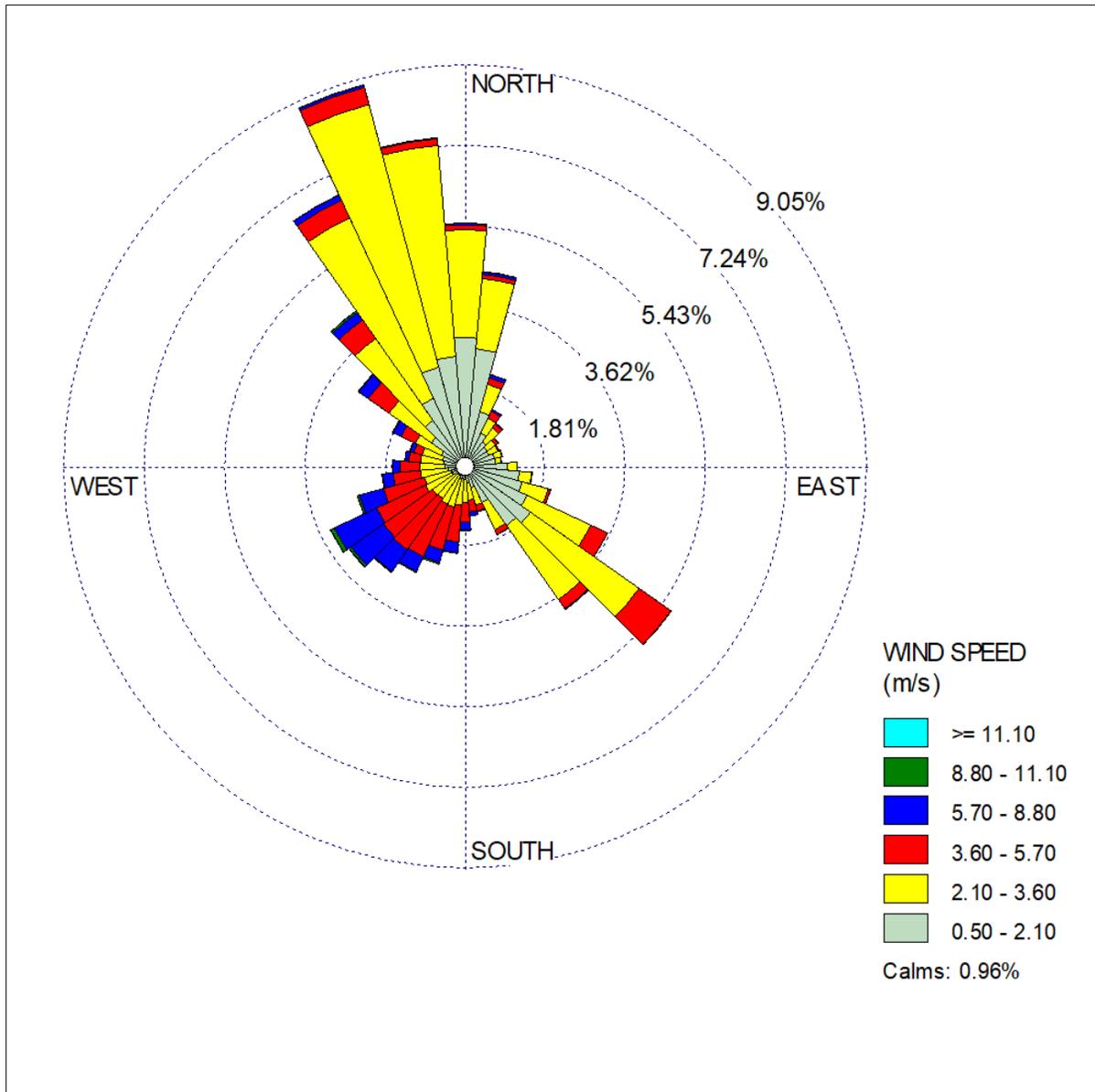


Figure 2. Wind Rose for Spooky Gulch, UT Monitoring Site 2012-2016

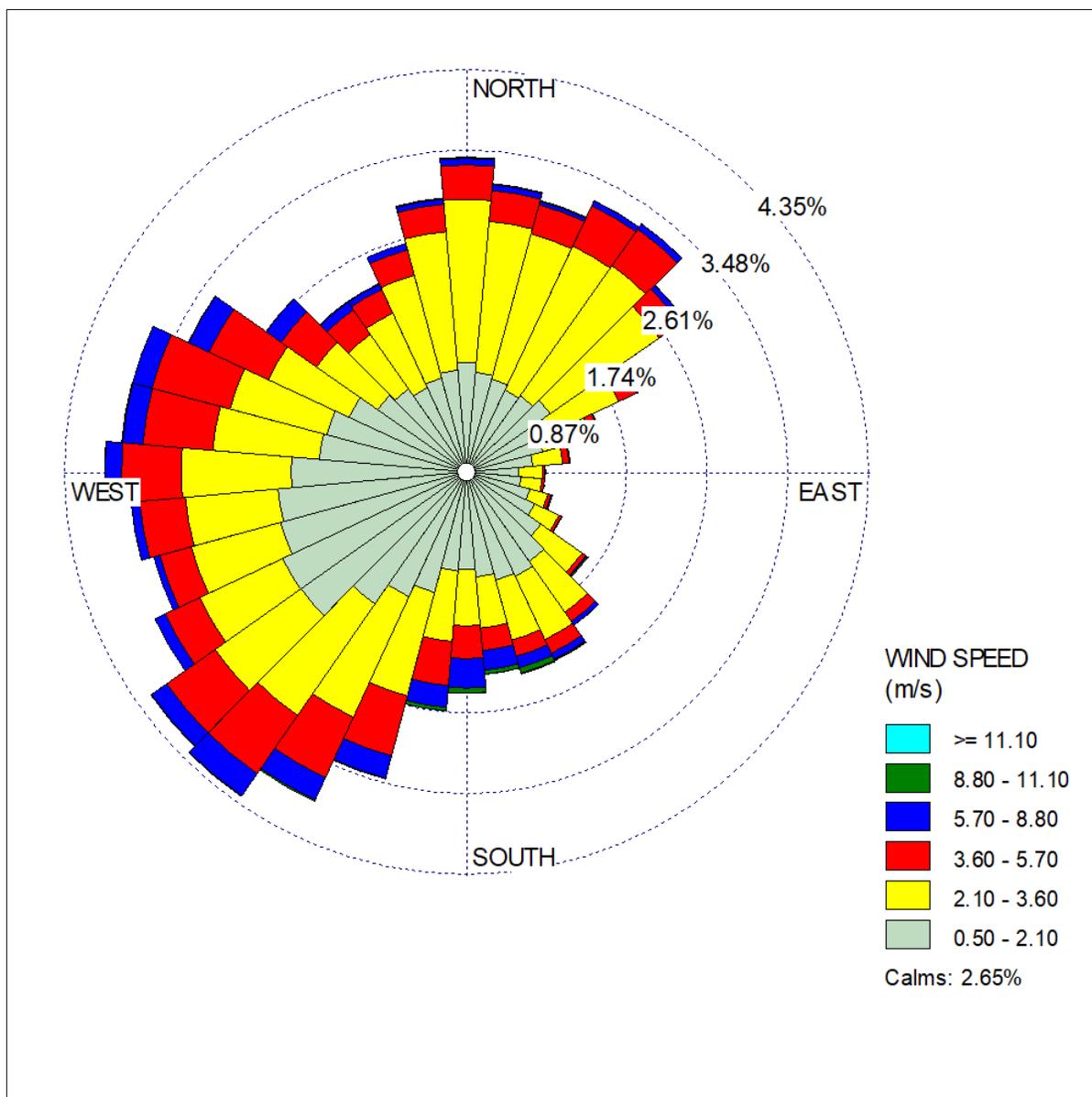


Figure 3. Wind Rose for Page, AZ Monitoring Site 2012-2016

Background Pollutant Concentrations

Total pollutant concentration is the sum of the modeled-derived impacts plus background pollutant concentrations for the region. The background concentrations include all of the sources currently existing. Background concentrations should be representative of the regional air quality in the vicinity of the Planning Area. Specification of the background monitored data was based on the following factors: (1) monitor location; (2) data quality (90 percent completeness criteria each quarter); and (3) how current the data are. Not all pollutants of interest are measured at all air quality monitoring sites. Discussed below is the underlying rationale for the selection of the representative background monitors used in this analysis. The final air quality monitoring stations selected for the background concentration levels are summarized in Table 10.

Ozone monitoring has been conducted in Escalante for at least the past 3 years. This location is the central-northern part of the Planning Area and is likely the most representative ozone monitoring for the area. These data are used in the ozone limiting method for use in AERMOD.

The background values for PM₁₀ and PM_{2.5} from the 3 most recent years are used from the Interagency Monitoring of Protected Visual Environments monitoring station, which is about 20 kilometers (13 miles) from KEPA. This site, located within Bryce Canyon National Park, is the most representative of the regional background particulate matter monitoring stations. The metrics are calculated consistent with the form of the standard for each pollutant and averaging period. The 24-hour PM₁₀ concentration is the maximum over the 3-year period of the second-highest 24-hour average concentration. The 24-hour PM_{2.5} concentration is the average over the 3-year period of the 98th percentile of the 24-hour average concentration. The annual PM_{2.5} concentration is the average over the 3-year period of the annual average concentration.

The background concentration for NO₂ is only monitored in a few locations in southern Utah. The nearest site is in Hurricane, UT and its peak values are only slightly higher than more rural locations where monitoring is done in northern Utah. This site is used as a conservative estimate of the background NO₂ concentration.

Finally, no SO₂ or CO monitoring is performed in southern Utah. Discussions with Utah DEQ recommended the following values as representative background concentration: 1 part per million (11,164 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) for 1-hour and 8-hour CO and 25 $\mu\text{g}/\text{m}^3$ for 1-hour and 3-hour SO₂.

Table 10. Background Concentrations and NAAQS

Pollutant	Averaging Period	NAAQS ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Background Monitor
PM ₁₀	24-hour ⁽¹⁾	150	18.2	Bryce Canyon National Park (2014–2016)
PM _{2.5}	24-hour ⁽²⁾	35	13.4	Bryce Canyon National Park (2014–2016)
	Annual ⁽³⁾	12	2.2	Bryce Canyon National Park (2014–2016)
NO ₂	1-hour ⁽⁴⁾	188	45.9	Hurricane, Utah
	Annual ⁽⁵⁾	100	4.4	Hurricane, Utah
SO ₂	1-hour ⁽⁶⁾	196	66.5	Utah DEQ estimated
	3-hour ⁽⁷⁾	1,310	66.5	Utah DEQ estimated
O ₃	8-hour ⁽⁸⁾	137	135.7	Escalante, Utah (2015/2017)
CO	1-hour ⁽⁹⁾	40,000	1,164	Utah DEQ estimated
	8-hour ⁽¹⁰⁾	10,000	1,164	Utah DEQ estimated

¹ Maximum of the second highest 24-hour average PM₁₀ concentration, for the most recent 3 years (2014–2016)

² Average of the 98th percentile of the 24-hour average PM_{2.5} concentration, for the most recent 3 years (2014–2016)

³ Average of the annual average PM_{2.5} concentration, for the most recent 3 years (2014–2016, however Q4 for 2016 only 47 percent complete)

⁴ Average of the 98th percentile of the 1-hour daily maximum NO₂ concentration, for the most recent 3 years (2015–2017)

⁵ Maximum annual mean concentration NO₂ concentration, for the most recent 3 years. (Here 2015–2017)

⁶ Average of the 99th percentile of the 1-hour daily maximum concentration SO₂ concentration, for most recent 3 years

⁷ 1-hour value used

⁸ Average of the annual fourth-highest daily maximum 8-hour average ozone concentration, for the most recent 3 years (2015 and 2017 as insufficient data for 2016)

⁹ Maximum 1-hour CO concentration during the most recent 3 years (8-hour non-overlapping)

¹⁰ Maximum 8-hour (non-overlapping) CO concentration for the most recent 3 years

NAAQS – National Ambient Air Quality Standard, $\mu\text{g}/\text{m}^3$ – microgram per cubic meter, PM_{10} – particulate matter 10 microns or smaller in size, $\text{PM}_{2.5}$ – particulate matter 2.5 microns or smaller in size, NO_2 – nitrogen dioxide, SO_2 – sulfur dioxide, O_3 – ozone, CO – carbon monoxide

Receptor Placement

As discussed, the objective for this study is to estimate air quality impacts for reasonably foreseeable development on KEPA, on the three GSENM units, nearby Class I areas, nearby population centers, and sensitive Class II areas. Should future development actually be proposed, the NEPA and air permitting processes would require the applicant conduct a detailed air quality analysis in the immediate vicinity using site-specific details and project specific emissions.

After reviewing the meteorological data and the potential reasonable foreseeable development types, three areas were proposed for near-field air quality modeling for this study.

1. The development of a coal mine is most likely to take place at the location of the former Smokey Hollow lease area. This location is at the southern end of the Kaiparowits Unit. This location is more than 50 kilometers from Escalante and wind field air flows appear are substantially different than in the Bryce Canyon or Escalante area. Therefore, a separate AERMOD simulation was performed using Page, AZ meteorological data and with a receptor grid focused on Class I and Class II areas as well as the nearby community of Big Water and along roadways in the vicinity of the reasonably foreseeable mine location.
2. The development of the oil and gas wells has the highest potential for recoverable oil in locations from the Permo Triassic Unconformity Play as reported in the *Mineral Potential Report* (BLM 2018a). This covers a broad number of areas surrounding the three separate monument units. The nearest Class I area to the potential oil and gas development play is close to Bryce Canyon National Park. Therefore, AERMOD using Bryce Canyon meteorological data was used to model an oil and gas development close to Bryce Canyon National Park and also look at the potential impacts for the small communities of Tropic, Cannonville, and Henrieville. Receptors were placed along roadways near the reasonably foreseeable project where the public may have access. We will also include an extensive receptor array within the Bryce Canyon National Park.² This area is not a likely location for oil and gas development, as there are no existing producing wells in the area of receptors near Bryce Canyon National Park and all previously producing wells in the area have been plugged and abandoned (BLM 2018a).
3. The area with the second-most potential for impact and the most potential for oil and gas development is close to Escalante. In contrast to the Bryce Canyon National Park area, this area is near existing producing wells in the Upper Valley oil field and may be a more likely location for development. Here we modeled the development of an oil and gas field close to Escalante with receptors in Escalante and along roadways near the reasonably foreseeable Project where the public may have access. Receptors were also included for nearby sensitive Class II areas (Box Hollow), as well as for the Class I areas of Bryce Canyon National Park and Capitol Reef National Park.

² The National Park Service Class I receptor file for Bryce Canyon is available on the National Park Service website at: <https://irma.nps.gov/DataStore/Reference/Profile/2249830>.

Oil and Gas Development near Escalante

A gridded set of receptors was placed around the oil and gas field every 200 meters, and along existing roads in the vicinity of the oil and gas field. Discrete receptors were also placed in nearby Escalante. Receptors within 400 meters of the well were excluded, unless along a roadway, based on the assumption that the public would not have access to these areas during construction and drilling operations. The most distant receptor modeled, as measured from the center of the oil and gas field, was 35 kilometers. Figure 4 shows the location for all of the receptors, while Figure 5 shows the location for the receptors close to the oil and gas field and Escalante.

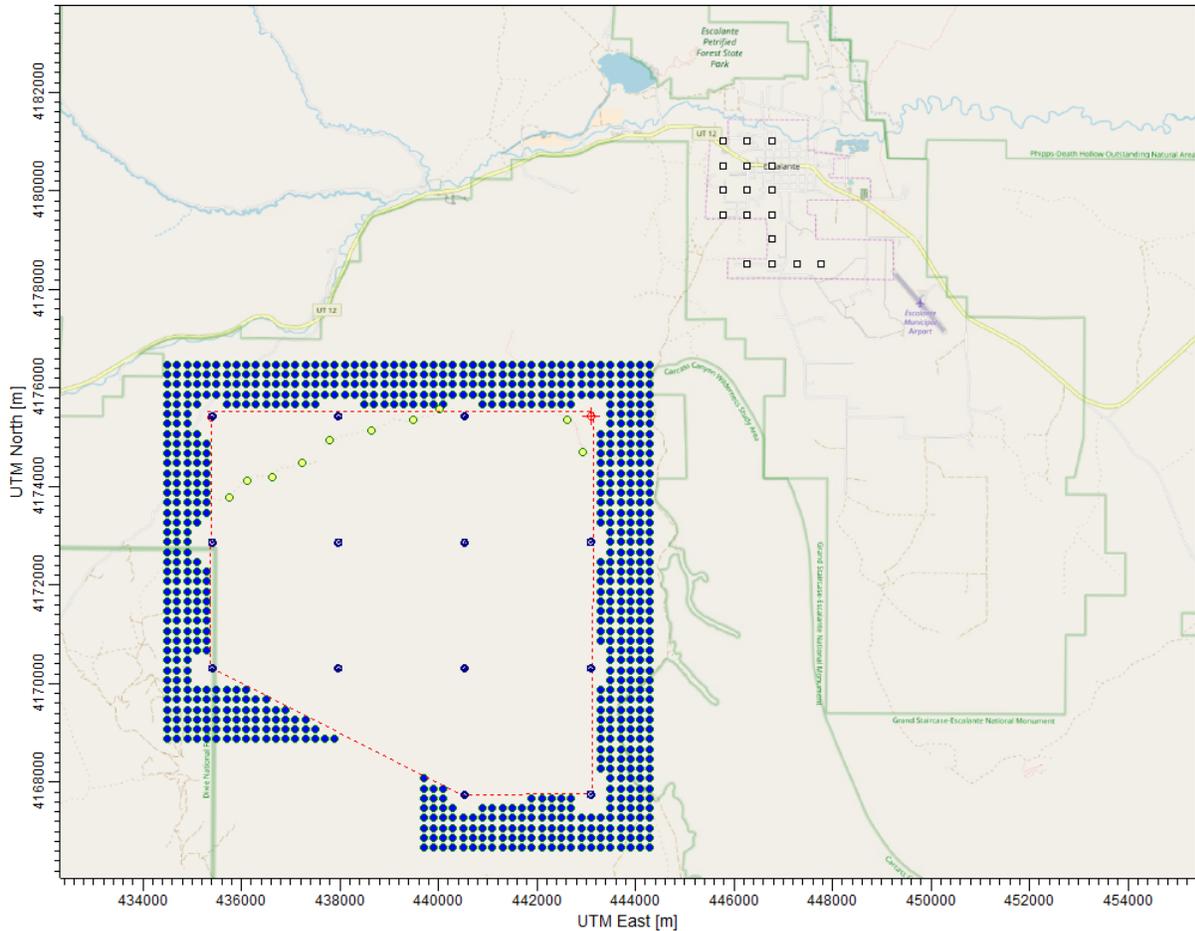


Figure 4. All Receptors Near Escalante

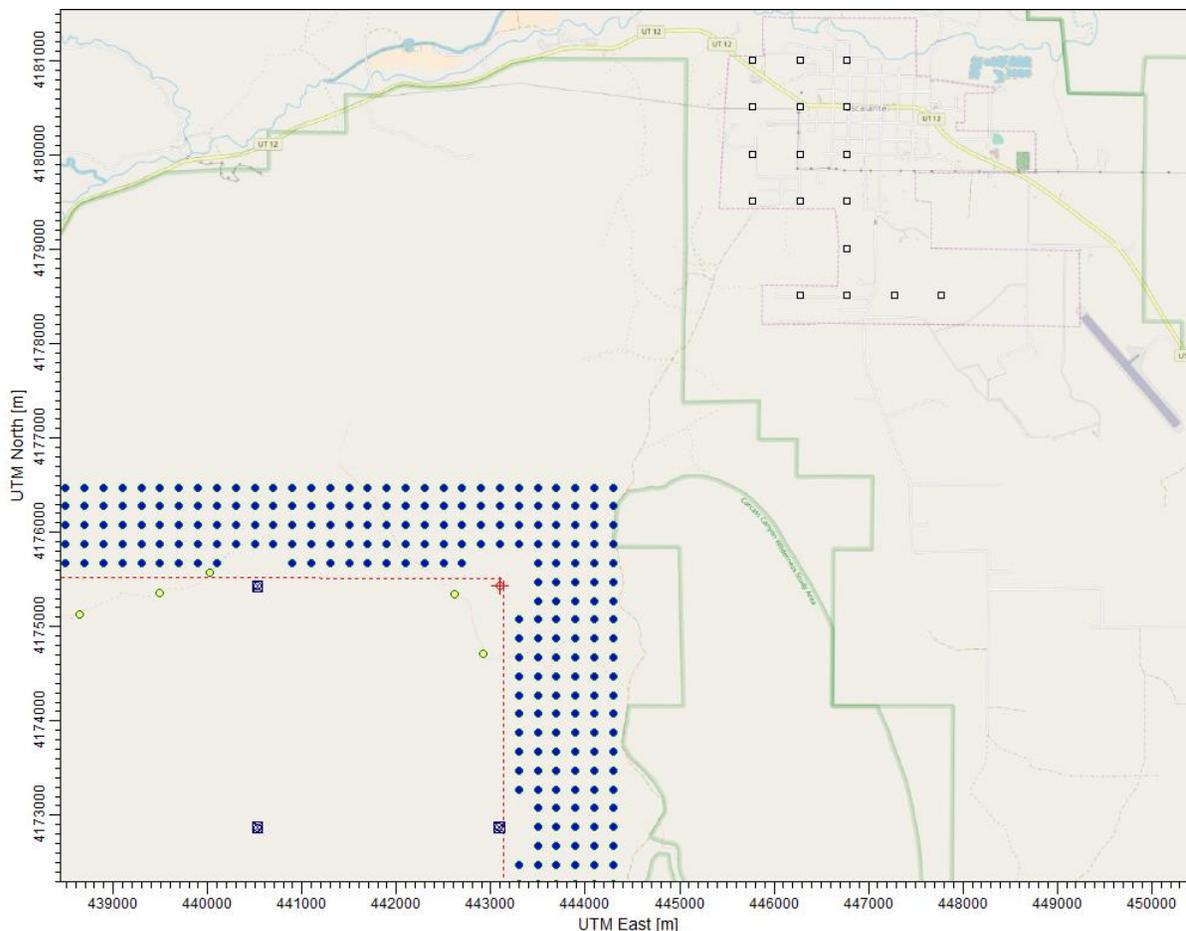


Figure 5. Receptors Closest to Escalante

Coal Mine Development Near Big Water

A gridded set of receptors was placed around the perimeter of the coal mine above-ground area every 100 meters, and along the existing roads both within the facility and along the entire length of the road back through Glen Canyon National Recreation Area (NRA) as well as along the boundary of portions of the Kaiparowits Unit of GSENM. Receptors along the roadway were placed 10 meters from the edge of the roadway and along both sides of the roadway. Receptors were placed along the roadway through Big Water to model impacts from increased truck traffic. Receptors were also placed at the closest distance to the Grand Canyon and Bryce Canyon National Park to evaluate potential Class I impacts. Figure 6 shows the location for all of the receptors, while Figure 7 shows the location for the receptors close to the underground coal mine.

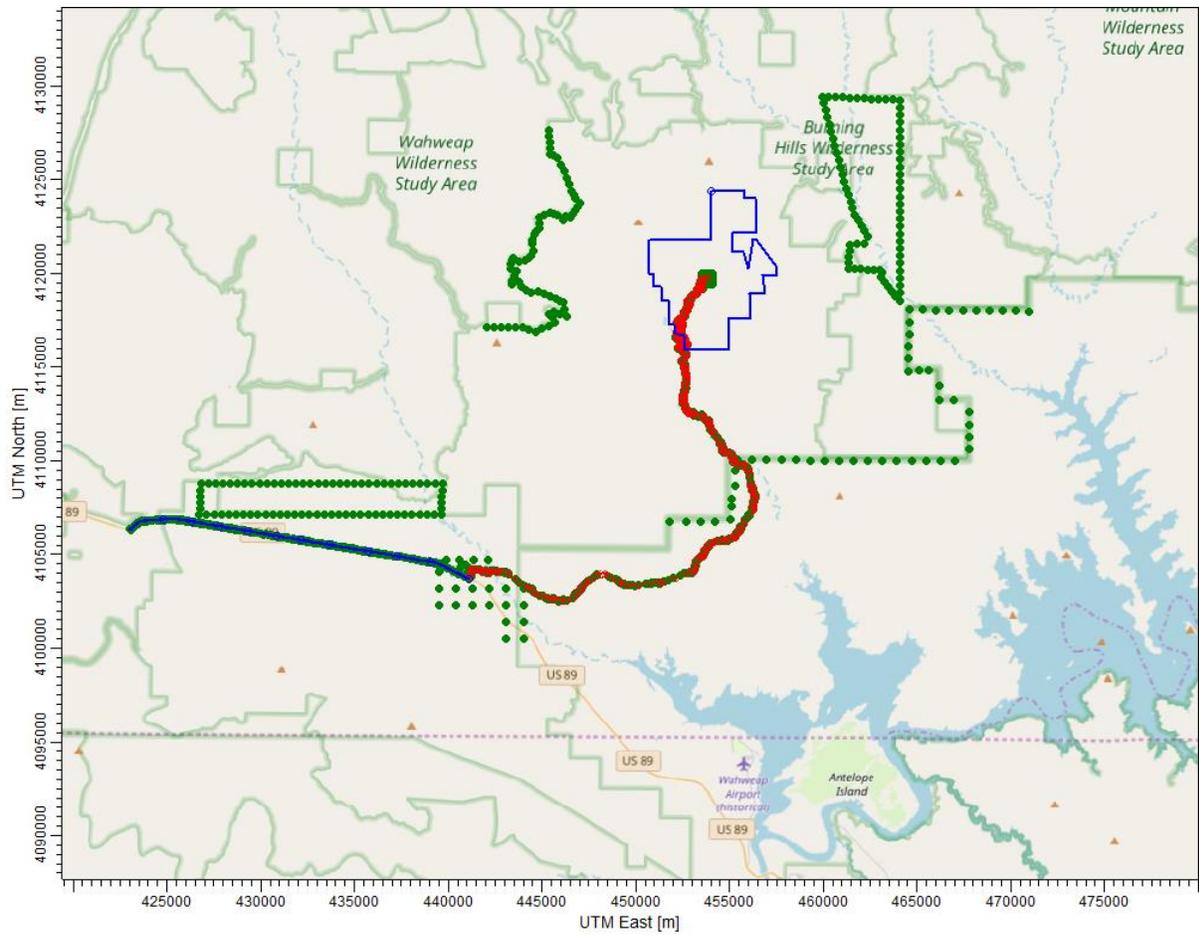


Figure 6. All Receptors Near Coal Mine Near Big Water, UT

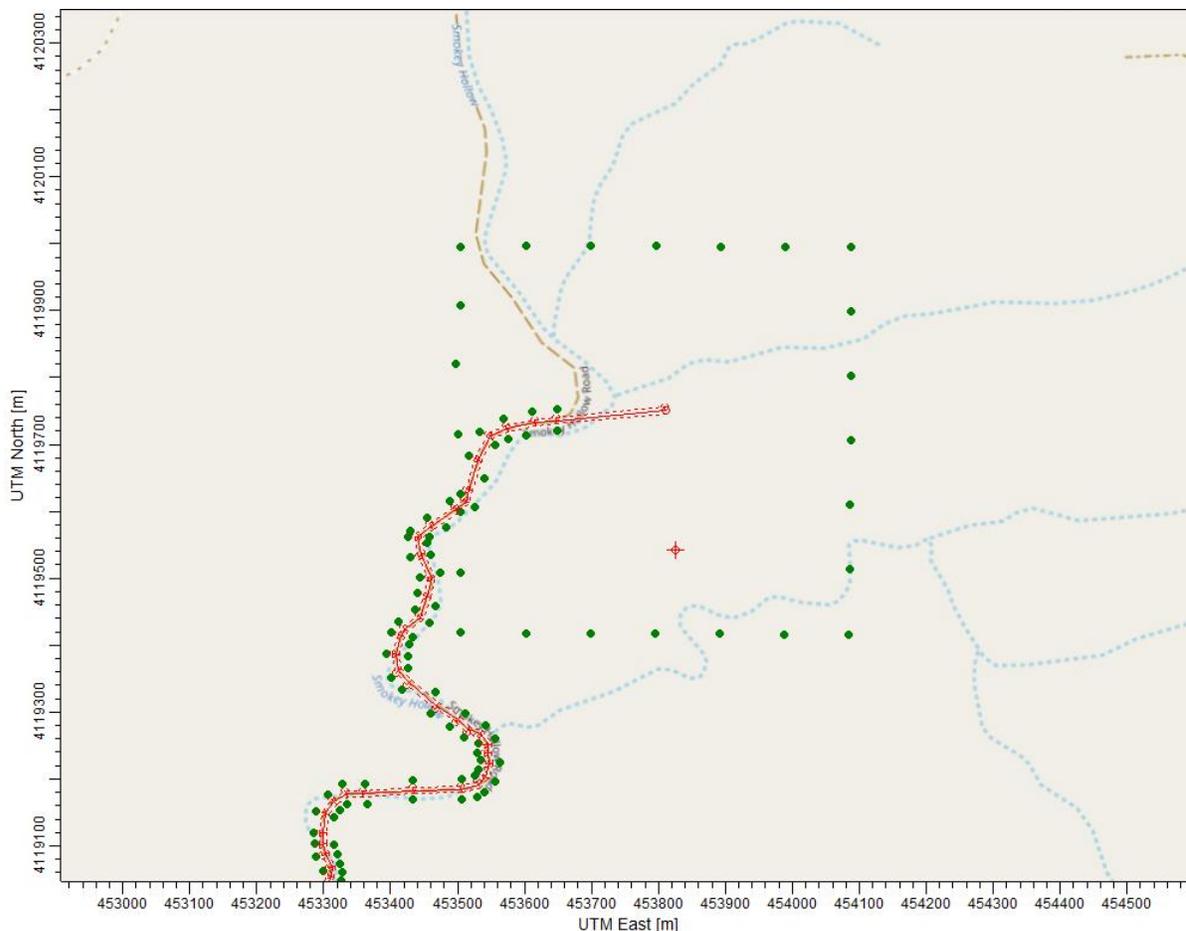


Figure 7. Receptors Closest to Coal Mine Near Big Water, UT

Oil & Gas Development Near Bryce Canyon National Park

A gridded set of receptors was placed around the oil and gas field every 200 meters, and along existing roads in the vicinity of the oil and gas field. Discrete receptors were also placed at the nearby communities of Cannonville, Henrieville, and Tropic, along the boundary of Kodachrome State Park, and along the closest boundary of Bryce Canyon National Park as well as within the entire National Park. Receptors within 400 meters of the well were excluded unless along a roadway based on the assumption that the public would not have access to these areas. The most distant receptor modeled, as measured from the center of the oil and gas field, was 21 kilometers. Figure 8 shows the location for all of the receptors, while Figure 9 shows the location for the receptors close to the oil and gas field, Bryce, and Cannonville.

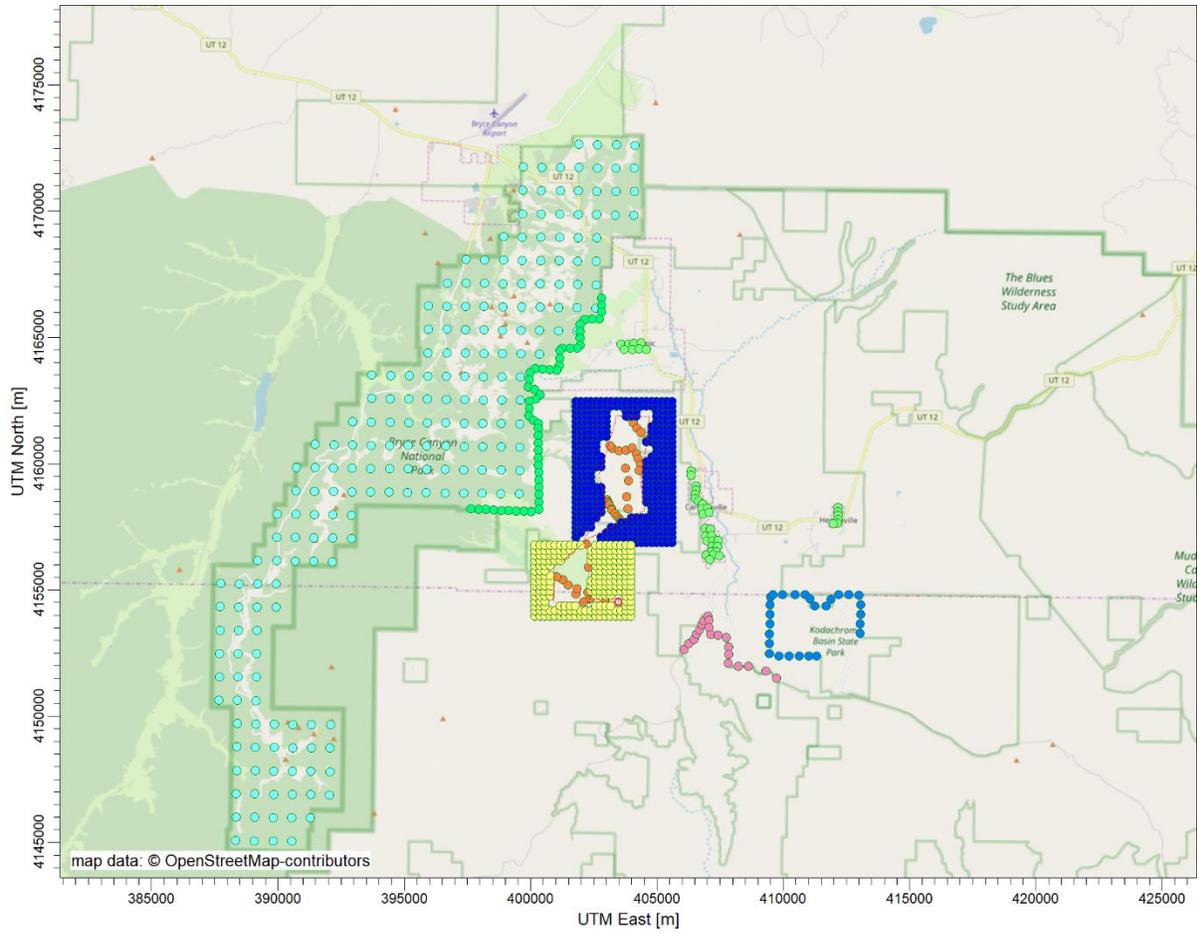


Figure 8. All Receptors Near Bryce Canyon National Park

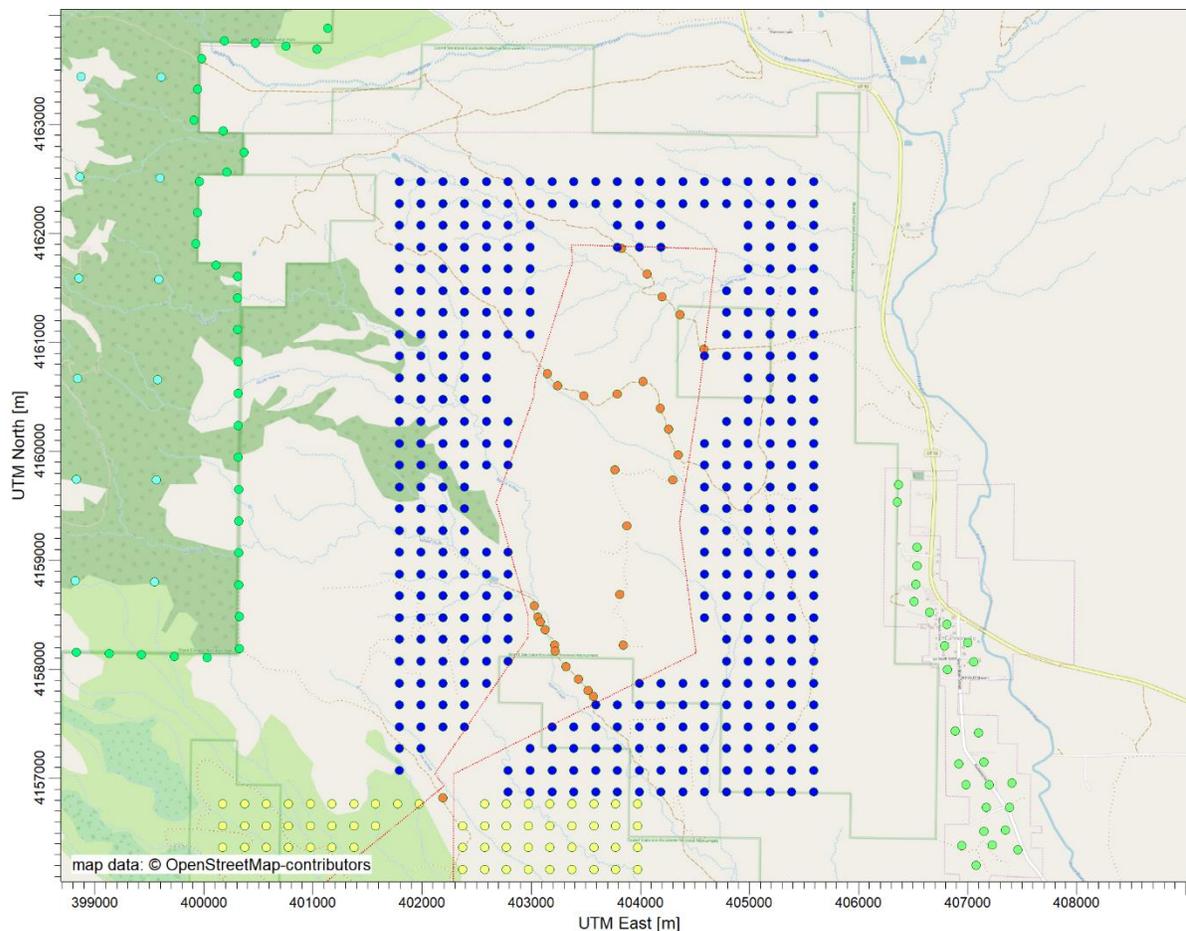


Figure 9. Receptors Closest to Bryce Canyon National Park

Oil and Gas Emissions

Long-term (annual) and short-term maximum hourly emissions as used in the air quality model were developed for well development and production scenarios. Emissions from well development activities are shown in Table 11 and Table 12.

For a well that is in the process of being drilled, there are several emissions sources operating on the pad and access road. CAP emissions result from the use of diesel internal combustion engines in mud pumps, draw works, the front-end loader, generator, and in cement pumping/casing running. There are traffic emissions from light- and heavy-duty vehicles. Vehicle traffic emissions include engine exhaust emissions as well as fugitive dust emissions from travel on unpaved and paved roads. Exhaust emissions from vehicle idling at the well pad are also modeled. Two heavy-duty vehicles (water truck and condensate truck) and one light-duty vehicle were assumed to be at the well pad for the short-term modeling scenario. Emissions from well development activities for a single well are shown in summary form in Table 11 and Table 12. Load factors for all engines were based on the Greater Chapita Wells EIS (Alpine Geophysics and Environ 2016, Appendix J, pp 26–49). Drilling emissions sources were assumed to operate 24 hours per day.

NO_x emissions were modeled using the Tier 3 ozone limiting method given the relatively short stacks and high emission rates from the Tier 2 engines. In-stack ratios were available for the CAT 3512 engine (2,500 hp) in the EPA in-stack ratio database (https://www3.epa.gov/scram001/no2_isr_database.htm) for comparably sized engines (1,400 hp). These engines are used for both hydraulic fracturing and drilling. The in-stack ratio database shows that the in-stack ratio for these three engines (Tok Power Generation Station in Alaska Cat 3512 model C engines) are 3.6, 2.2, and 2.7 percent based on source testing, or about an average of 3 percent. Default in-stack ratios of 50 percent were conservatively used for all other sources.

During the production phase, emissions result from dehydrators, separators, flaring of losses from dehydrators and condensate tanks, vehicle traffic, pneumatic devices and pumps, tank load-out, well workovers, well blowdowns, associated gas flaring, associated gas venting, produced condensate combustion, and fugitive emissions. CAP emissions for wells in production are shown in Table 12, HAP emissions are shown in Table 13a, and GHG emissions are shown in Tables 13b and 13c. Total emissions in each of these tables represent the nominal scenario: 13 wells in production and 1 well in development.

Emissions from drilling were modeled as point sources with emissions released vertically through the stack. Emissions from sources found at the well pad were released as volume sources with the source centered on the well pad. Emissions associated with trucks and equipment were modeled as an area source over the oil and gas field. Tables 14a through 14c show the stack parameters of oil and gas sources for point, volume, and area sources.

For the three drilling rig engines and the eight hydraulic fracturing engines, identical stacks with the same stack parameters were used in the modeling. We assumed that the stacks were all within 100 meters, which allowed us to treat the emissions as though all were coming from a single stack. This is consistent with EPA's guidance (EPA 1992).

Table 11. Project Wells during Development: CAP Emissions

Emission Source Category	Annual Emissions (Tons per year)						Daily Peak Max Emissions (grams/second)					
	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs
Construction Equipment	0.04	0.05	<0.01	<0.01	<0.01	0.05	0.55	0.64	0.03	0.03	<0.01	0.04
Construction On-road Vehicles	0.14	0.03	0.03	0.23	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Construction Dust Wind Erosion	0	0	0	0	0	0	0	0	0	0	0	0
Construction Fugitive Dust	0	0	0.01	0.02	0	0	0	0	<0.01	<0.01	0	0
Completion Equipment	1.31	1.94	0.06	0.07	<0.01	0.12	22.80	21.04	0.71	0.73	0.06	1.60
Completion On-road Vehicles	0.35	0.25	0.17	1.00	<0.01	0.03	0.01	0.01	0.01	0.03	<0.01	<0.01
Completion Venting	0	0	0	0	0	1.02	0	0	0	0	0	0.03
Drilling Equipment	2.86	4.98	0.16	0.16	0.01	0.28	2.95	5.14	0.16	0.17	0.01	0.29
Drilling On-road Vehicles	0.32	0.17	0.13	0.93	<0.01	0.03	0.01	0.01	<0.01	0.03	<0.01	<0.01
Total	5.03	7.41	0.57	2.41	0.02	1.49	26.32	26.84	0.91	1.00	0.07	1.96

CO – carbon monoxide, NO_x – nitrogen oxides, PM_{2.5} – particulate matter 2.5 microns or smaller in size, PM₁₀ – particulate matter 10 microns or smaller in size, SO₂ – sulfur dioxide, VOC – volatile organic compound

Table 12. Project Wells during Production - CAP Emissions Summary

Emission Source Category	Annual Emissions (Tons per year)						Daily Peak Max Emissions (grams/second)					
	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs
Heavy Duty Traffic	2.86	0.49	0.63	3.23	0.01	0.11	0.08	0.01	0.02	0.09	<0.01	<0.01
Light Duty Traffic	0.82	0.07	0.03	0.20	<0.01	0.04	0.02	<0.01	<0.01	0.01	<0.01	<0.01
Condensate Tank Flashing/Working/Breathing	14.88	2.74	-	-	-	3.52	0.43	0.08	-	-	-	0.10
Heaters	0.94	1.12	0.09	0.09	0.05	0.06	0.03	0.03	<0.01	<0.01	<0.01	<0.01
Tank Load-out (vapor losses)	-	-	-	-	-	13.65	-	-	-	-	-	0.39
Pneumatic Devices	-	-	-	-	-	1.87	-	-	-	-	-	0.05
Workover Equipment (diesel internal combustion engine)	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Blowdown	-	-	-	-	-	29.05	-	-	-	-	-	0.84
Fugitive Devices	-	-	-	-	-	6.40	-	-	-	-	-	0.18
Dehydrators	32.05	5.89	-	-	-	7.58	0.92	0.17	-	-	-	0.22
Gas Flaring	0.99	3.94	0.20	0.20	-	0.28	0.03	0.11	0.01	0.01	-	0.01
Gas Venting	10.21	4.08	0.22	0.22	-	-	0.29	0.12	0.01	0.01	-	-
Total	62.75	18.36	1.16	3.93	0.06	62.56	1.81	0.53	0.03	0.11	<0.01	1.80

CO – carbon monoxide, NO_x – nitrogen oxides, PM_{2.5} – particulate matter 2.5 microns or smaller in size, PM₁₀ – particulate matter 10 microns or smaller in size, SO₂ – sulfur dioxide, VOC – volatile organic compound

Table 13a. Project Wells during Production: HAP Emissions

Emissions Source Category	Annual VOC Emissions (tons/year)	Annual Emissions (Tons per year)					Daily Peak Max Emissions (grams/second)				
		Benzene	Ethyl-benzene	N-hexane	Toluene	Xylenes	Benzene	Ethyl-benzene	N-hexane	Toluene	Xylenes
Heavy Duty Traffic	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Light Duty Traffic	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Condensate Tank Flashing/Working/Breathing	3.52	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heaters	0.06	<0.01	-	-	<0.01	-	<0.01	-	-	<0.01	-
Tank Load-out (vapor losses)	13.65	0.01	<0.01	0.09	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pneumatic Devices	1.87	-	-	0.06	-	-	-	-	<0.01	-	-
Workover Equipment (diesel internal combustion engine)	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Blowdown	29.05	-	-	0.88	-	-	-	-	0.03	-	-
Fugitive Devices	6.40	-	-	0.19	-	-	-	-	0.01	-	-
Dehydrators (proposed action)	7.58	-	-	-	-	-	-	-	-	-	-
Gas Flaring	0.28	-	-	-	-	-	-	-	-	-	-
Gas Venting	-	-	-	-	-	-	-	-	-	-	-
Total	62.56	0.02	-	1.24	0.02	0.01	<0.01	<0.01	0.04	<0.01	<0.01

VOC – volatile organic compound

Table 13b. Project Wells during Development: GHG Emissions

Emissions Source Category	Annual Emissions (Tons per year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Construction Equipment	9	<1	<1	9
Construction On-road Vehicles	7	<1	<1	8
Completion Equipment	235	<1	<1	237
Completion On-road Vehicles	51	<1	<1	51
Completion Venting	<1	4	<1	111
Drilling Equipment	584	<1	<1	588
Drilling On-road Vehicles	35	<1	<1	36
Total	922	4	<1	1,039

GHG – greenhouse gas, CO₂ – carbon dioxide, CH₄ – methane, N₂O – nitrous oxide, CO₂e – carbon dioxide equivalent

Table 13c. Project Wells during Production: GHG Emissions

Emissions Source Category	Annual Emissions (Tons per year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Heavy Duty Traffic	1,692	<1	-	1,696
Light Duty Traffic	38	<1	<1	38
Condensate Tank Flashing/Working/Breathing	4,715	1	<1	4,762
Heaters	1,348	<1	<1	1,355
Tank Load-out (vapor losses)	<1	<1	-	10
Pneumatic Devices	7	2	-	60
Workover Equipment (diesel internal combustion engine)	1	<1	<1	1
Blowdown	4	113	-	3,170
Fugitive Devices	1	25	-	698
Dehydrators (proposed action)	9,522	3	<1	9,675
Combustion of Fuel Oil	95,734	2	<1	95,893
Gas Flaring	4,888	<1	<1	4,889
Gas Venting	6,505	<1	<1	6,508
Total	124,454	147	1	128,756

GHG – greenhouse gas, CO₂ – carbon dioxide, CH₄ – methane, N₂O – nitrous oxide, CO₂e – carbon dioxide equivalent

Table 14a. Well Development and Production Source Configuration for Point Source

Type	Source Group	Well Type	Stack Parameters			
			Release Height (m)	Temp (K)	Velocity (m/s)	Diameter (m)
Point	Well8_stack	Development	3.86	659.3	55.1	0.20

m – meter, K - Kelvin, m/s – meter per second

Table 14b. Well Development and Production Source Configuration for Volume Sources

Type	Source Group	Well Type	Stack Parameters			
			Release Height (m)	Length of side (m)	Initial lateral dim (m)	Initial vertical dim (m)
Volume	Well5_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well3_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well4_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well1_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well2_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well6_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well7_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well9_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well11_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well12_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well13_Vol	Production	2.5	110.2	25.63	2.33
Volume	Well14_Vol	Production	2.5	110.2	25.63	2.33

m - meter

Table 14c. Well Development and Production Source Configuration for Area and Area Poly Sources

Type	Source Group	Well Type	Stack Parameters			
			Release Height (m)	Length of x-side (m)/number of vertices	Length of y-side (m)	Initial vertical dim (m)
Area	Well8_Area	Development	2.5	110.2	110.2	2.33
Areapoly	Oil Field	Development	3.0	6	--	2.8

m - meter

Coal Mine Emissions

Long-term (annual) and short-term maximum hourly emissions were developed for the operation of the coal mine. Emissions from the operation of the coal mine are shown in Table 15a. Table 15b shows the annual GHG emissions associated with the operation of the mine and the combustion of the coal.

Table 15a. Underground Coal Mine Operational CAP Emissions

Emission Source Category	Annual Emissions (Tons per year)						Daily Peak Max Emissions (grams/second)					
	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs	CO	NO _x	PM _{2.5}	PM ₁₀	SO ₂	VOCs
Mine Venting	-	-	1.79	17.86	-	-	-	-	0.05	0.51	-	-
Above-Ground Equipment	21.88	22.24	0.94	1.03	0.03	2.14	3.59	2.33	0.11	0.11	0.01	0.28
Underground Equipment	-	-	-	-	-	-	-	-	-	-	-	-
Above-Ground Material Handling	-	-	0.69	7.27	-	-	-	-	0.06	0.65	-	-
Fugitive Dust	-	-	0.62	4.15	-	-	-	-	0.02	0.12	-	-
On-road Vehicle: Fugitive Dust & Exhaust including Worker Commute	127.57	387.38	35.53	95.99	0.73	21.65	3.67	11.14	1.02	2.76	0.02	0.62
Total	149.45	409.62	39.57	126.31	0.75	23.79						

CAP – criteria air pollutant, CO – carbon monoxide, NO_x – nitrogen oxides, PM_{2.5} – particulate matter 2.5 microns or smaller in size, PM₁₀ – particulate matter 10 microns or smaller in size, SO₂ – sulfur dioxide, VOC – volatile organic compound

Table 15b. Underground Coal Mine Operational GHG Emissions

Emissions Source Category	Annual Emissions (Tons per year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Mine Venting	13,823	49,881	-	1,061,322
Above Ground Equipment	2,528	<1	<1	2,551
Under Ground Equipment	-	-	-	-
Above Ground Material Handling	-	-	-	-
Fugitive Dust	-	-	-	-
On-road Vehicle: Fugitive Dust & Exhaust including Worker Commute	-	-	-	85,543-
Combustion of Coal	24,547,184	836	375	24,679,777
Total	24,563,535	50,717	375	25,829,193

GHG – greenhouse gas, CO₂ – carbon dioxide, CH₄ – methane, N₂O – nitrous oxide, CO₂e – carbon dioxide equivalent

Most of the onsite emissions, other than particulate matter, result from the use of diesel internal combustion engines by three bulldozers and the backup diesel generator. Particulate matter emissions on site are associated with the coal handling/transfer and the coal storage pile. However, overall most of the emissions are associated with the transport of coal from the mine to the rail loading facility. These vehicle traffic emissions include engine exhaust emissions as well as fugitive dust emissions from travel on paved roads. On-road mobile sources emissions were based on MOVES2014 for the calendar year 2022. The EPA’s NONROAD engines emissions factors used the Underground Mine Modeling Tool Version 1.0 developed for the BLM by AECOM. The three bulldozers were conservatively assume to be Tier 1, Tier 2, and Tier 3 compliant.

Emissions from the two emergency backup generators (2,520 and 3,640 hp, assumed Tier 4 compliant) were modeled as a single point sources with emissions released vertically through the stack. Emissions from the bulldozers were modeled as an area source. Fugitive dust emissions were modeled as an areapoly sources over an area of 83 acres (above-ground facility boundary size) associated with the soil disturbance activity, while the coal pile itself was modeled as a volume source. All of the truck emissions along roadways were modeled as line area sources or areapoly sources. Table 16a through 16c show the stack parameters and release parameters for coal mine modeling.

Table 16a. Underground Coal Mine Operation Source Configuration for Point Source

Type	Source Group	Stack Parameters			
		Release Height (m)	Temp (K)	Velocity (m/s)	Diameter (m)
Point	generator	4.6	768.6	28.8	0.50

m – meter, K – Kelvin, m/s – meter per second

Table 16b. Underground Coal Mine Operation Source Configuration for Line Area Sources

Type	Source Group	Stack Parameters				
		Release Height (m)	Width of side (m)	Number of area sources	Total length (km)	Initial vertical dimension (m)
Line area	Haul Trucks: Fugitive Dust	1.3	10.0	503	36.967	2.6
Line area	Haul Trucks: Exhaust	3.4	10.0	503	36.967	6.8
Areapoly	Haul Trucks: Fugitive Dust	1.3	--	27	139.391	2.6
Areapoly	Haul Trucks: Exhaust	3.4	--	27	139.391	6.8
Line area	Work Commute: Fugitive Dust	0.85	10.00	503	36.967	1.7
Line area	Work Commute: Exhaust	1.3	10.0	503	36.967	2.6

Note: Line area sources are for County Road, Smokey Hollow Road, and local roadways from Big Water to US Highway 89; Area polygon sources are for US Highway 89 (from Big Water to about 18 km west of Big Water); Interstate 15 (Coral Canyon to Cedar City), UT 9 (Coral Canyon to Hurricane), and UT 59.
m – meter, km – kilometer

Table 16c. Underground Coal Mine Configuration for Area and Areapoly Sources

Type	Source Group	Stack Parameters			
		Release Height (m)	Length of x-side (m)/number of vertices	Length of y-side (m)	Initial vertical dim (m)
Area	Dozers	6.0	201.2	201.2	2.8
Areapoly	Exh_US89_1... Exh_US89_11	3.4	25	--	6.8

m – meter

Air Quality Modeling Impact Assessment Results

A near-field criteria pollutant assessment was performed to estimate maximum potential impacts of criteria pollutants (PM₁₀, PM_{2.5}, NO_x, SO₂, and CO) from emission sources that could potentially operate in the Planning Area. These were then compared against the NAAQS and the Class II Significant Impact Level (SIL).³ Near-field HAP assessment was performed to estimate the potential impacts for both short-term (1-hour and 24-hour) and long-term exposure (annual) for both cancer and non-cancer risk.

Three emission scenarios were considered: development of an underground mine near Big Water, UT; development of a 14-well oil and gas field near Bryce Canyon National Park; and the development of a 14-well oil and gas field near Escalante. Maximum emissions from the field development and production were evaluated to determine which emissions activities produce

³ Class II SILs are provided as informational reference—the project would not be subject to a PSD permitting program where SILs are used.

the maximum pollutant impacts. Modeling scenarios were developed and evaluated for each case.

Oil and Gas: Two locations for potential oil and gas well development and operations were modeled for this impact assessment. An oil and gas field consisting of 14 wells was considered in the *Mineral Potential Report* (BLM 2018a) as a reasonably foreseeable small oil field that could be developed over the next 15 years. The largest source of NO_x and CO emissions occurs during drilling in the well development phase, but the highest-intensity NO_x emissions occurs from the engines used during hydraulic fracturing during well completion. During well production, the emission intensity is greatly reduced. Both locations examined the short-term maximum impacts with the highest emissions intensity during well development along with all other 13 wells in full production. Because of the very high NO_x emissions during hydraulic fracturing (a relatively short-duration activity), we report the maximum 1-hour NO₂ concentration during hydraulic fracturing and during drilling. It was assumed that only one well per year is developed. The long-term modeling included the emissions during development of the same year along with the production emissions from 13 activity wells in production.

Underground Coal Mine: The most likely location for the development of an underground coal mine was the proposed location for the Smoky Hollow mine within the southern part of the Kaiparowits coalfield. The development of this mine was intensely examined just prior to designation of GSENM. An underground coal mine operating at the maximum potential production rate of 5.5 million tons of coal was modeled in this study.

In accordance with averaging periods for existing ambient standards, NO₂ concentrations were calculated for 1-hour and annual averaging periods, SO₂ concentrations for 1-hour and 3-hour averaging periods, CO concentrations for 1-hour and 8-hour averaging periods, PM₁₀ concentrations for a 24-hour averaging period, and PM_{2.5} concentrations for 24-hour and annual averaging periods.

Criteria Pollutant Impact Assessment

Results are presented below in Table 17 and Table 18 showing the maximum affected receptor concentration in comparison to the NAAQS and Class II SILs⁴ for the oil and gas field development near Bryce Canyon National Park and the oil and gas field development near Escalante. The modeled values are determined based on the probabilistic form of the NAAQS as described in Table 10. For all species and averaging times, with the exception of 1-hour NO₂, the modeled concentration plus background are well below the NAAQS. Due to the short duration of activities, modeled exceedances are not likely to result in NAAQS violations of the 3-year average of the 98th percentile 1-hour NO_x standard. The worst-case NO_x emissions occur during the relatively short period of hydraulic fracturing, but potentially high 1-hour NO₂ concentrations are possible as shown in Table 17 and Table 18. These results are illustrated in spatial gridded values of the 98th percentile of the 1-hour daily maximum NO₂ concentrations averaged over 5 years near Bryce Canyon National Park (Figure 10) and near Escalante (Figure 11). NO_x emissions are lower during drilling and the combination of maximum modeled 1-hour concentration is 147.4 µg/m³ (Bryce Canyon) and 147.2 µg/m³ (Escalante); as such, the combination with background shows that the highest 1-hour NO₂ background is just slightly greater than the 1-hour NO₂ standard. This occurs within 1 kilometer of the well site. During

⁴ Class II SILs are provided as informational reference—the project would not be subject to a PSD permitting program where SILs are used.

production, the NO_x emissions are much lower and the modeled 1-hour NO_2 concentration is 98 and 87 $\mu\text{g}/\text{m}^3$, respectively, which, when paired with highest 1-hour background concentration, is well below the NO_2 standard. Class II SILs are exceeded for both 1-hour NO_2 and 24-hour $\text{PM}_{2.5}$ at both Bryce Canyon National Park and Escalante. In addition, 1- and 8-hour CO and 24-hour Class II SILs are exceeded at Escalante.

Results for the underground coal mine are presented below in Table 19 showing the maximum affected receptor concentration in comparison to the NAAQS and Class II SILs for the coal mine near Big Water. For all species and averaging times, with the exception of 1-hour NO_2 , the modeled concentration plus background are well below the NAAQS. The 1-hour NO_2 modeling includes the operation of the two emergency electrical generators, as they may be periodically tested throughout the year. These generators, if operated during the adverse meteorological conditions and in conjunction with the routine operation of bulldozers and haul truck activity, may lead to exceedances of the 1-hour NO_2 NAAQS. Implementation of best management practices (e.g., larger property area, higher-tiered bulldozer engines) could likely mitigate this potential issue.

These results indicate that emissions from the reasonably foreseeable development activities may result in concentrations that are greater than the NAAQS and UAAQS for 1-hour NO_2 . These high concentrations would primarily result from engines used in hydraulic fracturing for oil and gas scenarios, and from the use of emergency electrical generators in conjunction with the routine operation of the bulldozers and haul truck activity at the coal mine during times of adverse meteorological conditions. The modeled plus background values for all other criteria pollutants and time periods are less than the NAAQS and UAAQS thresholds.

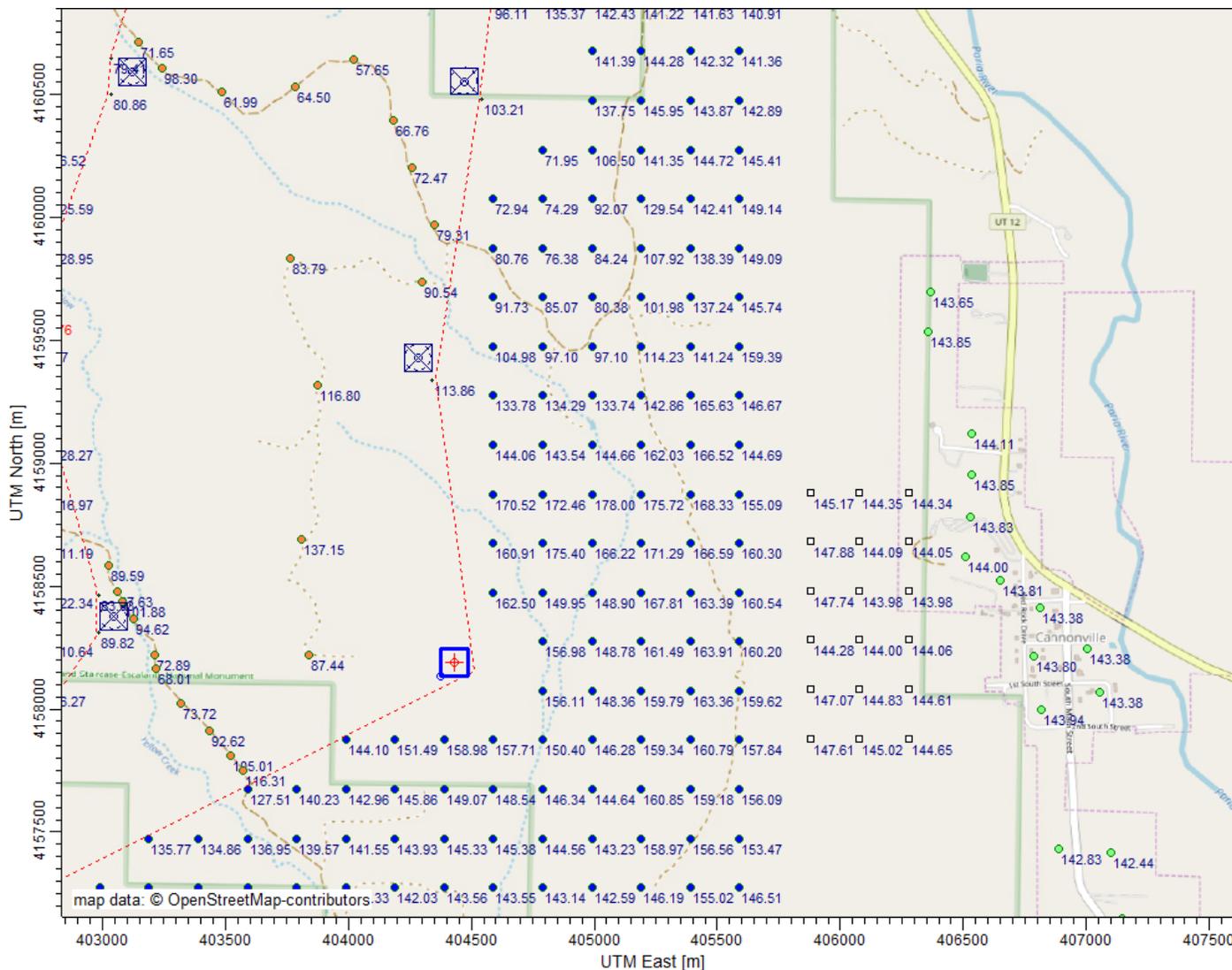


Figure 10. Modeled Concentrations of the 98th Percentile of the 1-hour Daily Maximum NO₂ Concentration Averaged over 5 Years during Well Completion Near Bryce Canyon National Park

Table 17. Near Bryce Canyon National Park Oil and Gas Scenario CAP Impacts and Comparison with the NAAQS and Class II SILs

Pollutant	Averaging Period	NAAQS (µm-3)	Background (µm-3)	Modeled Concentration (µm-3)	Class II SIL (µm-3)	Modeled Concentration + Background (µm-3)	Complies with NAAQS?	Complies with Class II SILs?	% of NAAQS
CO	8-hour	10,000	1,164	568	500	1,732	Yes	No	17%
CO	1-hour	40,000	1,164	660	2,000	1,824	Yes	Yes	5%
PM ₁₀	24-hour	150	18.2	2.2	5	20.4	Yes	Yes	14%
PM _{2.5}	Annual	12	2.2	0.12	0.2	2.3	Yes	Yes	19%
PM _{2.5}	24-hour	35	13.4	1.62	1.2	15.0	Yes	No	43%
NO ₂	Annual	100	4.4	1.39	1	5.8	Yes	No	6%
NO ₂	1-hour	188	45.9	178	7.5 ⁽¹⁾	224	No	No	119%
SO ₂	1-hour	196	66.5	1.14	7.8 ⁽¹⁾	67.6	Yes	Yes	35%
SO ₂	3-hour	1,310	66.5	1.14	25	67.6	Yes	Yes	5%

¹ Interim SIL value

CAP – criteria air pollutant, NAAQS – National Ambient Air Quality Standard, SIL – Significant Impact Level, µm – micrometer, CO – carbon monoxide, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide, SO₂ – sulfur dioxide, N/A – not applicable

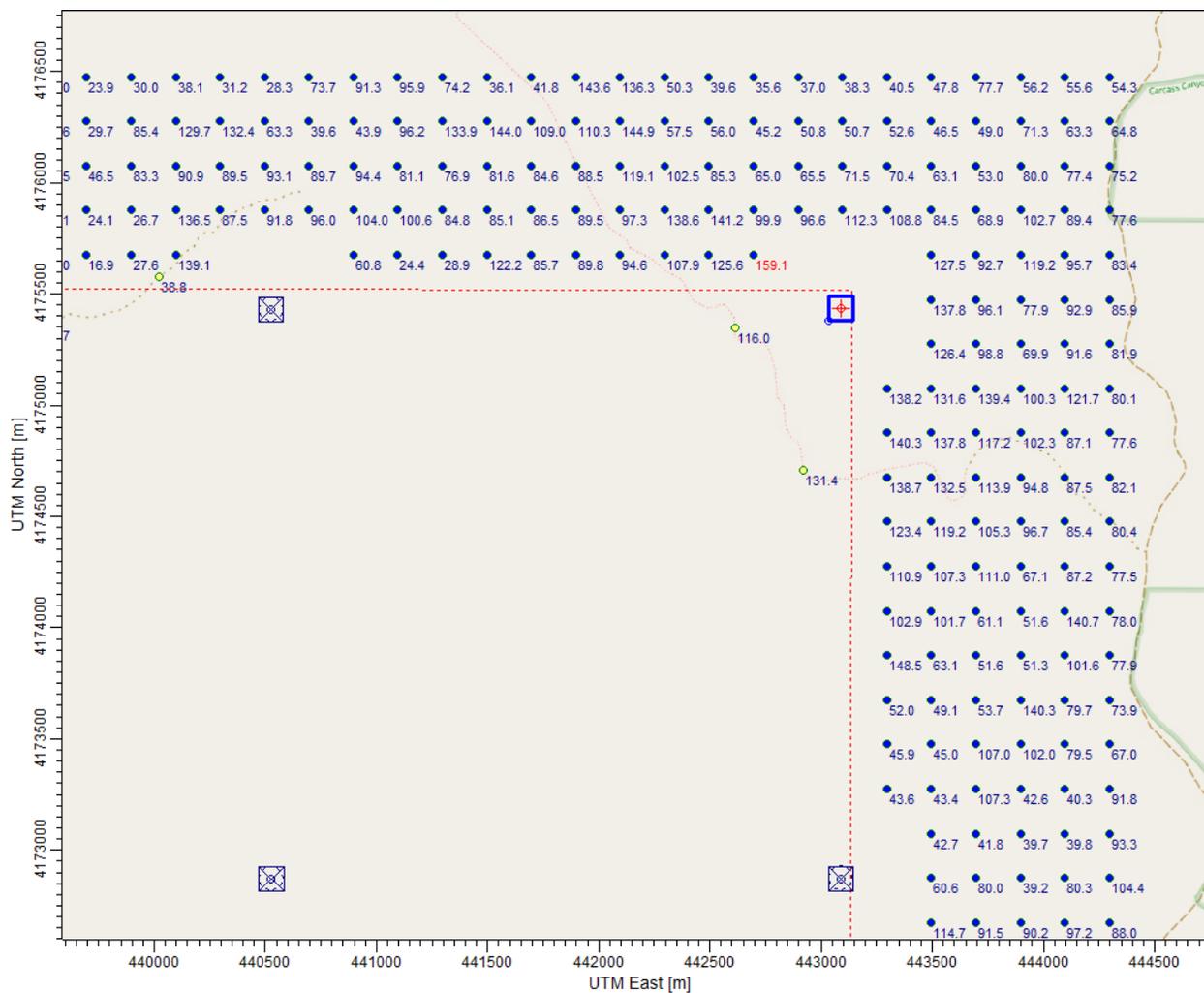


Figure 11. Modeled Concentrations of the 98th Percentile of the 1-hour Daily Maximum NO₂ Concentration Averaged over 5 Years during Well Completion Near Escalante

Table 18. Near Escalante, Utah Oil and Gas Scenario CAP Impacts and Comparison with the NAAQS and Class II SILs

Pollutant	Averaging Period	NAAQS (μm^{-3})	Background (μm^{-3})	Modeled Concentration (μm^{-3})	Class II SIL (μm^{-3})	Modeled Concentration + Background (μm^{-3})	Complies with NAAQS?	Complies with Class II SILs?	% of NAAQS
CO	8-hour	10,000	1,164	2,223	500	3,387	Yes	No	34%
CO	1-hour	40,000	1,164	2,323	2,000	3,487	Yes	No	9%
PM ₁₀	24-hour	150	18.2	6.1	5	24.3	Yes	No	16%
PM _{2.5}	Annuals	12	2.2	0.1	0.2	2.3	Yes	Yes	19%
PM _{2.5}	24-hour	35	13.4	5.2	1.2	18.6	Yes	No	53%
NO ₂	Annual	100	4.4	0.8	1	5.2	Yes	Yes	5%
NO ₂	1-hour	188	45.9	159.1	7.5 ⁽¹⁾	205	No	No	109%
SO ₂	1-hour	196	66.5	7.1	7.8 ⁽¹⁾	73.6	Yes	Yes	38%
SO ₂	3-hour	1,310	66.5	3.1	25	69.6	Yes	Yes	5%

¹ Interim SIL value

CAP – criteria air pollutant, NAAQS – National Ambient Air Quality Standard, SIL – Significant Impact Level, μm – micrometer, CO – carbon monoxide, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide, SO₂ – sulfur dioxide, N/A – not applicable

Table 19. Underground Coal Mine CAP Impacts and Comparison with the NAAQS and Class II SILs

Pollutant	Averaging Period	NAAQS (µm-3)	Background (µm-3)	Modeled Concentration (µm-3)	Class II SIL (µm-3)	Modeled Concentration + Background (µm-3)	Complies with NAAQS?	Complies with Class II SILs?	% of NAAQS
CO	8-hour	10,000	1,164	509	500	1,673	Yes	No	17%
CO	1-hour	40,000	1,164	1630	2,000	2,794	Yes	Yes	7%
PM ₁₀	24-hour	150	18.2	72.1	5	90.3	Yes	No	60%
PM _{2.5}	Annual	12	2.2	1.7	0.2	3.9	Yes	No	33%
PM _{2.5}	24-hour	35	13.4	10.6	1.2	24.0	Yes	No	69%
NO ₂	Annual	100	4.4	9.7	1	14.1	Yes	No	14%
NO ₂	1-hour	188	45.9	206.7	7.5 ⁽¹⁾	252.6	No	No	134%
SO ₂	1-hour	196	66.5	1.6	7.8 ⁽¹⁾	68.1	Yes	Yes	35%
SO ₂	3-hour	1,310	66.5	1.00	25	67.5	Yes	Yes	5%

¹ Interim SIL value

CAP – criteria air pollutant, NAAQS – National Ambient Air Quality Standard, SIL – Significant Impact Level, µm – micrometer, CO – carbon monoxide, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide, SO₂ – sulfur dioxide, N/A – not applicable

Table 20 shows the maximum impact within or at the boundary of the Glen Canyon NRA. These maximum concentrations are almost entirely due to the transport of coal by haul trucks through the Glen Canyon NRA. No concentrations are close to the NAAQS. However, the Class II SILs are exceeded for PM₁₀, PM_{2.5}, and NO₂. This is primarily due to the truck haul routes through the Glen Canyon NRA.

Table 20. Underground Coal Mine Scenario CAP Maximum Impacts Within or Along the Boundary of the Glen Canyon NRA and in Comparison with the Class II SILs

Pollutant	Averaging Period	NAAQS (µm-3)	Background (µm-3)	Modeled Concentration (µm-3)	Class II SIL (µm-3)	Complies with Class II SILs?
CO	8-hour	10,000	1,164	20	500	Yes
CO	1-hour	40,000	1,164	39	2,000	Yes
PM ₁₀	24-hour	150	18.2	7	5	No
PM _{2.5}	Annual	12	2.2	0.7	0.2	No
PM _{2.5}	24-hour	35	13.4	1.7	1.2	No
NO ₂	Annual	100	4.4	3	1	No
NO ₂	1-hour	188	45.9	34	7.5 ⁽¹⁾	No
SO ₂	1-hour	196	66.5	0.09	7.8 ⁽¹⁾	Yes
SO ₂	3-hour	1,310	66.5	0.07	25	Yes

¹ Interim SIL value

CAP – criteria air pollutant, NRA – National Recreation Area, SIL – Significant Impact Level, µm – micrometer, CO – carbon monoxide, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide, SO₂ – sulfur dioxide, N/A – not applicable

These potential mineral resource development projects may take place in locations that are in relatively close proximity to Class I areas. While these activities will not be subject to PSD, we have included a comparison of the Class I PSD SILs for informational purposes. Table 21, Table 22, and Table 23 show the concentrations of the maximum impact on a Class I area relative to the Class I SIL. For all three development projects, none of the Class I SILs are exceeded.

Table 21. Near Bryce Canyon National Park: Oil and Gas Scenario Highest Class I Concentration in Comparison with Class I SILs

Pollutant	Averaging Period	Modeled Concentration (µm ³)	Class I SIL (µm ³)	Complies with Class I SILs?
PM ₁₀	24-hour	0.051	0.2	Yes
PM _{2.5}	Annual	0.0012	0.05	Yes
PM _{2.5}	24-hour	0.02	0.27	Yes
NO ₂	Annual	0.019	0.1	Yes

SIL – Significant Impact Level, µm³ – cubic micrometer, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide

Table 22. Near Escalante, Utah: Oil and Gas Scenario Highest Class I Concentration in Comparison with Class I SILs

Pollutant	Averaging Period	Modeled Concentration (μm^3)	Class I SIL (μm^3)	Complies with Class I SILs?
PM ₁₀	24-hour	0.02	0.2	Yes
PM _{2.5}	Annual	0.0001	0.05	Yes
PM _{2.5}	24-hour	0.01	0.27	Yes
NO ₂	Annual	0.002	0.1	Yes

SIL – Significant Impact Level, μm^3 – cubic micrometer, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide

Table 23. Underground Coal Mine Scenario: Highest Class I Concentration in Comparison with Class I SILs

Pollutant	Averaging Period	Modeled Concentration (μm^3)	Class I SIL (μm^3)	Complies with Class I SILs?
PM ₁₀	24-hour	0.07	0.2	Yes
PM _{2.5}	Annual	0.001	0.05	Yes
PM _{2.5}	24-hour	0.022	0.27	Yes
NO ₂	Annual	0.008	0.1	Yes

SIL – Significant Impact Level, μm^3 – cubic micrometer, PM₁₀ – particulate matter 10 microns or smaller in size, PM_{2.5} – particulate matter 2.5 microns or smaller in size, NO₂ – nitrogen dioxide

Ozone and Secondary PM_{2.5} Impact Assessment

In the EPA’s guidance on the development of MERP as a Tier 1 demonstration tool for ozone and fine particulates in the PSD permitting program (EPA 2016), the investigated single-source impacts on ozone and secondary PM_{2.5} from some hypothetical sources provided the most conservative MERP values for VOCs, NO_x, and SO₂ for the western United States. For the western United States, the lowest MERPs for NO_x and VOCs are 184 tons per year and 1,049 tons per year, respectively. However, the lowest MERP of 184 tons per year for NO_x was based on the model results for a 90-meter stack in North Dakota. The EPA modeled a hypothetical near ground-level release in San Juan County, UT and Iron County, UT, which are more representative of the Planning Area, geographically and by source type release. These have a source-derived NO_x MERP of 349 tons per year and 724 tons per year, respectively. The emission rate from the oil and gas development ($14 \times 18.4 = 257.6$ tons per year) is well below this range of MERP values, but the underground coal mine (60 kilometers to the southeast) falls in between this range, at 410 tons per year. Most of these emissions from the coal mine are not from a single location but are distributed over some 200 miles associated with the coal haul truck emissions. Based on the EPA’s MERP modeling, we can conclude that the 8-hour ozone impacts due to the oil and gas emissions in the Planning Area would be below the SIL of 1.0 ppb, while the emissions from the coal mine operation may need further analysis to conclude no significant ozone impacts. Both the coal mine and oil and gas projects have annual VOC emissions (62.56 tons per year and 23.79 tons per year, respectively) well below the MERP value of 1,049 tons per year.

For the western United States, the lowest MERPs for NO_x and SO₂ derived based on a daily PM_{2.5} threshold of 1.2 $\mu\text{g}/\text{m}^3$ are 1,075 tons per year and 210 tons per year, respectively. The

lowest MERPs for NO_x and SO₂ derived based on an annual PM_{2.5} threshold of 1.2 µg/m³ are 3,184 tons per year and 2,289 tons per year, respectively. Both the NO_x and SO₂ emissions from the oil and gas development and the underground coal mine are below the lowest secondary PM_{2.5} MERP values for both the annual and daily MERPs as shown in Table 24. Therefore, the secondary formation of PM_{2.5} due to the potential mineral development in the area is expected to be less than significant.

Table 24. Results of Tier I Demonstration Using MERPs for Daily and Annual Particulate Matter

PM _{2.5} Precursor	Averaging Period	MERP (tpy)	Underground Coal Mine Potential Emissions (tpy)	Oil and Gas Project Potential Emissions(tpy)
NO _x	24-hour	1,075	409,62	18.36
	Annual	3,184		
SO ₂	24-hour	210	0.75	0.06
	Annual	2,289		

MERP – Modeled Emissions Rates for Precursors, PM_{2.5} – particulate matter less than or equal to 2.5 microns in size, tpy – tons per year, NO_x – nitrogen oxides, SO₂ – sulfur dioxide

HAP Impact Assessment

HAP emissions are expected from well site fugitives, well blowdown venting, pneumatic devices, and condensate tank losses, as well as other smaller sources, such as truck traffic. Because VOC emissions from the coal mine are poorly understood⁵ and the BLM's underground coal mine emission inventory tool does not include any HAP speciation factors, only HAP emissions from oil and gas operations were analyzed in this study.

Short-term (1-hour) maximum HAP concentrations from oil and gas activity are compared to acute (1- and 24-hour) Reference Exposure Levels (RELs), shown in Table 25 and Table 26. RELs are defined as concentrations at or below which no adverse health effects are expected. The model results indicate that neither location resulted in concentrations that exceed the 1-hour or 24-hour RELs.

Table 25. Near Bryce Canyon National Park: Oil and Gas Scenario Comparison of Highest Modeled Results with Acute RELs (1- and 24-hour Exposure)

HAP	1-hour REL (µg/m ³)	24-hour REL (µg/m ³)	Maximum Modeled 1-hour Concentration (µg/m ³)	Maximum Modeled 24-hour Concentration (µg/m ³)	Complies with 1-hour REL?	Complies with 24-hour REL?
Benzene	96	80	0.26	0.09	Yes	Yes
Toluene	7,537	5,653	0.49	0.10	Yes	Yes

⁵ While the VOC emissions from the coal mine are poorly understood, the types of air toxic emissions from fuel combustion associated with vehicle operations from mining activities would include compounds such as: 1,3 butadiene, acrolein, benzene, diesel particulate matter, ethylbenzene, naphthalene, and polycyclic organic matter. In addition, trace elements in coal dust may be of potential concern, as part of a draft EIS for the Tongue River Railroad Company the Surface Transportation Board conducted an extensive analysis on coal dust. That discussion can be found in Chapter 6 at: <https://www.stb.gov/decisions/readingroom.nsf/WebDecisionID/44400?OpenDocument>.

HAP	1-hour REL (µg/m ³)	24-hour REL (µg/m ³)	Maximum Modeled 1-hour Concentration (µg/m ³)	Maximum Modeled 24-hour Concentration (µg/m ³)	Complies with 1-hour REL?	Complies with 24-hour REL?
Ethylbenzene	21,712	8,685	0.04	0.02	Yes	Yes
Xylenes	8,684	400	0.68	0.08	Yes	Yes
n-Hexane ⁽¹⁾	6,345	N/A	19.0	4.1	Yes	N/A

¹ No REL available for these HAPs. 1-hour values shown are from Texas Commission on Environmental Quality. REL – Reference Exposure Level, HAP – hazardous air pollutant, µg/m³ – microgram per cubic meter, N/A – not applicable

Table 26. Near Escalante, Utah: Oil and Gas Scenario Comparison of Highest Modeled Results with Acute RELs (1- and 24-hour Exposure)

HAP	1-hour REL (µg/m ³)	24-hour REL (µg/m ³)	Maximum Modeled 1-hour Concentration (µg/m ³)	Maximum Modeled 24-hour Concentration (µg/m ³)	Complies with 1-hour REL?	Complies with 24-hour REL?
Benzene	96	80	2	0.11	Yes	Yes
Toluene	7,537	5,653	3	0.16	Yes	Yes
Ethylbenzene	21,712	8,685	0.4	0.02	Yes	Yes
Xylenes	8,684	400	3	0.12	Yes	Yes
n-Hexane ⁽¹⁾	6,345	N/A	15	1.64	Yes	N/A

¹ No REL available for these HAPs. 1-hour values shown are from Texas Commission on Environmental Quality. REL – Reference Exposure Level, HAP – hazardous air pollutant, µg/m³ – microgram per cubic meter, N/A – not applicable

Long-term exposure to HAPs emitted by 13 wells in production and 1 well in development were compared to Reference Concentrations for Chronic Inhalation (RfCs) for the maximum receptor, as shown in Table 27 and Table 28 for the two oil and gas field locations. An RfC is defined by the EPA as the daily inhalation concentration at which no long-term adverse health effects are expected. RfCs exist for both non-carcinogenic and carcinogenic effects on human health (EPA's Integrated Risk Information System).⁶ No modeled concentration values exceed the RfCs for any HAP.

Table 27. Near Bryce Canyon National Park: Oil and Gas Scenario Comparison of Highest Modeled Results with Non-carcinogenic HAP RfCs (Annual Average)

HAP	Non-Carcinogenic RfC (µg/m ³)	Maximum Modeled Concentration (µg/m ³)	Complies with RFC?
Benzene	10	1.13E-02	Yes
Toluene	5,000	1.22E-02	Yes
Ethylbenzene	1,000	5.00E-04	Yes
Xylenes	100	4.52E-03	Yes
n-Hexane ⁽¹⁾	700	1.00E+00	Yes

¹ No REL available for these HAPs. Values shown are from Texas Commission on Environmental Quality.

⁶ The EPA's Integrated Risk Information System keeps a continual update database on human health risk reference concentration levels for non-cancer and cancer assessments. www.epa.gov/iris.

HAP – hazardous air pollutant, RfC – Reference Concentration for Chronic Inhalation, $\mu\text{g}/\text{m}^3$ – microgram per cubic meter, REL – Reference Exposure Level

Table 28. Near Escalante, Utah: Oil and Gas Scenario Comparison of Highest Modeled Results with Non-carcinogenic HAP RfCs (Annual Average)

HAP	Non-Carcinogenic RfC ($\mu\text{g}/\text{m}^3$)	Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Complies with RfC?
Benzene	10	1.E-03	Yes
Toluene	5,000	1.E-03	Yes
Ethylbenzene	1,000	7.E-05	Yes
Xylenes	100	5.E-04	Yes
n-Hexane ⁽¹⁾	700	0.1	Yes

¹ No REL available for these HAPs. Values shown are from Texas Commission on Environmental Quality.

HAP – hazardous air pollutant, RfC – Reference Concentration for Chronic Inhalation, $\mu\text{g}/\text{m}^3$ – microgram per cubic meter, REL – Reference Exposure Level

Finally, long-term exposures to emissions of the human carcinogen, benzene, are evaluated based on estimates of the increased cancer risk over a 70-year lifetime. The analysis presents the potential incremental risk from the oil and gas field. The cancer risks were calculated using the maximum annual modeled concentrations and the EPA's chronic inhalation unit risk factors for carcinogenic constituents. Estimated cancer risks were evaluated based on the Superfund National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), where a cancer risk range of 1×10^{-6} to 1×10^{-4} is generally acceptable. Two estimates of cancer risk are presented: (1) a most likely exposure (MLE) scenario; and (2) a maximum exposed individual (MEI) scenario. The estimated cancer risks were adjusted to account for duration of exposure and time spent at home.

Maximum annual modeled concentrations were multiplied by the EPA's unit risk factors (based on 70-year exposure) for those pollutants, and then the product was multiplied by an adjustment factor that represents the ratio of projected exposure time to 70 years. The adjustment factors represent two scenarios: an MLE scenario and one reflective of the MEI. The MLE duration is assumed to be 9 years, which corresponds to the mean duration that a family remains at a residence (40 CFR 300). This duration corresponds to an adjustment factor of $9/70 = 0.13$. The duration of exposure for the MEI is assumed to be 60 years, corresponding to an adjustment factor of $60/70 = 0.86$. A second adjustment is made for time spent at home versus time spent elsewhere. For the MLE scenario, the at-home time fraction is 0.64 (40 CFR 300), and it was assumed that during the rest of the day, the individual would remain in an area where annual HAP concentrations would be one-quarter as large as the maximum annual average concentration. Therefore, the MLE adjustment factor is $(0.13) \times [(0.64 \times 1.0) + (0.36 \times 0.25)] = 0.0949$. The MEI scenario assumes that the individual is at home 100 percent of the time, for a final adjustment factor of $(0.86 \times 1.0) = 0.86$. EPA unit risk factors and adjustment factors are based on the latest data posted on the EPA's Integrated Risk Information System (www.epa.gov/iris). Finally, the cancer risk was computed by multiplying the maximum predicted annual concentration by the appropriate risk factor and overall exposure adjustment factor. The modeled cancer risks are well within the acceptable limits (1×10^{-6} to 1×10^{-4}) for all scenarios as shown in Table 29 and Table 30.

Because the modeled concentrations are much smaller than the REL and RfC values, the potential for increased acute and/or long-term health impacts resulting from HAP emissions from the reasonably foreseeable development activities are expected to be minimal. The modeled cancer risks are 0.0321 per million and 0.291 per million for the MLE and MEI, respectively.

Table 29. Near Bryce Canyon National Park: Oil and Gas Scenario Cancer Highest Risk Assessment: Carcinogenic HAP RfCs, Exposure Adjustment Factors, and Adjusted Exposure Risk

Analysis	HAP	Carcinogenic RfC (Risk Factor) $1/(\mu\text{g}/\text{m}^3)^{(1)}$	Exposure Adjustment Factor	Cancer Risk	Within Acceptable Limits?
MLE	Benzene ⁽²⁾	7.8E-06	9.49E-02	8.34E-09	Yes
MEI	Benzene	7.8E-06	0.86	7.56E-08	Yes

¹ Annual Average Concentration

² Source: EPA 2018

HAP – hazardous air pollutant, RfC – Reference Concentration for Chronic Inhalation, $\mu\text{g}/\text{m}^3$ – microgram per cubic meter, MLE - most likely exposure, MEI – maximum exposed individual

Table 30. Near Escalante, Utah: Oil and Gas Scenario Cancer Highest Risk Assessment: Carcinogenic HAP RfCs, Exposure Adjustment Factors, and Adjusted Exposure Risk

Analysis	HAP	Carcinogenic RfC (Risk Factor) $1/(\mu\text{g}/\text{m}^3)^{(1)}$	Exposure Adjustment Factor	Cancer Risk	Within Acceptable Limits?
MLE	Benzene ⁽²⁾	7.8E-06	9.49E-02	7.7E-10	Yes
MEI	Benzene	7.8E-06	0.86	6.98E-09	Yes

¹ Annual Average Concentration

² Source: EPA 2018

HAP – hazardous air pollutant, RfC – Reference Concentration for Chronic Inhalation, $\mu\text{g}/\text{m}^3$ – microgram per cubic meter, MLE - most likely exposure, MEI – maximum exposed individual

VISCREEN Modeling for Visibility Impact Assessment

The initial screening criteria from the *Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report* (revised 2010) were used to assess whether emissions associated with resource mineral development in the Planning Area will cause or contribute to visibility impairment in Class I areas farther than 50 kilometers from the Project. As part of the EPA's Regional Haze regulation, the Federal Land Managers concluded that, based on a source's annual emission strength and distance from a Class I area, it will not cause or contribute to visibility impairments to Class I areas if the following is true:

- Sources more than 50 kilometers from any Class I area emit less than 500 tons per year of NO_x or SO₂ (or combined NO_x and SO₂), or
- Sources more than 100 kilometers from any Class I area emit less than 1,000 tons per year of NO_x or SO₂ (or combined NO_x and SO₂).

The oil and gas development Project emissions of NO_x and SO₂ are 258 tons per year, which is below the 500 tons per year threshold and therefore will not cause or contribute to visibility impairments to distant Class I areas, according to the FLAG screening criteria. The underground

coal mine more than 60 kilometers away from the oil and gas development would also be below the 500 tons per year threshold, at 410 tons per year.

The EPA's VISCREEN is used to assess the potential for observers in nearby (within 50 kilometers) Class I areas (National Parks and wilderness areas) of KEPA lands to perceive visible plumes from the resource development projects. Figure 12 shows the locations of National Parks and wilderness areas within 50 kilometers; VISCREEN was applied for the five areas listed in Table 31.

Table 31. Class I and Class II National Parks and Wilderness Areas Near the Kanab-Escalante Planning Area Lands

Area Name (Managing Agency)	Designation	Average Visual Range in kilometers (miles)
Bryce Canyon National Park (NPS)	Class I	273.6 (170)
Capital Reef National Park (NPS)	Class I	273.6 (170)
Zion National Park (NPS)	Class I	257.5 (160)
Box-Death Hollow Wilderness Area (USFS)	Class II sensitive	273.6 (170)
Kanab Creek Wilderness Area (USFS)	Class II sensitive	257.5 (160)

NPS – National Park Service; USFS – U.S. Forest Service

VISCREEN evaluates the plume visual effects for both inside and outside the Class I or II area for both contrast and human perceptibility against the sky background and terrain background for different sun angles. The model accounts for spatial and sun angles that affect the visibility of a plume. VISCREEN is a screening tool with three levels of screening analysis, each of which require additional input data. We first applied Level-1 screening and then, where necessary, Level-2 screening.

Level-1 screening assumes worst-case meteorology; extremely stable atmospheric conditions and low wind speeds (1 m/s); and worst-case direction. Inputs include:

- The region's background visual range (refer to Table 31) and background ozone concentration
- The emission inputs, including the maximum annual operational emission rates from all of the new sources of:
 - Particulate matter (PM₁₀)
 - NO_x
 - Primary NO₂
 - Elemental carbon
 - Primary sulfate

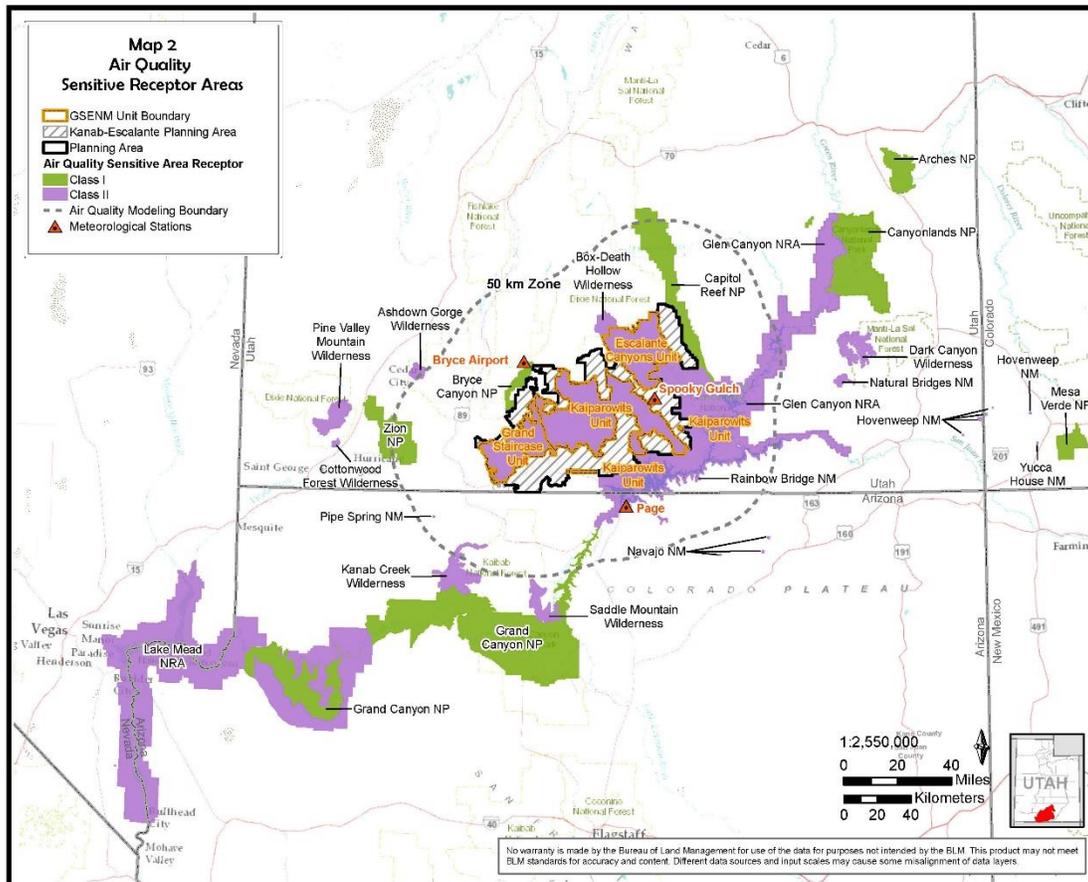


Figure 12. Class I and Class II Areas within 50 and 100 Kilometers and Surface Meteorological Stations Used in this Analysis

VISCREEN uses two threshold criteria to screen for potential impacts:

- Delta-E ($L^*A^*B^*$) values greater than 2.0
- Plume contrast values of magnitude greater than 0.05

Delta-E ($L^*A^*B^*$) is a plume perceptibility measure that is a combined parameter of brightness, hue, and saturation. The plume contrast is a criterion of the perceptibility of green light. If the analysis did not pass the Level-1 screening, we performed a Level-2 screening analysis. The Level-2 screening analysis works through the meteorological conditions (wind speed, direction, and stability), plus travel time, that result in a threshold criteria exceedance. Depending on the distance of the source to a Class I area and the pollutants emitted, this may be sufficient to show no potential for visibility impairment.

Visibility Impacts

Level-1 Analysis

Potential visibility impacts within the National Parks were evaluated using the single-source VISCREEN model, in accordance with the procedures provided in the EPA's *Workbook for Estimating Visibility Impairment* (EPA 1980). A Level-1 assessment was performed for each of

three considered mineral development projects, with the visibility effects assessed for all five Class I or sensitive Class II areas. A Level-1 assessment is a conservative estimate of plume visual impact that assumes that extremely stable meteorological conditions persist for 12 hours with a very low wind speed of 1 m/s. VISCREEN model runs were conducted for the worst-case emissions associated with the completion phase of construction activities of the oil and gas well nearest to the Class I or sensitive Class II areas, while the underground coal mine was associated with the operation of the mine at full production and with the operation of the backup generators.

Potential visibility impacts, or the maximum degree of plume visibility, from the proposed wells nearest to the parks were evaluated against Delta E criterion of 2.0 and contrast criterion of 0.05. The VISCREEN Level-1 results show one potential exceedance of the Delta E (color perceptibility parameter) criterion within Box-Death Hollow Wilderness Area, as shown in Table 32, for the oil and gas well development near Bryce Canyon National Park. In addition, Level-1 results show four potential exceedances of Delta E and two potential exceedances of contrast within Bryce Canyon National Park for the oil and gas well development near Bryce Canyon National Park. However, less than screening level impacts were found for all other emission scenarios for the oil and gas well development near Bryce Canyon National Park.

For the oil and gas well development near Escalante, screening Level-1 impacts are shown in Table 33. The VISCREEN Level-1 results show three potential exceedances of Delta E within Box-Death Hollow Wilderness Area, one potential exceedance of Delta E within Capitol Reef National Park, and three potential exceedances of Delta E within Bryce Canyon National Park. However, less than screening level impacts were found for all other emission scenarios for the oil and gas well development near Escalante.

Table 34 shows no Level-1 screening exceedances for the coal mine development scenario, indicating no adverse effect on visibility from the proposed coal mine in any of the Class I or sensitive Class II areas.

As a result of the potential visibility impacts during oil and gas development near Bryce Canyon National Park and Escalante, a refined Level-2 analysis was conducted as described below.

Table 32. Level-1 VISCREEN Modeling Results of Plume Visibility Inside Class I and Sensitive Class II Areas from Oil and Gas Completion Activities near Bryce Canyon National Park

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Bryce Canyon National Park					
Well 3	Sky 1	22.12	2.00	0.02	0.05
Well 3	Sky 2	16.75	2.00	-0.19	0.05
Well 3	Terrain 1	29.75	2.00	0.17	0.05
Well 3	Terrain 2	3.22	2.00	0.01	0.05
Capitol Reef National Park					
Well 2	Sky 1	0.84	2.00	0.00	0.05
Well 2	Sky 2	0.66	2.00	-0.01	0.05
Well 2	Terrain 1	0.42	2.00	0.01	0.05

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Well 2	Terrain 2	0.20	2.00	0.00	0.05
Zion National Park					
Well 10	Sky 1	1.24	2.00	0.00	0.05
Well 10	Sky 2	0.96	2.00	-0.01	0.05
Well 10	Terrain 1	0.61	2.00	0.01	0.05
Well 10	Terrain 2	0.30	2.00	0.00	0.05
Box-Death Hollow Wilderness Area					
Well 2	Sky 1	2.12	2.00	0.00	0.05
Well 2	Sky 2	1.74	2.00	-0.01	0.05
Well 2	Terrain 1	1.44	2.00	0.01	0.05
Well 2	Terrain 2	0.56	2.00	0.00	0.05
Kanab Creek Wilderness Area					
Well 10	Sky 1	0.54	2.00	0.00	0.05
Well 10	Sky 2	0.40	2.00	-0.00	0.05
Well 10	Terrain 1	0.21	2.00	0.00	0.05
Well 10	Terrain 2	0.11	2.00	0.00	0.05

Table 33. Level-1 VISCREEN Modeling Results of Plume Visibility Inside Class I and Sensitive Class II Areas from Oil and Gas Completion Activities near Escalante, Utah

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Bryce Canyon National Park					
Well 3	Sky 1	5.17	2.00	0.00	0.05
Well 3	Sky 2	4.10	2.00	-0.04	0.05
Well 3	Terrain 1	2.84	2.00	0.02	0.05
Well 3	Terrain 2	0.81	2.00	0.00	0.05
Capitol Reef National Park					
Well 14	Sky 1	2.23	2.00	0.00	0.05
Well 14	Sky 2	1.71	2.00	-0.02	0.05
Well 14	Terrain 1	1.43	2.00	0.01	0.05
Well 14	Terrain 2	0.56	2.00	0.00	0.05
Zion National Park					
Well 3	Sky 1	0.61	2.00	0.00	0.05
Well 3	Sky 2	0.45	2.00	-0.00	0.05
Well 3	Terrain 1	0.24	2.00	0.00	0.05
Well 3	Terrain 2	0.13	2.00	0.00	0.05
Box-Death Hollow Wilderness Area					
Well 14	Sky 1	4.62	2.00	0.00	0.05

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Well 14	Sky 2	3.95	2.00	-0.03	0.05
Well 14	Terrain 1	6.58	2.00	0.03	0.05
Well 14	Terrain 2	1.00	2.00	0.00	0.05
Kanab Creek Wilderness Area					
Well 3	Sky 1	0.36	2.00	0.00	0.05
Well 3	Sky 2	0.25	2.00	-0.00	0.05
Well 3	Terrain 1	0.13	2.00	0.00	0.05
Well 3	Terrain 2	0.06	2.00	0.00	0.05

Table 34. Level-1 VISCREEN Modeling Results of Plume Visibility Inside Class I and Sensitive Class II Areas from Coal Mine Development

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Bryce Canyon National Park					
Coal Mine	Sky 1	0.61	2.00	0.01	0.05
Coal Mine	Sky 2	0.13	2.00	-0.00	0.05
Coal Mine	Terrain 1	1.39	2.00	0.01	0.05
Coal Mine	Terrain 2	0.06	2.00	0.00	0.05
Capitol Reef National Park					
Coal Mine	Sky 1	0.79	2.00	0.01	0.05
Coal Mine	Sky 2	0.11	2.00	-0.00	0.05
Coal Mine	Terrain 1	1.25	2.00	0.01	0.05
Coal Mine	Terrain 2	0.05	2.00	0.00	0.05
Zion National Park					
Coal Mine	Sky 1	0.26	2.00	0.01	0.05
Coal Mine	Sky 2	0.04	2.00	-0.00	0.05
Coal Mine	Terrain 1	0.33	2.00	0.00	0.05
Coal Mine	Terrain 2	0.02	2.00	0.00	0.05
Box-Death Hollow Wilderness Area					
Coal Mine	Sky 1	0.49	2.00	0.01	0.05
Coal Mine	Sky 2	0.11	2.00	-0.00	0.05
Coal Mine	Terrain 1	1.09	2.00	0.01	0.05
Coal Mine	Terrain 2	0.05	2.00	0.00	0.05
Kanab Creek Wilderness Area					
Coal Mine	Sky 1	0.29	2.00	0.01	0.05
Coal Mine	Sky 2	0.05	2.00	-0.00	0.05
Coal Mine	Terrain 1	0.34	2.00	0.00	0.05
Coal Mine	Terrain 2	0.02	2.00	0.00	0.05

Level-2 Analysis

Because the Level-1 analysis indicates potential visibility impacts inside of Bryce Canyon National Park and Box-Death Hollow Wilderness Area from oil and gas development near Bryce Canyon National Park, an additional Level-2 screening is warranted. In addition, the Level-1 analysis indicates potential visibility impacts inside of Bryce Canyon National Park, Box-Death Hollow Wilderness Area, and Capitol Reef National Park from oil and gas development near Escalante, and a Level-2 screening is warranted. The Level-2 screening allows the use of user-specified particle size and density, and the most conservative meteorological conditions specific to the proposed oil and gas well development area. Specifically, for Level-2 screening, the VISCREEN model is used to find the maximum wind speed during the daytime (D stability or greater) where Delta E and contrast in the park could potentially be exceeded.

Meteorological data for the Level-2 screening were based on the 5 years of hourly surface data from the Bryce Canyon airport 2013–2017 meteorological dataset and the Spooky Gulch 2012–2016 wind dataset as used in the AERMOD near-field modeling. The hourly data were extracted and summarized for each of the 16 wind directions and a joint frequency and cumulative frequency was developed to summarize the most conservative meteorological combinations of stability, wind direction, and wind speed. The Level-2 screening uses the cumulative 1-percentile meteorology (occurs on approximately 4 days a year) to be indicative of worst-day plume visual impacts when the probability of meteorological conditions is coupled with the probability of other factors being ideal for maximizing plume visual impacts. In accordance with EPA guidance, dispersion conditions with transport times of more than 12 hours to reach the Class I areas of concern were not considered in the cumulative frequency. Also, the meteorological wind direction range that could potentially transport the plume to the Class I and Class II areas was utilized based on the location of the nearest well pad to the Class I and Class II areas. For the Level-2 analysis, only daylight hours from 6 a.m. to 6 p.m. are considered as potential periods when plume visual impacts could occur within the Class I and Class II areas. It should be noted that the most stable daytime stability class is considered to be slightly stable to neutral, or category D.

Using this screening for oil and gas well development near Bryce Canyon National Park, the 1-percentile atmospheric stability and wind speed within Bryce Canyon National Park are determined to be stability category D with wind speed of 4 m/sec. The 1-percentile atmospheric stability and wind speed within Box-Death Hollow Wilderness Area are determined to be stability category E with wind speed of 3 m/sec. Stability category E conditions typically occur during nighttime hours or during the day under strong subsidence, and these 1-percentile conditions are assumed to be very conservative. In addition, only peak day emissions during completion activities were input into VISCREEN for the Level-2 analysis because completion emissions were highest among construction-related activities, and production activities were determined to not cause an exceedance of either Delta E or plume contrast screening criteria. The Level-2 VISCREEN visual impacts during completion activities using this most conservative dispersion category associated with oil and gas well development near Bryce Canyon National Park are summarized below in Table 35. The VISCREEN Level-2 results show three potential exceedances of Delta E (color perceptibility parameter) criteria within Bryce Canyon National Park. However, completion activities would only occur over a maximum of 14 calendar days, and those days would need to overlap with the 4 days when atmospheric conditions are ideal,

thus making the likelihood of impacts unlikely or rare. There would be no exceedances of visibility screening criteria during drilling activities, which account for the second-highest emissions among construction-related activities. The Level-2 VISCREEN visual impacts during drilling using the aforementioned conservative dispersion category inside of Bryce Canyon National Park are summarized below in Table 36.

For oil and gas well development near Escalante, the 1-percentile atmospheric stability and wind speed within Capitol Reef National Park and Box-Death Hollow Wilderness Area are determined to be stability category D with wind speed of 4 m/sec. Within Bryce Canyon National Park, the cumulative frequency of dispersion conditions associated with atmospheric stabilities D–F and wind speeds 1–8 m/s is less than the 1-percentile of the Bryce Canyon and Spooky Gulch met datasets. Consequently, the potential for visibility impacts within Bryce Canyon National Park is very low and not analyzed with a Level-2 VISCREEN analysis. In addition, only peak day emissions during completion activities were input into VISCREEN for the Level-2 analysis because completion emissions were highest among construction-related activities, and production activities were determined to not cause an exceedance of either Delta E or plume contrast screening criteria. The Level-2 VISCREEN visual impacts during completion activities using this most conservative dispersion category associated with oil and gas well development near Escalante are summarized below in Table 37. The VISCREEN Level-2 results show no exceedances of visibility screening criteria during completion activities and, consequently, there would be no visibility impacts during construction or production activities for oil and gas well development near Escalante.

The Level-2 screening results indicate that oil and gas completion activities could increase plume perceptibility in Bryce Canyon National Park, but only if completion activities occur on days with the adverse 1-percentile meteorology conditions (approximately 4 days per year). No adverse impacts on visibility are anticipated in the other Class I or Sensitive Class II areas based on Level-2 screening. Based on these findings, should development occur near Bryce Canyon National Park, it would be prudent to perform additional future visibility analyses and assessment and include possible mitigation measures in the plan.

Table 35. Level-2 VISCREEN Modeling Results of Plume Visibility from Oil and Gas Development during Completion Activities Near Bryce Canyon National Park

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Bryce Canyon National Park					
Well 3	Sky 1	2.89	2.00	0.00	0.05
Well 3	Sky 2	2.45	2.00	-0.02	0.05
Well 3	Terrain 1	4.69	2.00	0.02	0.05
Well 3	Terrain 2	0.94	2.00	0.00	0.05
Box-Death Hollow Wilderness Area					
Well 2	Sky 1	0.44	2.00	0.00	0.05
Well 2	Sky 2	0.36	2.00	-0.00	0.05
Well 2	Terrain 1	0.30	2.00	0.00	0.05
Well 2	Terrain 2	0.11	2.00	0.00	0.05

Table 36. Level-2 VISCREEN Modeling Results of Plume Visibility Inside Bryce Canyon National Park from Oil and Gas Development During Drilling Activities Near Bryce Canyon National Park

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Bryce Canyon National Park					
Well 3	Sky 1	0.79	2.00	0.00	0.05
Well 3	Sky 2	0.67	2.00	-0.00	0.05
Well 3	Terrain 1	1.39	2.00	0.01	0.05
Well 3	Terrain 2	0.25	2.00	0.00	0.05

Table 37. Level-2 VISCREEN Modeling Results of Plume Visibility from Oil and Gas Development during Completion Activities Near Escalante

Emissions Source	Assessment	Delta E		Contrast	
		Result	Criterion	Result	Criterion
Box-Death Hollow Wilderness Area					
Well 2	Sky 1	0.39	2.00	0.00	0.05
Well 2	Sky 2	0.33	2.00	-0.00	0.05
Well 2	Terrain 1	0.62	2.00	0.00	0.05
Well 2	Terrain 2	0.08	2.00	0.00	0.05
Capitol Reef National Park					
Well 2	Sky 1	0.21	2.00	0.00	0.05
Well 2	Sky 2	0.15	2.00	-0.00	0.05
Well 2	Terrain 1	0.11	2.00	0.00	0.05
Well 2	Terrain 2	0.04	2.00	0.00	0.05

Conclusions

The modeling results indicate that the reasonably foreseeable development activities would result in some increases in criteria pollutants; however, these increases would be small and, with the exception of 1-hour NO₂, would not result in concentrations greater than the NAAQS or UAAQS. No adverse impacts on ozone are expected as a result of oil and gas activities. Further analysis may be required to quantify the impacts on ozone from the coal mine, although it should be noted that ozone impacts would primarily be attributable to the use of coal haul trucks and would be distributed across a 200-mile transport area.

Short-term exposure to HAPs is expected to be very small compared to acute RELs. Similarly, long-term exposure to HAPs is expected to be very small compared to RfCs. HAP modeling does not indicate any human health concerns, and the cancer risks from reasonably foreseeable development activities are minimal.

Potential visibility impacts would be the greatest in Bryce Canyon National Park if reasonably foreseeable development of an oil and gas field were to occur in close proximity to Bryce

Canyon National Park. VISCREEN results show that inside of the park a visible plume may be perceptible and in contrast with the sky and terrain during completion activities on days of adverse meteorological conditions. Based on the VISCREEN analyses, visibility impacts would not occur during any other phase of construction or during the production phase.

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Abbreviations-Acronyms

Term	Definition
°R	Degrees Rankine
µg/m ³	Micrograms per cubic meter
1000L/MCF	Thousand liters per thousand cubic feet
AERMET	AERMOD Meteorological Processor
ASOS	Automated Surface Observing System
atm	Atmosphere
bbl	Barrel
BLM	Bureau of Land Management
Btu	British thermal unit
CAP	Criteria air pollutant
CFR	Code of Federal Regulations
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
DEQ	Department of Environmental Quality
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act
FLAG	Federal Land Managers' Air Quality Related Values Work Group
g/hp-hr	Gram per horsepower-hour
g/mol	Gram per mole
g/ton	Gram per ton
GHG	Greenhouse gas
GLYCalc	Glycol units
GSENM	Grand Staircase-Escalante National Monument
HAP	Hazardous air pollutant
hp	Horsepower
hr/pad	Hour per pad
K	Kelvin
KEPA	Kanab-Escalante Planning Area
kg/ton	Kilogram per ton
L-atm/mol-K	Liter-atmosphere per mole-Kelvin
lbs/MMscf	Pounds per million standard cubic feet
m/s	Meter per second
M-18	Pound per square inch absolute [psia
M-7	Pound per mile [lb/mile
M-8	Grams per square meter [g/m ²
MCF	Thousand cubic feet

Term	Definition
MEI	Maximum exposed individual
MERP	Modeled Emissions Rates for Precursors
MLE	Most likely exposure
MMBtu	Million British thermal units
mph	Mile per hour
N ₂ O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NLCD92	National Land Cover Dataset 1992
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NRA	National Recreation Area
NSPS	New Source Performance Standards
NWS	National Weather Service
PM ₁₀	Particulate matter less than or equal to 10 microns in size
PM _{2.5}	Particulate matter less than or equal to 2.5 microns in size
ppb	Part per billion
PSD	Prevention of Significant Deterioration
REL	Reference Exposure Level
RfC	Reference Concentration for Chronic Inhalation
RMP	Resource Management Plan
scf	Standard cubic foot
SIL	Significant Impact Level
SO ₂	Sulfur dioxide
SO _x	Sulfur oxides
THC	Total hydrocarbon
TOC	Total organic carbon
UAAQS	Utah Ambient Air Quality Standards
VMT	Vehicle miles traveled
VOC	Volatile organic compound

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix N

***Cumulative Impact Methodology and Past, Present,
and Reasonably Foreseeable Future Actions***

August 2018

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Appendix N: Cumulative Impact Methodology and Past, Present, and Reasonably Foreseeable Future Actions

Introduction

This appendix provides supporting and supplementary information for the analysis of cumulative impacts presented in Chapter 3 (*Affected Environment and Environmental Consequences*) of the Resource Management Plans (RMPs)/Environmental Impact Statement (EIS). Cumulative impacts are the effects on the environment that result from the impact of implementing RMPs alternatives in combination with other actions outside the scope of this plan that may contribute to cumulative impacts. The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) define cumulative impacts as, “The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (RFAs) regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

The analysis of cumulative impacts identifies projected incremental impacts from the RMPs alternatives in combination with impacts from past, present, and RFAs, which results in cumulative impacts. The cumulative impacts analysis included in Chapter 3 (*Affected Environment and Environmental Consequences*) reflects the programmatic level of analysis in the RMPs/EIS. Additional analysis of cumulative impacts would occur during site-specific/implementation-level NEPA reviews.

Cumulative Analysis Methodology

CEQ suggests cumulative impact analyses focus on meaningful impacts, and not exhaustively analyze all possible cumulative impacts. Therefore, the cumulative impacts analysis in Chapter 3 (*Affected Environment and Environmental Consequences*) considers the RMP alternatives in the context of the broader human environment. Because of the programmatic, broad-scale nature of these RMPs, this assessment is similarly broad and generalized to address potential effects that could occur from alternative management scenarios when combined with other activities or projects that could contribute to impacts in the same temporal and geographic scope of the direct and indirect impacts. This assessment is primarily qualitative for many resources because of the lack of detailed information that would result from project-level decisions, site-specific resource conditions, and other activities or projects.

In defining potential cumulative impacts issues for consideration, the Bureau of Land Management (BLM) paid particular attention to the following:

1. Issues identified during scoping
2. Internal scoping (i.e., the professional judgment of BLM resource specialists and cooperating agencies)
3. A review of other RFAs in the cumulative impact analysis areas (CIAAs)
4. Consideration of context and intensity of potential impacts

To focus the scope of cumulative impacts analysis, cumulative impacts issues were considered in the context of baseline conditions described in the affected environment sections of Chapter 3, *Affected Environment and Environmental Consequences*, the incremental impacts on individual resources described in the direct and indirect impacts analysis in Chapter 3 (*Affected Environment and Environmental Consequences*), the past, present, and RFAs in this appendix, and the following factors as modified from CEQ’s *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997):

- Does the affected resource have substantial value relative to legal protection and/or ecological, cultural, economic, or social importance?
- Are RFAs anticipated to have environmental impacts similar to the kinds of impacts identified for RMP alternatives?
- Have any recent or ongoing NEPA analyses of similar actions in the geographic area identified important adverse or beneficial cumulative impacts issues?
- Has the impact on the resource been historically important, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

Time Frame of Cumulative Impacts Analysis

The time frame for the cumulative impacts analysis for each resource is based on the duration of the short-term and long-term, direct and indirect impacts of the RMP alternatives. In general, the time frame of the cumulative impacts analysis is the estimated 20-year life of the RMPs. In some cases, the cumulative impacts analysis time frame for certain resources is longer than the life of the RMPs to encompass residual effects and impacts that may last beyond the life of the plan.

Cumulative Impact Analysis Areas

This cumulative impacts analysis defines the CIAAs for each resource to delineate the geographic scope of the analysis for each resource. The CIAAs for each resource can be different than the analysis area for direct and indirect impacts, and may extend beyond the Planning Area, to encompass the full extent of cumulative impacts that would result from the incremental addition of direct and indirect impacts from the RMP alternatives when added to impacts from past actions, ongoing actions, and RFAs. Table 1 below identifies the CIAAs for each resource and the rationale.

Table 1. Cumulative Impact Analysis Areas, by Resource

Resource	Cumulative Impact Analysis Area	Rationale
Air Quality	Garfield and Kane Counties, as well as nearby Class I and Sensitive Class II areas	This area encompasses emissions from various sources within the Planning Area that may affect air quality concentrations and air quality-related values throughout the region.
Cultural Resources	The Planning Area plus a 15-mile buffer	This area encompasses cultural resources that could be directly affected by surface-disturbing activities as well as the viewshed of historic trails that could be affected by cumulative impacts.

Appendix N: Cumulative Impact Methodology and Past, Present, and Reasonably Foreseeable Future Actions

Resource	Cumulative Impact Analysis Area	Rationale
Fish and Wildlife (including Special Status Species)	The cumulative impacts analysis area for big game species is game management units that intersect the Planning Area; for aquatic species it is the boundaries of watersheds that extend within and outside of the Planning Area; for migratory birds and non-big game terrestrial wildlife species it is the Planning Area.	These areas include the documented home range or foraging territories of species or groups of species that are present or have suitable habitat in or adjacent to the Planning Area.
Lands with Wilderness Characteristics	The identified lands with wilderness characteristics and the WSAs within the Planning Area	The cumulative impact analysis area incorporates all lands that contain wilderness characteristics in the Planning Area.
Paleontological Resources and Geology	The Planning Area	This area encompasses paleontological resources that may experience direct or indirect effects from management actions and could contribute to cumulative impacts.
Soil Resources and Water	The cumulative impacts analysis area for soil is the Planning Area and directly adjacent areas from which sedimentation and noxious weed dispersion could affect the Planning Area. The cumulative impacts analysis area for water includes all surface water features (e.g., streams, watersheds) and groundwater resources (i.e., groundwater basins and aquifers) within or crossing the boundary of the Planning Area.	This soils cumulative impact analysis area encompasses areas of surface disturbance in the Planning Area and the extent of area where surface runoff and erosion would increase due to the NPL Project. The water cumulative analysis area includes the extent of watersheds and groundwater basins that could experience cumulative impacts.
Vegetation and Fire and Fuels	The cumulative impacts analysis area for vegetation is the Planning Area and areas directly adjacent from which noxious weeds, invasive species, and pests could spread. The cumulative impacts analysis area for fire and fuels is the level four hydrologic subbasins within and immediately adjacent to the Planning Area.	The vegetation cumulative impacts analysis area encompasses the extent of vegetation communities that could experience cumulative effects. This area encompasses the range that wildland fires could burn based on fuel availability, weather, and topography that may experience direct or indirect effects from management and could experience cumulative impacts.
Visual Resources, Night Skies, and Natural Soundscape	The viewshed within 12 miles of the Planning Area	This area is near the limit of visibility of skylined energy development facilities, such as transmission towers and wind turbines, that may be readily noticeable to casual observers.
Wild Horses	The full extent of HAs that intersect the Planning Area	This area encompasses the extent of the HAs that intersect the Planning Area.

Resource	Cumulative Impact Analysis Area	Rationale
Forestry and Woodland Products	The Planning Area and watersheds that intersect the Planning Area	The analysis area encompasses the extent of forested areas and communities that could be cumulatively affected by harvesting, fires, vegetation treatments, and other activities associated with management decisions.
Lands and Realty and Renewable Energy	The Planning Area	This area includes the extent of area where land exchanges could affect the boundary of the Planning Area.
Livestock Grazing	The full extent of allotments that intersect the Planning Area	This cumulative impact analysis area encompasses the full extent of the grazing allotments that intersect the Planning Area.
Minerals	The Planning Area	This area encompasses the extent of mineral resources that could be affected by management decisions.
Recreation	The Planning Area and surrounding public land accessible to recreation users	This area includes recreation areas that could be directly affected by management decisions and surrounding public lands that could also experience recreation impacts due to management decisions in the Planning Area.
Transportation	The cumulative impact analysis area is the Planning Area, the extent of transportation routes that intersect the Planning Area, and transportation routes in areas adjacent to the Planning Area.	This area encompasses the full extent of transportation routes that could experience impacts resulting from management decisions in combination with other past, present, and RFAs.
Areas of Critical Environmental Concern	The cumulative impact analysis areas for ACECs is the Planning Area.	This area encompasses the boundaries of ACECs and other locations in the Planning Area that could be cumulatively affected by ACEC management decisions in combination with other past, present, and RFAs.
National Trails	The Old Spanish National Historic Trail and associated viewshed up to 12 miles or the horizon (whichever is closer)	This area includes the only national historic trail in the Planning Area and is near the limit of visibility of skylined energy development facilities that may be readily noticeable to casual observers.
Scenic Routes	The viewshed within a 12-mile distance of the Planning Area	This area is near the limit of visibility of skylined energy development facilities that may be readily noticeable to casual observers on scenic routes.
Wild and Scenic Rivers	Suitable river corridors in the planning area	This area includes the full extent of all suitable wild and scenic rivers that could be affected by management decisions in combination with other past, present, and RFAs.

Appendix N: Cumulative Impact Methodology and Past, Present, and Reasonably Foreseeable Future Actions

Resource	Cumulative Impact Analysis Area	Rationale
Wilderness Study Areas	WSAs within the Planning Area	This area includes the full extent of WSAs that intersect the Planning Area that could be affected by management decisions in combination with other past, present, and RFAs.
Social and Economic Considerations	The full extent of Garfield and Kane Counties in Utah and Coconino County in Arizona	This area encompasses the entirety of the counties that intersect the Planning Area as well as the adjacent Coconino County in Arizona.
Environmental Justice	The extent of Garfield and Kane Counties in Utah and Coconino County in Arizona	This area encompass the entirety of the counties that intersect the Planning Area as well as the adjacent Coconino County in Arizona.
Hazardous Materials and Public Safety	The Planning Area and any routes used to transport hazardous materials to and from the Planning Area	This area includes the full extent of areas and routes where hazardous materials could affect other resources.

RFA – reasonably foreseeable future action, HA – herd area, WSA – Wilderness Study Area, BLM – Bureau of Land Management

Past, Present, and Reasonably Foreseeable Future Actions

The cumulative impacts analysis considers past and ongoing actions that have contributed to the conditions of resources within the geographic scope and time frame of the cumulative impacts analysis. A variety of different types of projects and actions are contributing to ongoing effects on resources and are considered in this analysis, including recreation permits (e.g., Special Recreation Permits), livestock grazing (e.g., range improvement projects), vegetation treatments, and land use authorizations (e.g., film permits, pipelines, rights-of-way). The cumulative impacts analysis also considers ongoing actions and RFAs that may result in incremental impacts or synergistic effects if implemented in combination with the RMP alternatives.

Table 2 below identifies the past, present, and RFAs considered in the cumulative impacts analysis. RFAs are those foreseeable future actions for which there are existing decisions, funding, or formal proposals, or which are highly probable, based on known opportunities or trends. In general, RFAs do not include remote or speculative actions or projects.

Table 2. Cumulative Impact Analysis Areas, by Resource

Past, Present, and Reasonably Foreseeable Actions
BLM RMPs, Programmatic NEPA Documents, and Other Federal Plans, Agreements, and Decisions
Interagency Agreement between the BLM and NPS for grazing management (1993)
Establishment of GSENM and Presidential Proclamation 9682 (1996, 2017)
NPS Management Policies 2006 (2006)
Glen Canyon General Management Plan (1979)
Land and Resource Management Plan for the Fishlake National Forest (1986)
Dixie National Forest Land and Resource Management Plan (1986)

Past, Present, and Reasonably Foreseeable Actions

Warm Springs Resource Area Approved Resource Management Plan (1987)
House Range Resource Area Approved Resource Management Plan (1987)
St. George Field Office Resource Management Plan and Record of Decision (1999)
Glen Canyon Grazing Management Plan (1999)
Escalante Management Framework Plan (1999)
Zion National Park General Management Plan (2001)
Ely Approved Resource Management Plan and Record of Decision (2008)
Kanab Resource Management Plan (2008)
Arizona Strip Field Office Resource Management Plan and Record of Decision (2008)
Richfield Resource Management Plan and Record of Decision (2008)
Bryce Canyon National Park Foundation Document (2014)
BLM GSENM Monument Management Plan (2000; amended September 2015)
Programmatic Noxious Weed and Invasive Plant Management Plan (2015)
Glen Canyon Off-Road Vehicle Management Plan (2017)
Establishment of Glen Canyon National Recreation Area and enabling legislation (1972)
Bears Ears National Monument Management Plan (2019)
Greater Sage-Grouse Approved Resource Management Plans, Amendments, and Maintenance Actions
Geothermal Resources Leasing Programmatic EIS
Record of Decision for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS (2007)
Capitol Reef National Park Livestock Grazing and Trailing Management Plan and EIS (2018)
County and State Planning Documents
Utah Code Sections 63j-4-401
Utah Code, Title 63J, Chapter 8, State of Utah Resource Management Plan for Federal Lands
State Protocol Agreement Between the Utah State Director of BLM and the Utah State Historic Preservation Office (SHPO) and the Programmatic Agreement Among BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs
Scenic Byway 12 Corridor Management Plan (2001)
Utah's Water Resources: Planning for the Future, Utah Division of Water Resources (2001)
State Comprehensive Outdoor Recreation Plan (2003)
Coconino County Comprehensive Plan (2003)
Utah Comprehensive Wildlife Conservation Strategy (2005)
Coral Pink Sand Dunes State Park General Management Plan (2005)
Garfield County Economic Development Plan (2007)
Kane County 2030 Land Resource Management Plan (March 2011)
Garfield County Comprehensive Plan 2030 (Adopted November 2010, last amended November 2013)
Kane County Land Use Ordinance, Chapter 27, Escalante Region Multiple Use/Multiple Functions Grazing Zone (last amended September 22, 2014)
Kane County Resource Management Plan (adopted June 22, 1998; last amended November 2016)
Kane County General Plan (adopted June 22, 1998; last amended December 19, 2016)
Garfield County General Management Plan (2017)

Appendix N: Cumulative Impact Methodology and Past, Present, and Reasonably Foreseeable Future Actions

Past, Present, and Reasonably Foreseeable Actions
Lands and Realty
Garkane Transmission Right-of-Way
South Central Buckskin to Page, Buried Fiber Optic Line
South Central Johnson Canyon to Cannonville, Buried Fiber Optic Line
Lake Powell Pipeline
Various film permits
Solar Energy Development on SITLA land near Big Water
Livestock Grazing
Cat Pasture Corral Line Shack Project
Swapp Canyon Pipeline, Water Meter, Trough, Float Box, and Fence
Various Water Catchment, Fence, and other Range Improvement Projects
Minerals
Up to 10 producing oil and gas wells and 4 exploration wells in the Planning Area
Up to 1 coal mine in the same general vicinity as the previously proposed Smoky Hollow Mine
Locatable Mine Claims for Alabaster
Additional Free-Use Permits for Sand and Gravel Mines
Ongoing oil and gas development in the Upper Valley Field
Vegetation Projects
Upper Paria Watershed Vegetation Treatments
Skutumpah Vegetation Treatments
Alvey Wash, Coal Bench, and Last Chance Vegetation Restoration
Jenny Clay – chaining and seeding project
Cockscomb Bull Hog, Harrow, and Seeding project
Deer Springs Ranch Fuel Reduction Project
Recreation
Programmatic EA for Organized Group Activities along Hole-in-the-Rock Road (2012)
Calf Creek Recreation Area Site Improvements EA (2017)
Dry Fork Facilities Development (parking lot, bathrooms, roads/trails)
Various Special Recreation Permits
Hole-in-the-Rock Road Repair Project
Various Trail Projects (e.g., trail re-routes)
Other
Various Paleontological Excavation Projects
BLM – Bureau of Land Management, NEPA – National Environmental Policy Act, NPS – National Park Service, GSENM – Grand Staircase-Escalante National Monument, EIS – Environmental Impact Statement, SHPO – State Historic Preservation Officer, EA – Environmental Assessment

References

Council on Environmental Quality (CEQ). 1997. *Considering Cumulative Effects Under the National Environmental Policy Act*. January 1997.

Abbreviations-Acronyms

Term	Definition
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CIAA	Cumulative impact analysis area
EIS	Environmental Impact Statement
NEPA	National Environmental Policy Act
RFA	Reasonably foreseeable future action
RMP	Resource Management Plan

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix O

Biological Resources

August 2018

Appendix O: Biological Resources

Table 1 lists the common and scientific names of special status plants and animal species mentioned in the Grand Staircase Escalante National Monument and Kanab-Escalante Planning Area Resource Management Plans and Environmental Impact Statement.

Table 1. Common and Scientific Names of Special Status Plant and Wildlife Species

Common Name	Scientific Name
Plants	
Atwood's pretty phacelia	<i>Phacelia pulchella</i> var. <i>atwoodii</i>
Chinle chia	<i>Salvia columbariae</i> var. <i>argillacea</i>
Chinle evening primrose	<i>Oenothera murdockii</i>
Cronquist's phacelia	<i>Phacelia cronquistiana</i>
Cutler's lupine	<i>Lupinus caudatus</i> var. <i>cutleri</i>
Escarpment milkvetch	<i>Astragalus striatiflorus</i>
Gumbo milkvetch	<i>Astragalus ampullarius</i>
Hole-in-the-rock prairie clover	<i>Dalea flavescens</i> var. <i>epica</i>
Jones's cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>
Kanab thelypody	<i>Thelypodopsis ambigua</i> var. <i>erecta</i>
Kane breadroot	<i>Pediomelum epipsilum</i>
Kodachrome bladderpod	<i>Physaria tumulosa</i>
Navajo sedge	<i>Carex specuicola</i>
Paria spurge	<i>Euphorbia nephradenia</i>
Siler pincushion cactus	<i>Pediocactus sileri</i> (= <i>Echinocactus</i> s., <i>Utahia</i> s.)
Smoky Mountain mallow	<i>Sphaeralcea grossulariifolia</i> var. <i>fumariensis</i>
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>
Welsh's milkweed	<i>Asclepias welshii</i>
Fish	
Bluehead sucker	<i>Catostomus discobolus</i>
Bonytail chub	<i>Gila elegans</i>
Colorado pikeminnow	<i>Ptychocheilus lucius</i>
Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>
Flannel mouth sucker	<i>Catostomus latipinnis</i>
Humpback chub	<i>Gila cypha</i>
Razorback sucker	<i>Xyrauchen texanus</i>
Roundtail chub	<i>Gila robusta</i>
Amphibians	
Arizona toad	<i>Bufo microscaphus</i>
Reptiles	
Common chuckwalla	<i>Sauromalus ater</i>
Desert night lizard	<i>Xantusia vigilis</i>

Common Name	Scientific Name
Birds	
Bald eagle	<i>Haliaeetus leucocephalus</i>
Burrowing owl	<i>Athene cunicularia</i>
California condor	<i>Gymnogyps californianus</i>
Ferruginous hawk	<i>Buteo regalis</i>
Golden eagle	<i>Aquila chrysaetos</i>
Greater sage-grouse	<i>Centrocercus urophasianus</i>
Lewis's woodpecker	<i>Melanerpes lewis</i>
Mexican spotted owl	<i>Strix occidentalis lucida</i>
Northern goshawk	<i>Accipiter gentiles</i>
Short-eared owl	<i>Asio flammeus</i>
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Mammals	
Allen's big-eared bat	<i>Idionycteris phyllotis</i>
Big free-tailed bat	<i>Nyctinomops macrotis</i>
Fringed myotis	<i>Myotis thysanodes</i>
Spotted bat	<i>Euderma maculatum</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
Western red bat	<i>Lasiurus blossevillii</i>

***Grand Staircase-Escalante National Monument and
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Appendix P

Water Resources

August 2018

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Appendix P: Water Resources

Subbasins and Surface Waterbodies

Table 1 includes acreages of subbasins in the Planning Area, and waterbodies within these subbasins. Waterbodies include natural creeks and rivers, natural waterbodies, linear conveyances, and artificial waterbodies.

Table 1. Subbasins and Surface Waterbodies in the Analysis Area

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
Kanab Creek Subbasin (15010003)	–	1,507,353	acres
<i>Natural Creeks and Rivers</i>			
Perennial Streams	Unnamed	81.0	km
	Big Sand Wash	0.20	km
	Birch Creek	0.78	km
	Bitter Seeps Wash	6.40	km
	Bulrush Wash	0.18	km
	Cottonwood Creek	16.2	km
	Dry Fork	0.03	km
	Johnson Wash	53.1	km
	Kaibab Wash	0.04	km
	Kanab Creek	203	km
	Lost Spring Wash	0.69	km
	Mill Creek	9.55	km
	North Fork Robinson Wash	0.11	km
	Pipe Valley Wash	0.18	km
	Robinson Wash	0.44	km
	Sandy Canyon Wash	0.41	km
	Seaman Wash	1.04	km
	Skutumpah Creek	13.3	km
	South Moccasin Wash	10.0	km
	Thompson Creek	25.0	km
Twomile Wash	15.1	km	
Intermittent streams	Unnamed	222	km
	Big Sand Wash	10.4	km
	Birch Creek	3.86	km
	Bitter Seeps Wash	6.15	km
	Bulrush Wash #1	19.1	km
	Bulrush Wash #2	32.3	km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Cottonwood Creek	23.9	km
	Dry Fork	3.41	km
	Johnson Wash	45.3	km
	Kaibab Wash	10.5	km
	Kanab Creek	70.4	km
	Lick Creek	3.16	km
	Lost Spring Wash	15.9	km
	Lower Robinson Creek	6.76	km
	Mineral Creek	6.58	km
	North Fork Robinson Wash	12.6	km
	Pipe Valley Wash	22.7	km
	Robinson Wash	34.3	km
	Sand Wash	13.6	km
	Sandy Canyon Wash	31.3	km
	Seaman Wash	21.8	km
	South Moccasin Wash	7.90	km
	Tenny Creek	7.47	km
	Thompson Creek	1.32	km
	Twomile Wash	0.84	km
	White Sage Wash	35.4	km
	Yellowstone Wash	13.2	km
Ephemeral Streams	Unnamed	8,902	km
Natural Waterbodies			
Perennial Waterbodies	Unnamed	2.8E-01	sq km
	Blowdown Tank	3.2E-04	sq km
	Cougar Lake	6.9E-04	sq km
	Dry Park Lakes	9.3E-04	sq km
	Earl Reservoir	2.8E-03	sq km
	East Lake	3.0E-03	sq km
	Jacob Lake	3.2E-03	sq km
	Lookout Lakes	5.6E-04	sq km
	Sims Reservoir	1.2E-02	sq km
	Spencer Number Two Reservoir	8.1E-02	sq km
	Three Lakes	1.8E-03	sq km
	Twin Tanks	2.9E-03	sq km
	V T Ridge Number Two Tank	2.2E-04	sq km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
Intermittent Waterbodies	Unnamed	1.28	sq km
	Big Cove Tank	1.5E-03	sq km
	Big Jackson Tank	2.6E-03	sq km
	Big Ridge Tank	7.1E-04	sq km
	Big Saddle Tank	6.8E-04	sq km
	Bone Hollow Tank	6.2E-04	sq km
	Buffalo Hill Tank	9.2E-04	sq km
	Burnt Corral Tank	8.6E-04	sq km
	CCC Trail Reservoir	4.1E-03	sq km
	Cedar Ridge Reservoir	2.8E-03	sq km
	Corral Lake	9.9E-04	sq km
	Deer Trail Tank	1.1E-03	sq km
	Dickie Tank	1.6E-03	sq km
	Divide Tank	1.0E-03	sq km
	Dugway Tank	2.9E-04	sq km
	East Slide Tank	2.3E-03	sq km
	Faver Tank	1.4E-03	sq km
	Filarea Tank	2.4E-03	sq km
	Findlay Tank	4.3E-04	sq km
	Flax Lakes	9.4E-04	sq km
	Fracas Canyon Tank	4.4E-04	sq km
	Government Reservoir	9.7E-04	sq km
	Gump Tank	2.0E-03	sq km
	Gunsight Tank	1.0E-03	sq km
	Hack Reservoir	2.2E-03	sq km
	Hatch Brothers Tank	4.9E-03	sq km
	Hatch Tank	3.0E-03	sq km
	Horsespring Tank	3.2E-04	sq km
	Jackson Reservoir	3.5E-03	sq km
	Jackson Tank	1.5E-03	sq km
	Jacob Canyon Tank	8.6E-04	sq km
	Jacob Reservoir	3.5E-03	sq km
	Jensen Tank	3.3E-03	sq km
Joes Mud Hole	2.0E-03	sq km	
Joes Reservoir	3.4E-03	sq km	
Johnson Reservoir	2.5E-03	sq km	
Judd Tank	1.1E-03	sq km	
Jumpup Tank	5.0E-04	sq km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	June Heaton Tank	1.4E-03	sq km
	June Tank	6.4E-03	sq km
	Lambs Lake	3.9E-03	sq km
	Lookout Canyon Tank	7.4E-04	sq km
	Meeks Reservoir	2.2E-03	sq km
	Merle Findlay Tank	1.0E-03	sq km
	Middle Burnt Corral Tank	6.1E-04	sq km
	Middle Reservoir	6.8E-04	sq km
	Mile-and-a-half Lake	2.4E-03	sq km
	Muggins Reservoir	3.7E-03	sq km
	Nates Tank	4.0E-03	sq km
	Nininger Tank	2.6E-03	sq km
	North Big Saddle Trick Tank	2.9E-04	sq km
	North Blow Down Tank	6.1E-04	sq km
	Old Arizona Catchment	2.4E-03	sq km
	Pigeon Tank	1.1E-03	sq km
	Pine Flat Tank	1.3E-03	sq km
	Pratt Reservoir	2.2E-03	sq km
	Robinson Reservoir	8.8E-04	sq km
	Rock Canyon Reservoir #1	3.5E-04	sq km
	Rock Canyon Reservoir #2	4.3E-04	sq km
	Sawmill Tank	8.6E-04	sq km
	School Section Tank	2.1E-03	sq km
	Slide Elbow Tank	3.9E-04	sq km
	Slide Tank	1.3E-03	sq km
	Spooks Knoll Reservoir	1.3E-03	sq km
	Suttle Tank	1.3E-03	sq km
	Table Rock Tank	1.1E-03	sq km
	Tom Lamb Reservoir	3.3E-03	sq km
	Warm Springs Lake	5.3E-04	sq km
	West Blow Down Tank	7.8E-04	sq km
	White Pockets Tank	4.3E-04	sq km
	White Tank	1.6E-03	sq km
	Whiting Tank	1.8E-03	sq km
	Wildhorse Park	6.0E-04	sq km
	Winter Road Catchment	3.1E-03	sq km
Linear Conveyances	N/A	N/A	N/A
Artificial Waterbodies	Unnamed	0.39	sq km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
Paria River Subbasin (14070007)	–	903,979	acres
<i>Natural Creeks and Rivers</i>			
Perennial Streams	Unnamed	61.1	km
	Bryce Creek	3.74	km
	Campbell Creek	1.34	km
	Cottonwood Creek	10.2	km
	Dry Creek	0.45	km
	Henrieville Creek	16.8	km
	Horse Creek	0.04	km
	Lower Crawford Creek	0.90	km
	Paria River	126	km
	Rock Springs Creek	0.02	km
	Sheep Creek	14.8	km
	Willis Creek	13.1	km
	Yellow Creek	3.71	km
Intermittent streams	Unnamed	4,890	km
	Bridge Creek	2.76	km
	Bryce Creek	6.63	km
	Bull Run	4.64	km
	Campbell Creek	9.74	km
	Cedar Fork	7.11	km
	Cottonwood Creek	38.2	km
	Coyote Wash	23.5	km
	Dry Creek	23.2	km
	Dry Valley Creek	17.8	km
	Hackberry Creek	32.3	km
	Henderson Creek	22.5	km
	Henrieville Creek	12.9	km
	Heward Creek	7.59	km
	Hogeye Creek	8.05	km
	Horse Creek	17.7	km
	Little Creek	18.1	km
	Lower Crawford Creek	10.0	km
	Lower Podunk Creek	14.3	km
	North Creek	13.5	km
Papoose Creek	4.06	km	
Paria River	23.6	km	
Rock Springs Creek	11.2	km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Sheep Creek	19.1	km
	Shurtz Bush Creek	9.10	km
	Snake Creek	7.65	km
	Squaw Creek	8.97	km
	Willis Creek	8.57	km
	Yellow Creek	13.3	km
Ephemeral Streams	N/A	N/A	N/A
Natural Waterbodies			
Perennial Waterbodies	Unnamed	0.11	sq km
Intermittent Waterbodies	Unnamed	0.45	sq km
	Bush Head Tank	8.7E-04	sq km
	Butler Valley Reservoir	2.1E-03	sq km
	Johnson Storage Reservoir	3.0E-03	sq km
	Lynn Tank	5.2E-04	sq km
	Maries Reservoir	2.0E-04	sq km
	Middle Reservoir	1.8E-03	sq km
	Moquitch Tank	7.0E-04	sq km
	Nipple Lake	0.37	sq km
	Rubin Tank	2.4E-03	sq km
	Shearing Corral Reservoir	4.1E-04	sq km
Linear Conveyances	Unnamed	40.9	km
Artificial Waterbodies	N/A	N/A	N/A
Lower Lake Powell Subbasin (14070006)	–	1,914,128	acres
Natural Creeks and Rivers			
Perennial Streams	Unnamed	324	km
	Antelope Creek	16.3	km
	Aztec Creek	15.2	km
	Bridge Creek	5.74	km
	Chaiyahi Creek	6.06	km
	Colorado River	127	km
	Dry Rock Creek	5.29	km
	Fall Creek	0.06	km
	Kaibito Creek	31.0	km
	Last Chance Creek	41.4	km
	Middle Rock Creek	6.17	km
	Navajo Creek	90.5	km
	Padre Creek	6.66	km
Rock Creek	10.9	km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	San Juan River	0.67	km
	Sand Wash	0.15	km
	Sei Billikoon	10.8	km
	Starting Water Wash	0.06	km
	Wahweap Creek	19.0	km
	Warm Creek	19.1	km
	West Canyon Creek	27.0	km
Intermittent Streams	Unnamed	5,810	km
	Allen Creek	7.96	km
	Bear Creek	4.10	km
	Birch Creek	1.82	km
	Blue Spring Creek	0.94	km
	Calf Creek	1.62	km
	Canaan Creek	18.4	km
	Cherry Creek	4.49	km
	Clear Creek	1.94	km
	Corn Creek	2.59	km
	Deep Creek	0.89	km
	Dry Creek	1.49	km
	Dry Fork #1	8.17	km
	Dry Fork #2	5.54	km
	East Deer Creek	1.12	km
	East Fork Boulder Creek	8.29	km
	East Fork North Creek	12.2	km
	Fiftymile Creek	15.1	km
	Fortymile Creek	19.6	km
	Frisky Creek	0.75	km
	Griffin Creek	2.43	km
	Grimes Creek	1.39	km
	Hall Creek	2.82	km
	Hungry Creek	1.61	km
	Indian Creek	3.34	km
	Left Hand Allen Creek	7.71	km
	Lizzie Creek	4.81	km
Mamie Creek	16.1	km	
Middle Deer Creek	2.21	km	
Moody Creek	39.3	km	
North Fork Silver Falls Creek	22.0	km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Pine Creek	17.5	km
	Road Draw Creek	1.19	km
	Sand Creek	1.45	km
	Silver Falls Creek	20.9	km
	Steep Creek	1.30	km
	Sweetwater Creek	10.4	km
	Twitchell Creek	2.59	km
	Upper Valley Creek	24.6	km
	West Branch Pine Creek	5.66	km
	West Fork Boulder Creek	2.19	km
	Willow Creek #1	21.8	km
	Willow Creek #2	10.8	km
	Willow Patch Creek	4.14	km
	Wolverine Creek	16.7	km
Ephemeral Streams	N/A	N/A	N/A
Natural Waterbodies			
Perennial Waterbodies	Unnamed	48.3	sq km
	Lake Powell	456	sq km
	Red Mesa Reservoir	0.001	sq km
Intermittent Waterbodies	Unnamed	0.366	sq km
	Alkali Tank #1	0.009	sq km
	Alkali Tank #2	0.002	sq km
	Antelope Tank	0.003	sq km
	Bishops Tank	0.000	sq km
	Circular Tank	0.002	sq km
	Dejolie Tank	0.018	sq km
	Drip Tank	0.000	sq km
	Gunsight Tank	0.002	sq km
	Padre Tank	0.001	sq km
	Point of the Mountain Tank	0.001	sq km
	Red Dirt Tank	0.001	sq km
	White Dome Tank	0.003	sq km
	Willow Tank	0.001	sq km
	Wooded Tank	0.004	sq km
Linear Conveyances	Unnamed	75.2	km
Artificial Waterbodies	Unnamed	0.15	sq km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
Escalante River Subbasin (14070005)	–	1,295,715	acres
<i>Natural Creeks and Rivers</i>			
Perennial Streams	Unnamed	257.0	km
	Bear Creek	10.8	km
	Birch Creek	20.3	km
	Blue Spring Creek	3.6	km
	Boulder Creek	40.7	km
	Calf Creek	13.1	km
	Cherry Creek	5.4	km
	Clear Creek	2.9	km
	Corn Creek	4.8	km
	Deep Creek	10.3	km
	Deer Creek	30.6	km
	Durfey Creek	3.8	km
	East Deer Creek	5.4	km
	East Fork Boulder Creek	15.5	km
	Escalante River	196.4	km
	Fiftymile Creek	4.3	km
	Frisky Creek	14.0	km
	Grimes Creek	2.5	km
	Hall Creek	5.8	km
	Hungry Creek	4.8	km
	Indian Creek	1.5	km
	Lake Creek	10.9	km
	Left Hand Allen Creek	0.0	km
	Middle Deer Creek	0.9	km
	Moody Creek	0.0	km
	North Creek	27.8	km
	Pine Creek	25.9	km
	Sand Creek	41.6	km
Silver Falls Creek	0.0	km	
Steep Creek	24.3	km	
Sweetwater Creek	7.4	km	
Twitchell Creek	5.7	km	
West Branch Pine Creek	3.7	km	
West Deer Creek	7.5	km	
West Fork Boulder Creek	9.1	km	
West Fork North Creek	5.2	km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	White Creek	4.6	km
	Willow Creek #1	0.0	km
	Willow Creek #2	6.4	km
Intermittent Streams	Unnamed	5,810.5	km
	Allen Creek	8.0	km
	Bear Creek	4.1	km
	Birch Creek	1.8	km
	Blue Spring Creek	0.9	km
	Calf Creek	1.6	km
	Canaan Creek	18.4	km
	Cherry Creek	4.5	km
	Clear Creek	1.9	km
	Corn Creek	2.6	km
	Deep Creek	0.9	km
	Dry Creek	1.5	km
	Dry Fork #1	8.2	km
	Dry Fork #2	5.5	km
	East Deer Creek	1.1	km
	East Fork Boulder Creek	8.3	km
	East Fork North Creek	12.2	km
	Fiftymile Creek	15.1	km
	Fortymile Creek	19.6	km
	Frisky Creek	0.7	km
	Griffin Creek	2.4	km
	Grimes Creek	1.4	km
	Hall Creek	2.8	km
	Hungry Creek	1.6	km
	Indian Creek	3.3	km
	Left Hand Allen Creek	7.7	km
	Lizzie Creek	4.8	km
	Mamie Creek	16.1	km
	Middle Deer Creek	2.2	km
	Moody Creek	39.3	km
	North Fork Silver Falls Creek	22.0	km
	Pine Creek	17.5	km
	Road Draw Creek	1.2	km
	Sand Creek	1.4	km
	Silver Falls Creek	20.9	km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Steep Creek	1.3	km
	Sweetwater Creek	10.4	km
	Twitchell Creek	2.6	km
	Upper Valley Creek	24.6	km
	West Branch Pine Creek	5.7	km
	West Fork Boulder Creek	2.2	km
	Willow Creek	21.8	km
		10.8	km
	Willow Patch Creek	4.1	km
	Wolverine Creek	16.7	km
Ephemeral Streams	N/A	N/A	N/A
Natural Waterbodies			
Perennial Waterbodies	Unnamed	14.50	sq km
	Bakeskillet Lake	0.03	sq km
	Barker Reservoir	0.04	sq km
	Barney Lake	0.01	sq km
	Bear Lake	0.06	sq km
	Black Lake	0.02	sq km
	Blue Lake	0.00	sq km
	Chriss Lake	0.02	sq km
	Circle Lake	0.02	sq km
	Crater Lake	0.03	sq km
	Cresecent Lake	0.04	sq km
	Cyclone Lake	0.33	sq km
	Deer Creek Lake	0.10	sq km
	Divide Lake	0.02	sq km
	Dry Lake	0.08	sq km
	East Boulder Lakes	0.01	sq km
	East Lake	0.01	sq km
	Elbow Lake	0.02	sq km
	Five Lakes	0.00	sq km
	Flat Lake	0.03	sq km
Grass Lake	0.03	sq km	
Green Lake	0.01	sq km	
Halfmoon Lake	0.04	sq km	
Horseshoe Lake	0.05	sq km	
Jacobs Reservoir	1.43	sq km	
Joe Lay Reservoir	0.01	sq km	

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Kings Pasture Reservoir	0.01	sq km
	Lake Powell	187.98	sq km
	Ledge Lake	0.00	sq km
	Long Willow Bottom Reservoir	0.01	sq km
	Lower Barker Reservoir	0.02	sq km
	McGath Lake	0.18	sq km
	Moosman Reservoir	0.01	sq km
	North Creek Reservoir	0.10	sq km
	Posy Lake	0.05	sq km
	Purple Lake	0.06	sq km
	Rain Lakes	0.01	sq km
	Rim Lake	0.02	sq km
	Round Willow Bottom Reservoir	0.03	sq km
	Roundy Reservoir	0.28	sq km
	Row Lakes	0.00	sq km
	Spectacle Lake	0.13	sq km
	Steep Creek Lake	0.01	sq km
	Tall Four Reservoir	0.00	sq km
	Tule Lakes	0.02	sq km
	Twin Lakes #1	0.00	sq km
	Twin Lakes #2	0.00	sq km
	West Fork Reservoir	0.00	sq km
	West Lake	0.00	sq km
	Wide Hollow Reservoir	0.59	sq km
	Yellow Lake	0.02	sq km
Intermittent Waterbodies	Unnamed	0.95	sq km
	Auger Hole Lake	0.06	sq km
	Barney Reservoir	1.1E-03	sq km
	Blue Grass Lake	2.6E-03	sq km
	Boulder Meadows	5.4E-04	sq km
	Cuddyback Lake	0.03	sq km
	Death Ridge Reservoir	3.3E-03	sq km
	Deer Lakes	2.4E-03	sq km
	Donkey Lake	6.9E-03	sq km
	Dry Lake	0.05	sq km
	Four Lakes	5.6E-03	sq km
	Gates Tank	3.3E-04	sq km
	Green Lake	0.04	sq km

Subbasin (HUC-8) / Waterbody	Name of Waterbody	Area/Length within Analysis Area	Unit
	Kings Pasture	1.4E-03	sq km
	Marts Pasture	6.7E-04	sq km
	Mud Lake	0.02	sq km
	Rock Lake	3.9E-03	sq km
	Rockwell Reservoir	3.4E-03	sq km
	Sawmill Lake	0.02	sq km
	Stink Flats	1.9E-03	sq km
Linear Conveyances	Unnamed	38.3	km
	Tailrace Canal	2.30	km
Artificial Waterbodies	N/A	N/A	N/A

Source: GIS Derived Data

HUC – Hydrologic Unit Code, km – kilometer, sq km – square kilometer, N/A – none reported/present

References

BLM. 2018. GIS Derived Data.

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix Q

Livestock Grazing

August 2018

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Appendix Q: Livestock Grazing

This appendix provides an overview of livestock grazing allotments including acreage and season of use (Table 1), allotment categorization (Table 2), and allotments assessed for standards and guidelines (Table 3). In addition, it provides details of range improvement projects. Table 4 presents allotment acres available or unavailable for livestock grazing by alternative.

Table 1. Grazing Allotments, Acres, Animal Unit Months, and Season of Use

Allotment Number	Allotment Name	Public Acres GIS	Livestock Kind	Season of Use	Public AUMs
UT06001	Alvey Wash	60,185	Cattle	May 15–September 30	1,424
UT06003	Big Bowns Bench ¹	16,839	Cattle	November 1–March 31	750
UT06002	Big Horn	50,215	Cattle	November 1–June 15	3,515
UT06006	Black Ridge	11,657	Cattle	November 1–May 31	903
UT24008	Black Rock	9,310	Cattle	June 6–October 16	408
UT05917	Black Rock (State)	1,251	Cattle	June 6–October 16	64
UT14009	Boot	2,675	Cattle	August 1–October 31	45
UT06004	Boulder Creek	3,251	Cattle	September 1–December 31	80
UT00018	Bull Run (State)	631	Cattle	July 1–February 28	5
UT05952	Bunting Trust (State)	226	Cattle	May 15–November 30	16
UT24018	Calf Pasture	2,775	Cattle	June 10–August 10 (even years) August 10–October 15 (odd years)	176
UT06007	Circle Cliffs	30,212	Cattle	November 1–March 31	1,050
UT15003	Clark Bench	25,170	Cattle	November 1–April 30	1,238
UT25055	Cockscomb	2,753	Cattle	March 1–May 31	36
UT06008	Collet	16,723	Cattle	June 16–September 15	97
UT15004	Cottonwood	103,326	Cattle	November 1–May 31	3,188
UT25034	Coyote	32,636	Cattle	November 1–May 31	2,044
UT06009	Death Hollow	19,538	Cattle	November 1–March 31 April 1–May 15	1,057
UT06010	Deer Creek	8,991	Cattle	November 1–February 28	358
UT06010	Wolverine Pasture (forage reserve) of the Deer Creek Allotment	3,816	Cattle	October 1–March 31	148
UT25005	Deer Range	11,107	Cattle	August 1–October 15	231
UT24030	Deer Spring Point	24,986	Cattle	June 10–October 17	585
UT25006	Dry Valley	11,448	Cattle	March 1–December 31 March 1–January 31 July 1–October 31	699
UT24041	First Point	3,015	Cattle	June 1–December 31	410
UT24043	Fivemile Mountain	17,848	Cattle	November 1–April 30	385
UT24044	Flood Canyon	13,576	Cattle	July 1–October 31	148
UT24047	Ford Well	9,088	Cattle	June 10–October 9	300

Allotment Number	Allotment Name	Public Acres GIS	Livestock Kind	Season of Use	Public AUMs
UT06012	Fortymile Ridge ¹	57,905	Cattle	October 15–May 31	4,290
UT24055	Granary Ranch	1,905	Cattle	July 1–November 30	70
UT06036	Hall Ranch	34	Cattle	March 1–February 28	12
UT06013	Haymaker Bench	3,150	Cattle	November 1–February 28	100
UT15011	Headwaters	154,436	Cattle	November 1–March 15	3,469
UT24060	Hells Bellows	2,132	Cattle	May 1–October 15	44
UT04121	Johnson Canyon	10,121	Cattle	June 1–November 15	274
UT24064	Johnson Lakes	11,142	Cattle	June 1–November 30	347
UT24065	Johnson Point	2,344	Cattle	November 1–March 31	135
UT24065	King Bench	54,328	Cattle	November 1–March 31	1,515
UT06015	Lake ¹	22,741	Cattle	June 1–September 30	1,310
UT04135	Lake Powell ¹	367	Horse	October 15–March 15	20
UT06016	Last Chance ¹	250,120	Cattle	March 1–February 28	4,642
UT06022	Little Bowns Bench (forage reserve)	3,422	Cattle	October 1–March 31	130
UT14071	Locke Ridge	4,456	Cattle	December 1–April 30	172
UT06017	Lower Cattle ¹	81,350	Cattle	October 1–April 15	7,488
UT25014	Lower Hackberry	20,173	Cattle	October 15–March 15	435
UT25015	Lower Warm Creek ¹	15,920	Cattle/ Horse	November 1–March 31	225
UT05957	Main Canyon	312	Cattle	June 1–September 30	14
UT24081	Meadow Canyon	4,681	Cattle	September 1–November 30	144
UT24083	Mollies Nipple	102,361	Cattle	March 1–February 28	3,880
UT06019	Moody ¹	43,272	Cattle	November 1–March 31	909
UT25016	Mud Springs	15,652	Cattle	July 15–October 15	277
UT14086	Neaf	1,287	Cattle	March 1–November 30	9
UT25018	Nipple Bench ¹	30,459	Cattle	December 1–April 30	1,042
UT06024	Phipps (Phipps pasture; forage reserve)	7,365	Cattle	October 1–March 31	140
UT06023	Pine Creek	3,804	Cattle	September 16–October 31	144
UT05912	Pine Creek (State)	592	Cattle	November 1–January 31	27
UT04102	Pine Point	8,828	Cattle	June 16–October 15	365
UT06020	Rock Creek-Mudholes ¹	64,873	Cattle	March 1–February 28	2,173
UT25020	Round Valley	9,920	Cattle	November 1–March 31	522
UT25054	Roy Willis	195	Cattle	November 1–March 15	9
UT25021	Rush Beds	18,765	Cattle	November 1–April 30	252
UT14105	School Section	753	Cattle	May 1–April 30	102
UT04161	Second Point	5,890	Cattle	August 1–September 30	98
UT04111	Sink Holes	6,589	Cattle	November 1–April 1	154
UT05930	Slick Rock (State)	643	Cattle	June 1–June 30	24
UT06026	Soda ¹	70,445	Cattle	October 1–May 31	2,798
UT06056	South Fork	118	Cattle	March 1–February 28	12
UT14120	Swallow Park	16,494	Cattle	May 1–October 31	1,076

Allotment Number	Allotment Name	Public Acres GIS	Livestock Kind	Season of Use	Public AUMs
UT04124	Timber Mountain	7,662	Cattle	June 16–October 15	426
UT06028	Upper Cattle ¹	92,420	Cattle	November 1–June 15	8,158
UT25023	Upper Hackberry	22,835	Cattle	November 1–March 31 April 16–June 15	654
UT06033	Upper Paria	94,347	Cattle	May 1–June 10 May 1–September 30	2,833
UT15024	Upper Warm Creek ¹	77,363	Cattle	November 1–May 31	1,638
UT04130	Vermilion	43,084	Cattle	February 16–February March 1–May 15 June 1–September 15 October 1–January 15	2,849
UT06029	Wagon Box Mesa ¹	28,995	Cattle	November 1–March 31	637
UT25025	Wahweap	17,222	Cattle	December 1–April 30	491
UT06032	White Rock	1,389	Cattle	December 1–January 31	60
UT04134	White Sage	2,142	Cattle	May 6–June 5	76
UT06030	Wide Hollow	3,779	Cattle	October 1–December 31	353
UT06031	Willow Gulch	12,214	Cattle	November 1–March 31 December 1–January 31	474
UT04145	Wiregrass ¹	19,865	Cattle	November 1–March 31	99

Source: BLM 2018

¹ Allotment partially or wholly in Glen Canyon

GIS – geographic information system, AUM – animal unit month

Table 2 presents the current and proposed allotment categorization for allotments in the Planning Area. In 1985, the Bureau of Land Management (BLM) established three categories for allotments to identify areas where management was needed, as well as to prioritize workloads and the use of range improvement dollars. The categories and criteria used to place an allotment into each category are described below.

Category I – Improve Existing Resource Conditions. Criteria for placing allotments into this category include (1) the present range condition is unsatisfactory and where range condition is expected to decline further; (2) the present grazing management is not adequate; (3) the allotment has potential for medium to high vegetative production but production is low to moderate; (4) resource conflicts/controversy with livestock grazing are evident; and (5) there is potential for positive economic return on public investment.

Category M – Maintain Existing Resource Conditions. Criteria for placing allotments into this category include: (1) the present range condition and management are satisfactory with good to excellent condition and will be maintained under present management, or fair condition and improving with improvement expected to continue under present management, or opportunities for BLM management are limited because percentage of public land is low or acreage of public lands is small; (2) the allotment has a potential for moderate or high vegetative production and is producing at or near this potential; (3) there are no significant land-use resource conflicts with livestock grazing; (4) land ownership status may or may not limit management opportunities; and (5) opportunities for positive economic return from public investment may exist.

Category C – Custodial Management. Criteria for placing allotments into this category include: (1) the present range condition is not in a downward trend; (2) the allotment has a low vegetative production potential and is producing near this level; (3) there may or may not be limited conflicts between livestock grazing and other resources; (4) present management is satisfactory or is the only logical management under existing conditions; and (5) opportunities for a positive economic return on public investments do not exist.

Table 2. Allotment Categorization: Current

Allotment	Allotment Name	Current Category
UT06001	Alvey Wash	M
UT06003	Big Bowns Bench ¹	M
UT06002	Big Horn	I
UT06006	Black Ridge	M
UT24008	Black Rock	I
UT05917	Black Rock (State)	M
UT14009	Boot	C
UT06004	Boulder Creek	C
UT00018	Bull Run (State)	C
UT05952	Bunting Trust (State)	M
UT24018	Calf Pasture	M
UT06007	Circle Cliffs	I
UT15003	Clark Bench	M
UT25055	Cockscomb	C
UT06008	Collet	C
UT15004	Cottonwood	M
UT25034	Coyote	M
UT06009	Death Hollow	C
UT06010	Deer Creek	M
UT06010	Wolverine Pasture (forage reserve)	M
UT25005	Deer Range	M
UT24030	Deer Spring Point	I
UT25006	Dry Valley	M
UT24041	First Point	M
UT24043	Fivemile Mountain	C
UT24044	Flood Canyon	I
UT24047	Ford Well	C
UT06012	Fortymile Ridge ¹	I
UT24055	Granary Ranch	C
UT06036	Hall Ranch	C
UT06013	Haymaker Bench	M
UT15011	Headwaters	M
UT24060	Hells Bellows	C

Appendix Q: Livestock Grazing

Allotment	Allotment Name	Current Category
UT04121	Johnson Canyon	C
UT24064	Johnson Lakes	I
UT24065	Johnson Point	C
UT24065	King Bench	I
UT06015	Lake ¹	M
UT04135	Lake Powell ¹	M
UT06016	Last Chance ¹	I
UT06022	Little Bowns Bench (forage reserve)	C
UT14071	Locke Ridge	I
UT06017	Lower Cattle ¹	M
UT25014	Lower Hackberry	I
UT25015	Lower Warm Creek ¹	M
UT05957	Main Canyon	M
UT24081	Meadow Canyon	I
UT24083	Mollies Nipple	M
UT06019	Moody ¹	C
UT06019	Mud Springs	I
UT14086	Neaf	C
UT25018	Nipple Bench ¹	I
UT06024	Phipps (Phipps pasture; forage reserve)	I
UT06023	Pine Creek	C
UT05912	Pine Creek (State)	M
UT04102	Pine Point	I
UT06020	Rock Creek-Mudholes ¹	I
UT25020	Round Valley	I
UT25054	Roy Willis	C
UT25021	Rush Beds	I
UT14105	School Section	C
UT04161	Second Point	C
UT04111	Sink Holes	I
UT05930	Slick Rock (State)	M
UT06026	Soda ¹	I
UT06056	South Fork	C
UT14120	Swallow Park	I
UT04124	Timber Mountain	M
UT06028	Upper Cattle ¹	I
UT25023	Upper Hackberry	I
UT06033	Upper Paria	I
UT15024	Upper Warm Creek ¹	I

Allotment	Allotment Name	Current Category
UT04130	Vermilion	M
UT06029	Wagon Box Mesa ¹	C
UT25025	Wahweap	M
UT06032	White Rock	M
UT04134	White Sage	C
UT06030	Wide Hollow	C
UT06031	Willow Gulch	M
UT04145	Wiregrass ¹	M

Source: BLM 2018

¹Allotment partially or wholly in Glen Canyon

Table 3. Allotment Management Plans and Rangeland Management Agreements Developed

Allotment Number	Allotment Name	Management Plan Type	AMP Implementation Date	Public Acres
UT06001	Alvey Wash	A	07/01/1983	
UT06003	Big Bowns Bench ¹	-	-	
UT06002	Big Horn	A	03/01/1984	
UT06006	Black Ridge	A	06/01/1987	
UT24008	Black Rock	A	06/01/1969	
UT05917	Black Rock (State)	-	-	
UT14009	Boot	-	-	
UT06004	Boulder Creek	-	-	
UT00018	Bull Run (State)	-	-	
UT05952	Bunting Trust (State)	-	-	
UT24018	Calf Pasture	A	06/01/1986	
UT06007	Circle Cliffs	A	07/01/1983	
UT15003	Clark Bench	A	11/01/1976	
UT25055	Cockscomb	-	-	
UT06008	Collet	-	-	
UT15004	Cottonwood	A	11/01/1978	
UT25034	Coyote	A	03/01/1981	
UT06009	Death Hollow	-	-	
UT06010	Deer Creek	-	-	
UT06010	Wolverine Pasture (forage reserve)	-	-	
UT25005	Deer Range	-	-	
UT24030	Deer Spring Point	A	11/01/1980	
UT25006	Dry Valley	-	-	
UT24041	First Point	A	03/01/1980	
UT24043	Fivemile Mountain	-	-	

Appendix Q: Livestock Grazing

Allotment Number	Allotment Name	Management Plan Type	AMP Implementation Date	Public Acres
UT24044	Flood Canyon	A	09/16/1982	
UT24047	Ford Well	C	02/10/2000	
UT06012	Fortymile Ridge ¹	A	12/01/1983	
UT24055	Granary Ranch	-	-	
UT06036	Hall Ranch	-	-	
UT06013	Haymaker Bench	N	-	
UT15011	Headwaters	A	05/01/1977	
UT24060	Hells Bellows	-	-	
UT04121	Johnson Canyon	-	-	
UT24064	Johnson Lakes	A	07/01/1982	
UT24065	Johnson Point	-	-	
UT06014	King Bench	A	07/01/1970	
UT06015	Lake ¹	A	06/01/1971	
UT04135	Lake Powell ¹	N	09/19/1982	
UT06016	Last Chance ¹	A	07/01/1983	
UT06022	Little Bowns Bench (forage reserve)	-	-	
UT14071	Locke Ridge	A	03/12/1981	
UT06017	Lower Cattle ¹	A	09/01/1966	
UT25014	Lower Hackberry	A	03/26/1981	
UT25015	Lower Warm Creek ¹	-	-	
UT05957	Main Canyon	-	-	
UT24081	Meadow Canyon	A	03/12/1981	
UT24083	Mollies Nipple	A	03/01/1974	
UT06019	Moody ¹	-	-	
UT06019	Mud Springs	A	08/31/1982	
UT14086	Neaf	-	-	
UT25018	Nipple Bench ¹	-	-	
UT06024	Phipps (Phipps pasture; forage reserve)	A	09/16/1982	
UT06023	Pine Creek	-	-	
UT05912	Pine Creek (State)	-	-	
UT04102	Pine Point	A	09/30/1988	
UT06020	Rock Creek-Mudholes ¹	A	07/01/1983	
UT25020	Round Valley	A	09/07/1983	
UT25054	Roy Willis	-	-	
UT25021	Rush Beds	A	08/31/1982	
UT14105	School Section	-	-	
UT04161	Second Point	-	-	

Allotment Number	Allotment Name	Management Plan Type	AMP Implementation Date	Public Acres
UT04111	Sink Holes	–	–	
UT05930	Slick Rock (State)	–	–	
UT06026	Soda ¹	A	10/01/1983	
UT06056	South Fork	–	–	
UT14120	Swallow Park	A	06/15/1983	
UT04124	Timber Mountain	–	–	
UT06028	Upper Cattle ¹	A	05/01/1984	
UT25023	Upper Hackberry	A	03/26/1981	
UT06033	Upper Paria	A	04/07/1997	
UT15024	Upper Warm Creek ¹	A	02/25/1981	
UT04130	Vermilion	A	05/01/1969	
UT06029	Wagon Box Mesa ¹	–	–	
UT25025	Wahweap	–	–	
UT06032	White Rock	–	–	
UT04134	White Sage	–	–	
UT06030	Wide Hollow	A	07/01/1983	
UT06031	Willow Gulch	A	11/01/1984	
UT04145	Wiregrass ¹	A	12/28/1988	

Source: BLM 2018

¹ Allotment partially or wholly in Glen Canyon

AMP – Allotment Management Plan, A – Allotment Management Plan Implemented, C – Coordinated Management Plan Implemented, N – AMP written

– : No activity has been proposed written, or implemented for the allotment

Range Improvements

Existing rangeland seedings were originally completed throughout the Planning Area to provide forage for livestock, reduce erosion, and enhance watershed functionality. Typically, a rangeland seeding is a type of nonstructural range improvement where a vegetation type or community has been established through the artificial dissemination of seed and by clearing away vegetation. The original seedings were typically monocultures of crested wheatgrass or Russian wild rye. Seedings that are more recent have consisted of a mixture of native and nonnative species that include shrubs, forbs, and grasses.

In some cases, seedings were established to help improve the management of nearby resources. For example, in order to entice cattle away from riparian areas, some areas have been treated to provide palatable forage outside of the riparian zone. Currently, vegetation treatments in seedings are primarily intended to restore vegetation communities and wildlife habitat or to manage livestock use. No seedings are allowed on National Park System-managed lands, except on a case-by-case basis for ecological restoration. The BLM has completed nonstructural range improvements on approximately 4 percent of the decision area. The BLM maintains these seedings, although some are no longer functioning at a desired ecological level in the Upper Paria, Last Chance, Circle Cliffs, Vermilion, Mollies Nipple, Coyote, Cottonwood, and Headwaters Allotments. The BLM has treated some of the no-longer-

functioning seedings in order to restore them, with varying levels of success. The BLM bases current forage allocations on the presence and maintenance of these seedings. The failure of some of these seedings is partially responsible for actual use levels below permitted use.

The BLM authorizes most range improvements through a cooperative range improvement agreement (43 Code of Federal Regulations [CFR] 4120.3-2). Improvements authorized through such an agreement are permanent range improvements or rangeland developments (structural or nonstructural) needed to achieve management or resource condition objectives. Range improvements authorized under a cooperative range improvement agreement up to August 21, 1995, may be co-owned by the United States and the permittee; those issued after August 21, 1995, are owned by the United States alone. The costs of installing, maintaining, or modifying the improvements may be shared by the Government and the permittee, as specified in the cooperative range improvement agreement.¹

The BLM also authorizes range improvements through a range improvement permit (43 CFR 4120.3-3). Improvements authorized through such a permit are needed to achieve management objectives for the allotment in which the permit is held. Such improvements are removable or temporary, such as livestock handling facilities (e.g., corrals, handling equipment, and loading chutes) and troughs. The permittee owns range improvements issued under a range improvement permit and is generally responsible for maintaining such improvements.

In Glen Canyon, nonstructural range improvements, land treatments, and new line cabins are not permitted, according to the 1993 Interagency Agreement between the BLM and National Park Service for grazing management. Other range improvements could be permitted, subject to 54 United States Code 100101(a) et seq., the Glen Canyon enabling legislation, the Glen Canyon Grazing Management Plan, and the Glen Canyon General Management Plan. The Glen Canyon Superintendent first must complete a determination regarding the potential effects of the proposed action on the values and purposes of Glen Canyon.

¹ On July 12, 2006, BLM promulgated new grazing regulations, but these regulations became the subject of a Federal lawsuit and were ultimately enjoined in all respects by the Federal District Court of Idaho. As a result of the court's decision, BLM applies the grazing regulations as they existed prior to the 2006 rulemaking. This has been reiterated in several Instructional Memoranda (IM) from the BLM Washington Office. See BLM-WO IM 2007-004, "Grazing Regulations Status" (October 10, 2006), IM 2007-137 "Idaho District Court Enjoins Grazing Regulations" (June 15, 2007), and IM 2009-109 "Idaho District Court Order and Judgment Enjoins Grazing Regulations" (September 30, 2010).

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Table 4. Allotment Acres as Available or Unavailable to Livestock Grazing by Alternative

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Alvey Wash #UT06001 Total Acres: 60,216 (56,169)¹																				
Available Acres	0	12,626	0	43,453	0	0	0	0	0	0	0	12,626	0	43,453	0	0	12,626	0	43,453	0
Unavailable Acres	0	0	0	0	0	0	12,626	0	43,453	0	0	0	0	0	0	0	0	0	0	0
Antone Flat (Unallotted) Total Acres: 15,033																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15,033	0	0	0	0
Unavailable Acres	15,033	0	0	0	0	15,033	0	0	0	0	15,033	0	0	0	0	0	0	0	0	0
Big Bowns Bench #UT06003 Total Acres: 18,590 (14,445) GCNRA Acres: 4145																				
Available Acres	13,522	0	0	0	0	0	0	0	0	0	13,522	0	0	0	0	13,522	0	0	0	0
Unavailable Acres	923	0	0	0	0	13,522	0	0	0	0	923	0	0	0	0	0	0	0	0	0
Big Horn #UT06002 Total Acres: 53,178 (48,498)																				
Available Acres	38,855	553	0	9,110	0	30,715	533	0	9,020	0	38,855	553	0	9,110	0	38,855	553	0	9,110	0
Unavailable Acres	0	0	0	0	0	8,140	0	0	90	0	0	0	0	0	0	0	0	0	0	0
Black Ridge #UT06006 Total Acres: 11,657																				
Available Acres	0	2,487	0	9,169	0	0	2,487	0	9,169	0	0	2,487	0	9,169	0	0	2,487	0	9,169	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Rock #UT24008 Total Acres: 9,348 (4,287)																				
Available Acres	0	0	1283	3004	0	0	0	1283	3004	0	0	0	1283	3004	0	0	1283	3004	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black Rock (State) #UT05917 Total Acres: 1,251 (236)																				
Available Acres	0	0	0	236	0	0	0	0	236	0	0	0	0	236	0	0	0	0	236	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boot #UT14009 Total Acres: 2,946																				
Available Acres	0	0	2,946	0	0	0	0	2,946	0	0	0	0	2,946	0	0	0	0	2,946	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boulder Creek #UT06004 Total Acres: 3,252																				
Available Acres	3,252	0	0	0	0	3,252	0	0	0	0	3,252	0	0	0	0	3,252	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bull Run (State) #UT00018 Total Acres: 631																				
Available Acres	0	0	0	631	0	0	0	0	631	0	0	0	0	631	0	0	0	0	631	0

Acres	Alternative A					Alternative B					Alternative C					Alternative D					
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bunting Trust (State) #UT05952 Total Acres: 226 (0)																					
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Calf Pasture #UT24018 Total Acres: 2,991 (2,775)																					
Available Acres	0	0	327	2,448	0	0	0	327	2,448	0	0	0	327	2,448	0	0	0	0	327	2,448	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Circle Cliffs #UT06007 Total Acres: 31,672 (30,240)																					
Available Acres	4,402	0	0	25,838	0	4,402	0	0	20,204	0	4,402	0	0	25,838	0	4,402	0	0	25,838	0	
Unavailable Acres	0	0	0	0	0	0	0	0	5,634	0	0	0	0	0	0	0	0	0	0	0	
Clark Bench #UT15003 Total Acres: 25,858 (16,758)																					
Available Acres	0	0	0	16,758	0	0	0	0	16,758	0	0	0	0	16,758	0	0	0	0	0	16,758	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cockscomb #UT25055 Total Acres: 3,695																					
Available Acres	0	0	44	3,651	0	0	0	44	3,651	0	0	0	44	3,651	0	0	0	0	44	3,651	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collet #UT06008 Total Acres: 16,723 (16,724)																					
Available Acres	0	12,704	0	4,020	0	0	12,704	0	4,020	0	0	12,704	0	4,020	0	0	0	12,704	0	4,020	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood #UT15004 Total Acres: 103,818																					
Available Acres	0	29,369	15,739	58,710	0	0	27,751	11,253	48,114	0	0	29,369	15,739	58,710	0	0	0	29,369	15,739	58,710	0
Unavailable Acres	0	0	0	0	0	0	1,618	4,486	10,596	0	0	0	0	0	0	0	0	0	0	0	0
Coyote #UT25034 Total Acres: 32,669 (32,636)																					
Available Acres	0	4,855	66	27,715	0	0	4,855	66	27,715	0	0	4,855	66	27,715	0	0	0	4,855	66	27,715	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Death Hollow #UT06009 Total Acres: 19,538																					
Available Acres	6,668	0	0	12,870	0	6,668	0	0	12,870	0	6,668	0	0	12,870	0	6,668	0	0	12,870	0	
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer Creek #UT06010 Total Acres: 12,807 (17,976)																					
Available Acres	12,807	0	0	0	0	0	0	0	0	0	12,807	0	0	0	0	17,967	0	0	0	0	0

Appendix Q: Livestock Grazing

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Unavailable Acres	5,169	0	0	0	0	17,967	0	0	0	0	5,169	0	0	0	0	0	0	0	0	0
Deer Range #UT25005 Total Acres: 11,748 (11,107)																				
Available Acres	0	0	7,287	3,820	0	0	0	7,287	3,280	0	0	0	7,287	3,280	0	0	0	7,287	3,280	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer Spring Point #UT24030 Total Acres: 33,410 (19,296)																				
Available Acres	0	0	6,393	12,903	0	0	0	6,393	12,903	0	0	0	6,393	12,903	0	0	0	6,393	12,903	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry Hollow (Closed) Total Acres: 1,273																				
Available Acres	0	0	0	0	0	0	0	0	0	0	1,273	0	0	0	0	1,273	0	0	0	0
Unavailable Acres	1,273	0	0	0	0	1,273	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry Valley #UT25006 Total Acres: 15,775 (7,017) Need Acreage for Hackberry Canyon portion of Dry Valley																				
Available Acres	0	3,703	0	3,314	0	0	3,703	0	3,314	0	0	3,703	0	3,314	0	0	3,703	0	3,414	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escalante River (Closed) Total Acres: 1,194																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	214	0	0	1,194	0	214	0	0	1,194	0	214	0	0	1,194	0	214	0	0	1,194	0
First Point #UT24041 Total Acres: 3,015																				
Available Acres	0	0	2,990	25	0	0	0	2,990	25	0	0	0	2,990	25	0	0	0	2,990	25	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fivemile Mountain #UT24043 Total Acres: 18,082 (17,636)																				
Available Acres	0	0	0	17,636	0	0	0	0	17,636	0	0	0	0	17,636	0	0	0	0	17,636	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flag Point Total Acres: 322																				
Available Acres	0	0	322	0	0	0	0	0	0	0	0	0	322	0	0	0	0	322	0	0
Unavailable Acres	0	0	0	0	0	0	0	322	0	0	0	0	0	0	0	0	0	0	0	0
Flood Canyon #UT24044 Total Acres: 13,575																				
Available Acres	0	0	13,575	0	0	0	0	0	0	0	0	0	13,575	0	0	0	0	13,575	0	0
Unavailable Acres	0	0	0	0	0	0	0	13,575	0	0	0	0	0	0	0	0	0	0	0	0
Ford Well #UT24047 Total Acres: 9,089 (8,720)																				
Available Acres	0	0	3,894	4,826	0	0	0	3,894	4,826	0	0	0	3,894	4,826	0	0	0	3,894	4,826	0

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fortymile Ridge #UT06012 Total Acres: 57,728 (39,975) GCNRA Lands 17,753??																				
Available Acres	0	8,081	0	31,894	0	0	8,011	0	29,771	0	0	8,081	0	31,894	0	0	8,081	0	31,894	0
Unavailable Acres	0	0	0	0	0	0	70	0	2,123	0	0	0	0	0	0	0	0	0	0	0
Granary Ranch #UT24055 Total Acres: 1,940																				
Available Acres	0	0	1,927	0	0	0	0	1,927	0	0	0	0	1,927	0	0	0	0	1,927	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hall Ranch #UT06036 Total Acres: 22																				
Available Acres	0	0	0	22	0	0	0	0	22	0	0	0	0	22	0	0	0	0	22	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harvey's Fear (Closed) Total Acres: 1921																				
Available Acres	0	0	0	0	0	0	0	0	22	0	0	0	0	22	0	0	0	0	22	0
Unavailable Acres	0	1,921	0	0	0	0	1,921	0	0	0	0	1,921	0	0	0	0	1,921	0	0	0
Haymaker Bench #UT06013 Total Acres: 3,153																				
Available Acres	3,153	0	0	0	0	3,153	0	0	0	0	3,153	0	0	0	0	3,153	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Headwaters #UT15011 Total Acres: 154,436																				
Available Acres	0	152,731	0	1,706	0	0	152,731	0	1,706	0	0	152,731	0	1,706	0	0	152,731	0	1,706	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hells Bells #UT24060 Total Acres: 2,513																				
Available Acres	0	0	1,931	120	0	0	0	1,931	120	0	0	0	1,931	120	0	0	0	1,931	120	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Johnson Canyon #UT04121 Total Acres: 10,489 (6,883)																				
Available Acres	0	0	6,855	28	0	0	0	6,855	28	0	0	0	6,855	28	0	0	0	6,855	28	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Johnson Lakes #UT24064 Total Acres: 11,142																				
Available Acres	0	0	11,142	0	0	0	0	11,142	0	0	0	0	11,142	0	0	0	0	11,142	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Johnson Point #UT24065 Total Acres: 2,344																				
Available Acres	0	0	1,719	624	0	0	0	1,719	624	0	0	0	1,719	624	0	0	0	1,719	624	0

Appendix Q: Livestock Grazing

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
King Bench #UT06014 Total Acres: 54,329																				
Available Acres	34,021	0	0	20,308	0	7,620	0	0	20,308	0	34,021	0	0	20,308	0	34,021	0	0	20,308	0
Unavailable Acres	0	0	0	0	0	26,401	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake #UT06015 Total Acres: 22,704 (17,629) GCNRA Lands 5,705??																				
Available Acres	0	17,629	0	0	0	0	15,255	0	0	0	0	15,255	0	0	0	0	17,629	0	0	0
Unavailable Acres	0	0	0	0	0	0	2,374	0	0	0	0	2,734	0	0	0	0	0	0	0	0
Lake Powell #UT04135 Total Acres: 371																				
Available Acres	0	0	0	0	371	0	0	0	0	371	0	0	0	0	371	0	0	0	0	371
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Last Chance #UT06016 Total Acres: 249,979 (227,548) GCNRA Lands 22,431??																				
Available Acres	0	120,437	0	107,111	0	0	70,434	0	92,862	0	0	120,437	0	107,111	0	0	120,437	0	107,111	0
Unavailable Acres	0	0	0	0	0	0	50,003	0	14,249	0	0	0	0	0	0	0	0	0	0	0
Little Bowns Bench (FR) #UT06022 Total Acres: 3,422																				
Available Acres	3,422	0	0	0	0	0	0	0	0	0	3,422	0	0	0	0	3,422	0	0	0	0
Unavailable Acres	0	0	0	0	0	3,422	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little Desert (Status?) Total Acres: 2,891																				
Available Acres	0	0	0	2,891	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,891	0
Unavailable Acres	0	0	0	0	0	0	0	0	2,891	0	0	0	0	2,891	0	0	0	0	0	0
Locke Ridge #UT14071 Total Acres: 5,056 (4,456)																				
Available Acres	0	0	4,456	0	0	0	0	4,456	0	0	0	0	4,456	0	0	0	0	4,456	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Canyon Stock Driveway (Unallotted) Total Acres: 1,043																				
Available Acres	1,043	0	0	0	0	1,043	0	0	0	0	1,043	0	0	0	0	1,043	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long Neck (Closed) Total Acres: 224																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224	0	0	0	0
Unavailable Acres	224	0	0	0	0	224	0	0	0	0	224	0	0	0	0	0	0	0	0	0
Lower Cattle #UT06017 Total Acres: 81,168 (62,891) GCNRA LANDS 18,277??																				
Available Acres	518	9,223	0	53,150	0	518	9,223	0	53,150	0	518	9,223	0	53,150	0	518	9,223	0	53,150	0

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower Hackberry #UT25014 Total Acres: 20,312																				
Available Acres	0	20,174	0	138	0	0	0	0	0	0	0	20,174	0	138	0	0	20,174	0	138	0
Unavailable Acres	0	0	0	0	0	0	20,174	0	138	0	0	0	0	0	0	0	0	0	0	0
Lower Warm Creek #UT25015 Total Acres: 23,915																				
Available Acres	0	0	0	0	23,915	0	0	0	0	0	0	0	0	0	23,915	0	0	0	0	23,915
Unavailable Acres	0	0	0	0	0	0	0	0	0	23,915	0	0	0	0	0	0	0	0	0	0
Main Canyon (State) #UT05957 Total Acres: 312 (284)																				
Available Acres	0	0	0	284	0	0	0	0	0	0	0	0	0	284	0	0	0	0	284	0
Unavailable Acres	0	0	0	0	0	0	0	0	284	0	0	0	0	0	0	0	0	0	0	0
McGath Point (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,132	0	0	0	0
Unavailable Acres	3,132	0	0	0	0	3,132	0	0	0	0	3,132	0	0	0	0	0	0	0	0	0
Meadow Canyon #UT24081 Total Acres: 4,676																				
Available Acres	0	0	4,672	4	0	0	0	4,672	4	0	0	0	4,672	4	0	0	0	4,672	4	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Molles Nipple #UT24083 Total Acres: 103,527 (99,817)+ (1,121 Private)= (100,938)																				
Available Acres	0	0	56,958	42,859	0	0	0	53,982	36,343 -Buckskin Portion	0	0	0	56,958	42,859	0	0	0	56,958	42,859	0
Unavailable Acres	0	0	0	0	0	0	0	2,976	6,516 +Buckskin Portion	0	0	0	0	0	0	0	0	0	0	0
Moody #UT06019 Total Acres: 43,418 (27,276 GCNRA??)																				
Available Acres	290	0	0	15,852	27,276	290	0	0	15,852	27,276	290	0	0	15,852	27,276	290	0	0	15,852	27,276
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mud Springs #UT25016 Total Acres: 16,331 (15,652)																				
Available Acres	0	15,652	0	0	0	0	15,652	0	0	0	0	15,652	0	0	0	0	15,652	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muley Twist (Closed) (Data)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Q: Livestock Grazing

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Navajo Bench (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	0	0	160	0	0	0	0	160	0	0	0	0	160	0	0	0	0	160	0
Neaf #UT14086 Total Acres: 1,284 (220 Acres)																				
Available Acres	0	0	1,056	8	0	0	0	1,056	8	0	0	0	1,056	8	0	0	0	1,056	8	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nipple Bench #UT25018 Total Acres: 30,739 (774 GCNRA)																				
Available Acres	0	0	2,785	27,180	774	0	0	2,785	27,180	774	0	0	2,785	27,180	774	0	0	2,785	27,180	774
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No Mans Mesa (Closed) (Acreage)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phipps (FR) #UT06024 Total Acres: 10,432																				
Available Acres	7,365	0	0	0	0	0	0	0	0	0	7,365	0	0	0	0	7,365	0	0	0	0
Unavailable Acres	3,067	0	0	0	0	10,432	0	0	0	0	3,067	0	0	0	0	3,067	0	0	0	0
Pine Creek #UT06023 Total Acres: 5,740 (151)																				
Available Acres	142	0	0	9	0	142	0	0	9	0	142	0	0	9	0	142	0	0	9	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Creek (State) #UT05912 Total Acres: 590 (513)																				
Available Acres	484	0	0	29	0	484	0	0	29	0	484	0	0	29	0	484	0	0	29	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Point #UT04102 Total Acres: 9,728 (6,632)																				
Available Acres	0	0	4,492	2,140	0	0	0	4,492	2,140	0	0	0	4,492	2,140	0	0	0	4,492	2,140	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rattlesnake Bench (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	3,564	0	0	0	0	3,564	0	0	0	0	3,564	0	0	0	0	3,564	0	0	0	0
Rock Creek-Mudholes #UT06020 Total Acres: 78,013 (43,070) (35,327 GCNRA acres??) Missing Middle Rock Creek acres?																				
Available Acres	0	17,253	0	25,433	0	0	0	0	0	0	0	17,253	0	25,433	0	0	17,253	0	25,433	0

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Unavailable Acres	0	251 + Middle Rock Cr. Acres	0	133 + Middle Rock Cr. Acres	0	0	17,504	0	25,566	0	0	251 + Middle Rock Cr. Acres	0	133 + Middle Rock Cr. Acres	0	0	251+ Middle Rock Cr. Acres	0	133+ Middle Rock Cr. Acres	0
Round Valley #UT25020 Total Acres: 10,562 (Includes Private 638)																				
Available Acres	0	6,532	4,030	0	0	0	0	0	0	0	0	6,532	4,030	0	0	0	6,532	4,030	0	0
Unavailable Acres	0	0	0	0	0	0	6,532	4,030	0	0	0	0	0	0	0	0	0	0	0	0
Roy Willis #UT25054 Total Acres: 195																				
Available Acres	0	0	0	195	0	0	0	0	195	0	0	0	0	195	0	0	0	0	195	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rush Beds #UT25021 Total Acres: 18,765																				
Available Acres	0	0	18,765	0	0	0	0	18,765	0	0	0	0	18,785	0	0	0	0	18,785	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salt Water Creek (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,055	0	0	0	0
Unavailable Acres	12,055	0	0	0	0	12,055	0	0	0	0	12,055	0	0	0	0	0	0	0	0	0
School Section #UT14105 Total Acres: 754 (744 Acres)																				
Available Acres	0	0	732	12	0	0	0	732	12	0	0	0	732	12	0	0	0	732	12	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Second Point #UT04161 Total Acres: 5,891																				
Available Acres	0	0	5,437	453	0	0	0	5,437	453	0	0	0	5,437	453	0	0	0	5,437	453	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sink Holes #UT04111 Total Acres: 5,591 (+ 1,330 acres Arizona State Lands)																				
Available Acres	0	0	0	4,263	0	0	0	0	4,263	0	0	0	0	4,263	0	0	0	0	4,263	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slick Rock (State) #UT05930 Total Acres: 643																				
Available Acres	0	2	0	641	0	0	2	0	641	0	0	2	0	641	0	0	2	0	641	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Soda #UT06026 Total Acres: 70,261 (51,962 GCNRA Acres??)																				
Available Acres	0	2,668	0	15,631	0	0	2,668	0	15,631	0	0	2,668	0	15,631	0	0	2,668	0	15,631	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Q: Livestock Grazing

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
South Fork #UT06056 Total Acres: 120 (Data?)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spencer Bench (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	2,256	0	2,989	0	0	2,256	0	2,989	0	0	2,256	0	2,989	0	0	2,256	0	2,989	0
Steep Creek (Closed)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,550	0	0	0	0
Unavailable Acres	7,550	0	0	0	0	7,550	0	0	0	0	7,550	0	0	0	0	0	0	0	0	0
Swallow Park #UT14120 Total Acres: 16,494																				
Available Acres	0	0	6,148	10,343	0	0	0	6,148	10,343	0	0	0	6,148	10,643	0	0	0	6,148	10,643	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber Mountain #UT04124 Total Acres: 7,742 (these acres include Private 80 acres)																				
Available Acres	0	0	7,742	0	0	0	0	7,742	0	0	0	0	7,742	0	0	0	0	7,742	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unallotted Areas in Glen Canyon (Data)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	2,256	0	2,989	0	0	2,256	0	2,989	0	0	2,256	0	2,989	0	0	2,256	0	2,989	0
Upper Cattle #UT06028 Total Acres: 92,313 (GCNRA acres 7,385??)																				
Available Acres	38,587	14,708		31,633	0	38,587	14,231	0	26,168	0	38,587	14,708	0	31,633	0	38,587	14,708	0	31,633	0
Unavailable Acres	0	0	0	0	0	0	477	0	5,565	0	0	0	0	0	0	0	0	0	0	0
Upper Hackberry #UT25023 Total Acres: 22,958 (Need to determined acres for Upper Hackberry Canyon for alter B)																				
Available Acres	0	14,743	0	8,096	0	0	14,015	0	7,533	0	0	14,743	8,096	0	0	0	14,743	8,1240	0	0
Unavailable Acres	0	0	0	0	0	0	628	0	563	0	0	0	0	0	0	0	0	0	0	0
Upper Paria #UT06033 Total Acres: 126,451																				
Available Acres	0	25,788	9,284	80,515	0	0	25,788	5,767	38,085	0	0	25,788	9,284	80,515	0	0	25,788	9,284	80,515	0
Unavailable Acres	0	0	0	0	0	0	0	3,517	42,430	0	0	0	0	0	0	0	0	0	0	0
Upper Warm Creek #UT15024 Total Acres: 77,291 (22,300 GCNRA Acreage??)																				
Available Acres	0	18,040	0	36,952	0	0	18,040	0	36,952	0	0	18,040	0	36,952	0	0	18,040	0	36,952	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Acres	Alternative A					Alternative B					Alternative C					Alternative D				
	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA	Escalante Canyonlands	Kaiparowits	Grand Staircase	Kanab-Escalante Planning Area	Glen Canyon NRA
Vermillion #UT04130 Total Acres: 44,322 (43,244, without private)																				
Available Acres	0	0	28,262	14,982	0	0	0	25,323	11,043	0	0	0	28,262	14,982	0	0	0	28,262	14,982	0
Unavailable Acres	0	0	0	0	0	0	0	2,939	3,939	0	0	0	0	0	0	0	0	0	0	0
Wagon Box Mesa #UT06029 Total Acres: 29,157 (689 acres in GCNRA??)																				
Available Acres	6,089	0	0	22,379	689	6,089	0	0	22,379	0	6,089	689	0	22,379	689	06,089	0	0	22,379	689
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wahweap #UT25025 Total Acres: 17,222																				
Available Acres	0	13,806	0	3,417	0	0	13,806	0	3,417	0	0	13,806	0	3,417	0	0	13,806	0	3,417	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White Rock #UT06032 Total Acres: 1,390																				
Available Acres	1,390	0	0	0	0	1,390	0	0	0	0	1,390	0	0	0	0	1,390	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White Sage #UT04134 Total Acres: 2,142 (2062)																				
Available Acres	0	0	643	1,419	0	0	0	643	1,419	0	0	0	643	1,419	0	0	0	643	1,419	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wide Hollow #UT06030 Total Acres: 3,907 (KFO)																				
Available Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Willow Gulch #UT06031 Total Acres: 12,214 (12,885)																				
Available Acres	12,045	0	0	166	0	12,045	0	0	166	0	12,045	0	0	166	0	12,045	0	166	0	0
Unavailable Acres	674	0	0	0	0	674	0	0	0	0	674	0	0	0	0	674	0	0	0	0
Wiregrass #UT04145 Total Acres: 35,012 (7,379- Need GCNRA and State Sections acres)																				
Available Acres	0	1,110	0	6,269	0	0	1,110	0	6,269	0	0	1,110	0	6,269	0	0	1,110	0	6,269	0
Unavailable Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

¹ Parenthetical acreages in the table represent geographic information system-derived acreages. Acreages not in parenthesis are from the Rangeland Administration System.
 NRA – National Recreation Area, FR – forage reserve

References

Bureau of Land Management (BLM). 2018. BLM Rangeland Administration System Reports. Retrieved from <https://reports.blm.gov/reports/RAS/>. Accessed June 14, 2018.

Abbreviations-Acronyms

Term	Definition
BLM	Bureau of Land Management
CFR	Code of Federal Regulations

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix R

Recreation Management Areas

August 2018

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Appendix R: Recreation Management Areas

Special Recreation Management Area, Extensive Recreation Management Area, and Recreation Management Zone Frameworks

Special Recreation Management Areas (SRMAs) are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially compared to other areas used for recreation. Summaries of each SRMA below establish objective decisions, describe recreation setting characteristics, identify management actions and allowable use decisions, and, if necessary, identify implementation decisions. Each SRMA write-up begins with a brief description of the rationale for designating the SRMA including the unique value, importance, or distinctiveness of the area. This documents the rationale for consideration of the SRMA in the planning process and, if selected, designation of the SRMA in the record of decision.

SRMA/Recreation Management Zone (RMZ) Objective(s): SRMAs may be subdivided into RMZs with discrete objectives. SRMA/RMZ objectives must define the specific recreation opportunities (i.e., activities, experiences, and benefits derived from those experiences), which become the focus of Recreation and Visitor Services management.

Recreation Setting Characteristic (RSC) Descriptions: This section describes the desired physical, social, and operational recreation setting qualities to be maintained or enhanced.

Extensive Recreation Management Areas (ERMAs) are administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services program investments. While generally unnecessary, ERMAs may be subdivided into RMZs to ensure Recreation and Visitor Services are managed commensurate with the management of other resources and resource uses.

Management and Allowable Use Decisions: Identify necessary management actions and allowable use decisions for recreation and visitor services and other program areas to achieve ERMA, SRMA, and RMZ objectives. *Please note:* the discharge of firearms is prohibited in all developed recreation sites (campgrounds, trailheads, picnic areas, etc.) per 43 Code of Federal Regulations (CFR) 8365.2-5(a). This prohibition applies to all ERMAs, SRMAs, and RMZs.

Grand Staircase-Escalante National Monument (GSENM) area is named for one of the iconic landscapes in the American West. The Grand Staircase, an unbroken sequence of cliffs and plateaus considered to be the most colorful exposed geologic section in the world, has inspired wonder in visitors since the days of early western explorers. The White Cliffs that rise more than 1,500 feet from the desert floor are the hardened remains of the largest sand sea that ever existed. The deep red Vermilion Cliffs, once the eastern shore of the ancient Lake Dixie, contain a rich fossil record from the Late Triassic period to the early Jurassic period, including petrified wood, fish, dinosaur, and other reptilian bones. Fossil footprints are also common, including those at the Flag Point tracksite, which includes dinosaur fossil tracks adjacent to a Native American rock art panel depicting dinosaur tracks. This area also contains a number of relict vegetative communities occurring on isolated mesa tops, an example of which, No Mans Mesa, was identified in Presidential Proclamation 6920.

The archaeology of the GSENM area is dominated by sites constructed by the Virgin Branch of the Ancestral Puebloans—ancient horticulturalists and farmers who subsisted largely on corn, beans, and squash, and occupied the area from nearly 2000 B.C.E. to about 1250 C.E. The landscape was also the home of some of the earliest corn-related agriculture in the Southwest, and it continues to hold remnants of these early farmsteads and small pueblos. The evidence of this history, including remnants of the beginning of agriculture and development of prehistoric farming systems, is concentrated in the lower levels of the Grand Staircase. The higher cliffs, benches, and plateaus hold evidence of occupation by Archaic and Late Prehistoric people, including Clovis and other projectile points and residential pit structures that indicate occupation by hunter-gatherers starting about 13,000 years ago.

Following the departure of Ancestral Puebloans, the area was re-occupied by a new population of hunter-gatherers, the people known today as the Southern Paiute Indians. The Southern Paiute Indians identify this area as part of their ancestral homeland. Still later, Mormon pioneers settled the area, as evidenced by remnants of roads, trails, line shacks, rock houses, and abandoned town sites.

Nephi Pasture SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 147,089 acres

The Nephi Pasture region attracts visitors from the surrounding communities and from outside the region due to the spectacular scenery, abundant wildlife, exposed geologic formations, and road network popular with the off-highway vehicle (OHV) community. The SRMA includes areas of interest that include Flag Point, Inch Worm Arch, Timber Mountain, and a portion of the Great Western Trail. OHV use is popular within the SRMA, as the road network and trailheads connect to the Bureau of Land Management (BLM) Kanab Field Office (KFO) transportation networks west of Johnson Canyon Road. The SRMA has one trailhead at the Nephi Pasture road and provides dispersed camping. The SRMA provides important wildlife habitat, hunting access, and commercial recreational opportunities in the region. These resources provide for excellent Primitive and semi-Primitive non-motorized recreation (within 0.5 mile of mechanized trails/routes) to Backcountry and Middlecountry motorized (touring) recreation (within 0.5 mile of four-wheel-drive, all-terrain vehicle [ATV], and motorcycle routes).

The area provides world-class opportunities for viewing a scenic landscape with roadside access to diverse recreation opportunities such as hiking, OHV/four-wheel-drive/auto touring, camping, hunting, and interpretation of natural, and geologic settings.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Hunting, wildlife viewing, hiking, photography, sightseeing, OHV, driving for pleasure.

Experiences

- Releasing or reducing mental tension
- Developing outdoor skills and abilities
- Enjoying exploring on my/our own

- Enjoying the closeness of family and friends

Benefits

- Personal
 - Improved mental well-being and physical fitness and health maintenance
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Closer relationship with the natural world
 - Increased appreciation of area's natural and cultural history
- Community
 - Heightened sense of satisfaction with our area as a place to live and visit
 - More informed citizenry about where to go for different kinds of recreation experiences and benefits
 - Reduced numbers of at-risk youth
 - Enlarged sense of community dependency on public lands
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Primitive to Middlecountry
 - Maintain Primitive settings where lands are more than 0.5 mile from either mechanized or motorized trail or routes.
 - Within 0.5 mile of mechanized trails/routes
 - Maintain Middlecountry settings on much of the SRMA where lands are on or near four-wheel-drive roads, but at least 0.5 mile from all improved roads, though they may be in sight.
- Naturalness: Primitive to Middlecountry
 - Undisturbed natural landscapes
 - Supporting natural landscape with modification in harmony with surroundings and not visually obvious
 - Where the character of the natural landscape is retained. A few modifications contrast the character of the landscape.

- **Facilities and Structures: Backcountry to Middlecountry**
 - Developed trails made mostly of native materials. Facilities and structures are rare and often accessible via unimproved routes.
 - Maintained and marked trails and roads, simple trailhead developments, and basic toilets at trailheads.

Desired Social RSCs

- **Contacts: Backcountry to Middlecountry**
 - Usually 3–6 encounters per day off travel routes and campsites, and 7–15 encounters per day on travel routes
- **Group Size:**
 - Limit group size
 - Evidence of use: Primitive, Backcountry, and Middlecountry
 - No alteration of the natural terrain. Footprints only observed. Sounds of people are rare.
 - Area of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.

Desired Administrative/Operational RSCs

- **Access: Primitive to Middlecountry**
 - Foot and horse, and non-motorized travel
 - Four-wheel-drive vehicles, ATVs, dirt bikes, or snowmobiles, in addition to non-motorized, mechanized use
- **Visitor Services:**
 - Basic maps, staff infrequently present to provide onsite assistance
- **Management Controls: Backcountry to Middlecountry**
 - Signs at key access points
 - Patrolled periodically by law enforcement officer and other BLM employees. Spike in BLM presence during hunting season.
 - Some use restrictions; limit motorized travel to designated roads and trails.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate.
 - Allow camping in designated campgrounds and dispersed camping areas.

- Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
- Prohibit campfires in Escalante and Paria/Hackberry Canyons and relic plant communities; in other areas, encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed.
- Require human waste disposal systems in proximity to water sources.
- Prohibit motorized or non-motorized competitive events (Alternative B) or allow motorized, except high-speed, and non-motorized competitive events (Alternative C).
- Allow parking off designated routes for dispersed camping up to one vehicle length (Alternative B) or up to 50 feet (Alternative C).
- Allow groups up to 12 people (Alternative B) or 25 people (Alternative C) unless a larger group size is approved by the authorized officer.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Apply restrictions on mineral leasing and disposals.
 - Apply restrictions on the issuance of rights-of-way (ROWS) (Alternative B).

Paria Hackberry SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 273,710 acres

The massive Navajo Sandstone walls of the Paria River and its tributaries are some of the tallest in GSENM. The varied terrain includes plateaus, benches, a portion of the Cockscomb ridge, scattered sand dunes, rock knobs and domes, and natural arches. All of the SRMA has outstanding scenic qualities. The Paria River marks the eastern edge of the Grand Staircase, the southern edge of the High Plateaus of the Utah Section of the Colorado Plateau Physiographic Province. The Grand Staircase was so named by early geologists because it is an ascending series of colored cliffs and terraces. At Bull Valley Gorge and Deer Creek Canyon, in the northwestern part of the Wilderness Study Area (WSA), the eastern end of the White Cliffs of the Grand Staircase is 600 to 1,000 feet high and is cut by eight canyons. East of the Paria River, the same sandstone as the White Cliffs is exposed but is more sculpted and dissected. A portion of the terrace of the Vermillion Cliffs, the Grand Staircase below the White Cliffs, is in the southwestern portion of the WSA. Below the cliffs are multi-colored badlands.

In between are high, forested plateaus and slickrock benches, which make for excellent hiking and backpacking challenges and a topographic and geologic wonderland. The canyons are deep and routes hard to find and follow. Observant visitors may also discover evidence of past Anasazi and Fremont civilizations. Uncounted and unnamed arches abound in a maze of opportunity for exploration. A transportation system surrounds the SRMA, providing OHV opportunities and access to the canyon system for day and overnight visitors. The Paria River is a historic wagon road, used today by the equestrian community and rich with historic pioneer inscriptions and wagon grease writings.

The majority of the SRMA is currently withdrawn as a WSA by congress under Section 603 of the Federal Land Policy and Management Act. The canyons in the SRMA offer a Primitive unconfined recreational experience within the Kaiparowits Unit of GSENM, popular for its deep colorful canyons and historic and cultural sites. The SRMA offers unique Primitive recreation

opportunities for day hikers, backpackers, equestrian users, and photographers. The Cottonwood Road offers access to popular trails and trailheads to Round Valley Draw, Cottonwood Narrows, Lower Hackberry Canyon, and the Paria Box. The Skutumpah Road corridor offers many day hikes to popular destinations that include Sheep Creek, Willis Creek, Bull Valley Gorge, and Lick Wash. The Paria River corridor offers hiking and equestrian use to experience a historic route.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Hiking, backpacking, camping, canyoneering, photography, equestrian use, and auto touring along roadways.

Experiences

- Savoring the total sensory—sight, sound, and smell—experience of a natural landscape
- Developing skills and abilities
- Enjoying the need for physical exercise
- Enjoying exploring on my/our own
- Enjoying the closeness of family and friends

Benefits

- Personal
 - Improved mental well-being and physical fitness and health maintenance
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Increased appreciation of area's cultural history
- Community
 - Greater community involvement in recreation and other land use decisions
 - Enlarged sense of community dependency on public lands
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- **Remoteness: Primitive to Frontcountry**
 - Maintain more than 0.5 mile from both mechanized or motorized trail and routes.
 - Within 0.5 mile of mechanized trail routes along the travel corridors
 - Within 0.5 mile of four-wheel-drive, ATV, and motorcycle routes
 - Within 0.5 mile of low-clearance or passenger vehicle routes (e.g., unpaved country roads, private land routes)
- **Naturalness: Primitive**
 - A setting maintaining an undisturbed natural landscape
- **Facilities and Structures:**
 - No structures; foot/horse and water trails only away from roadways
 - Facilities along roadways

Desired Social RSCs

- **Contacts:**
 - Primitive – Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes
- **Group Size: Primitive**
 - 12 people or fewer in the Backcountry
- **Evidence of Use: Primitive**
 - No alteration of the natural terrain. Footprints only observed. Sounds of people are rare.

Desired Administrative/Operational RSCs

- **Access: Primitive**
 - Maintain Primitive settings for foot, horse, and non-motorized travel.
- **Visitor Service/Information: Primitive**
 - No maps or brochures available on site except at trailheads. Staff rarely present to provide onsite assistance.
 - Some use restrictions; limit motorized travel to designated roads and trails. No campfires within the Paria/Hackberry Canyons.
- **Management Controls: Backcountry to Frontcountry**
 - Basic user regulations at key access points, minimum use restrictions
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Prohibit campfires in Escalante and Paria/Hackberry Canyons and relic plant communities; in other areas, encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed.
 - Require self-register permits for overnight camping (Alternative B).
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Allow parking off designated routes for dispersed camping up to one vehicle length (Alternative B) or up to 50 feet (Alternative C).
 - Require human waste disposal systems in proximity to water sources.
 - Prohibit motorized or non-motorized competitive events in the WSA (Alternative B) or prohibit all competitive events (Alternative C).
 - Allow groups up to 12 people and 12 pack stock.
 - Consider development of Corridor Management Plans within high recreational use areas of the SRMA/RMZs.
- **Other Program Area Management**
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Apply restrictions on mineral leasing and disposals.
 - Apply restrictions on the issuance of ROWs (Alternative B).

Paria Hackberry SRMA / Paria River RMZ—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 181 acres

The upper Paria River RMZ encompasses the river corridor from the north end of Cottonwood Road to the old Pahreah movie set just north of Highway 89. The river corridor is a historic pioneer wagon road and today is a popular with hikers, backpackers, and equestrian users. Popular destinations include Deer and Snake Creek, Kitchen Canyon, Starlite Canyon, Sam Pollock and Hogeeye Canyons, Lower Death Valley Cow Trails, Hidden Cache trail, Yellow Rock Trail, the Paria Box, and old Pahreah Townsite.

The Paria River RMZ offers a Primitive to Backcountry experience to explore the Paria River corridor through the middle of the Paria Hackberry SRMA. The river corridor provides access to multiple side canyons.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Backpacking, canyoneering, photography, and equestrian use.

Experiences

- Savoring the total sensory—sight, sound, and smell—experience of a natural landscape
- Developing skills and abilities
- Enjoying the need for physical exercise
- Enjoying exploring on my/our own
- Enjoying the closeness of family and friends

Benefits

- Personal
 - Improved mental well-being and physical fitness and health maintenance
 - Greater sensitivity to/awareness of outdoor aesthetics, and nature's art and its elegance
 - Increased appreciation of area's cultural history
- Community
 - Greater community involvement in recreation and other land use decisions
 - Enlarged sense of community dependency on public lands
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Primitive
 - Maintain more than 0.5 mile from both mechanized or motorized trails and routes.
- Naturalness: Primitive
 - A setting maintaining an undisturbed natural landscape
- Facilities and Structures: Primitive
 - No structures; foot/horse and water trails only

Desired Social RSCs

- **Contacts: Primitive to Middlecountry**
 - Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes
 - 7–15 encounters per day on travel routes
 - 15–29 encounters per day on travel routes
- **Group Size: Middlecountry to Rural**
 - 7–12 people per day along trails
 - 26–50 people per day along roadways
- **Evidence of Use: Middle to Frontcountry**
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people frequently heard in high-use areas.

Desired Administrative/Operational RSCs

- **Public Access: Primitive to Frontcountry**
 - Maintain Primitive settings for foot, horse, and non-motorized travel in Primitive areas.
 - Two wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use along roadways
- **Visitor Services: Primitive to Frontcountry**
 - No onsite posts/signs of visitor regulations, interpretive info, or ethics; few use restrictions in Primitive areas
 - No maps or brochures available on site except at trailheads. Staff rarely present to provide onsite assistance.
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
- **Management Controls: Backcountry to Frontcountry**
 - Basic user regulations at key access points, minimum use restrictions
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Prohibit the development of parking lots, restrooms, culinary water, and other recreation facilities.
 - Allow development of equestrian facilities where needed.
 - Allow camping in designated campgrounds and dispersed camping areas.

- Prohibit campfires.
- Require human waste disposal systems in proximity to water sources.
- Allow groups up to 12 people and 12 pack stock (Alternative B) or 25 people and 25 pack stock (Alternative C).
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Prohibit location, and mineral leasing and disposals.
 - Exclude issuance of ROWs.

Paria Hackberry SRMA / Cottonwood Road RMZ—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 5,290 acres

The Cottonwood Canyon RMZ encompasses the Cockscomb corridor from the north end of Cottonwood Road to Highway 89. The RMZ is a popular with hikers, backpackers, equestrian users, and auto tourists viewing scenic geologic features. Popular destinations include Grosvenor Arch, Round Valley Draw, Cottonwood Wash Narrows, Lower Hackberry Canyon, Yellow Rock, Paria River Valley, and the Paria Box.

Cottonwood Road travels along the Cockscomb, a unique geological feature. The RMZ offers a unique scenic drive and provides access to popular day hikes and access to Primitive areas within the Paria/Hackberry SRMA.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, camping, auto touring, photography, access for backpacking, canyoneering, photography, and equestrian use.

Experiences

- Savoring the total sensory—sight, sound, and smell—experience of a natural landscape
- Developing skills and abilities
- Enjoying the need for physical exercise
- Enjoying exploring on my/our own
- Enjoying the closeness of family and friends

Benefits

- Personal
 - Improved mental well-being and physical fitness and health maintenance
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Increased appreciation of area's cultural history
- Community
 - Greater community involvement in recreation and other land use decisions
 - Enlarged sense of community dependency on public lands

- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Middlecountry to Frontcountry
 - Within 0.5 mile of low-clearance or passenger vehicle routes (e.g., unpaved country roads, private land routes)
- Naturalness: Frontcountry
 - Character of natural landscape partially modified but none overpower natural landscapes (e.g., structures, utilities)
- Facilities and Structures: Middlecountry to Frontcountry
 - Maintained and marked trail, simple trailhead developments, and basic toilets
 - Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays

Desired Social RSCs

- Contacts: Middlecountry to Frontcountry
 - 15–29 encounters per day on travel routes
 - 30 or more encounters per day on travel routes
- Group Size: Middlecountry to Frontcountry
 - 7–12 people per group
 - 13–25 people per group
- Evidence of use: Middlecountry to Frontcountry
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard.

Desired Administrative/Operational RSCs

- Public Access: Frontcountry
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized mechanized use

- **Visitor Services: Frontcountry**
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
- **Management Controls: Frontcountry**
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Prohibit dispersed camping once campgrounds are developed and camping areas are designated (Alternative B).
 - Require human waste disposal systems in proximity to water sources.
 - Prohibit competitive events (Alternative B).
 - Allow only in designated fire grates, designated fire pits, or mandatory fire pans, and prohibit wood collection for campfires (Alternative B) or encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).
 - Allow groups up to 12 people (Alternative B) or 25 people (Alternative C) unless a larger group size is approved by the authorized officer.
- **Other Program Area Management**
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Prohibit location, and mineral leasing and disposals (Alternative B and C).
 - Allow community pits 5 acres or fewer (Alternative C).
 - Exclude issuance of ROWs (Alternative B).

Fiftymile Mountain SRMA–GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 157,605 acres

Fiftymile Mountain offers a unique and remote recreational experience. The SRMA offers a Primitive, uncrowded, and remote recreational experience for equestrian use, backpacking, and hunting. This WSA is bounded by the Straight Cliffs on the east and numerous southwest draining canyons on the west. Fiftymile Mountain WSA is a high-elevation island of pinyon-juniper woodland with aspen stands overlooking the sandstone expanse of southern Glen Canyon country, Lake Powell, and Navajo Mountain. The pinyon/juniper woodland of Fiftymile Mountain continues to reveal many new scientific insights into the fire history of this important habitat.

A remote and unconfined recreation experience in GSENM and the Kanab-Escalante Planning Area (KEPA) that provides a unique opportunity to view unique geologic formations and enjoy expansive views of the Colorado Plateau. This region offers a unique opportunity for the adventurous and experienced backpacker, requiring extensive preparation and planning to travel the region.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Hunting, extended backpacking and Backcountry camping, wildlife viewing, photography, equestrian use.

Experiences

- Savoring the total sensory—sight, sound, and smell—experience of a natural landscape
- Enjoy risk-taking adventure
- Enjoying exploring on my/our own
- Enjoying the closeness of family and friends

Benefits

- Personal
 - Personal development and growth: greater self-reliance, enhanced sense of personal freedom
 - Developing skills and abilities in a remote roadless area
 - Enjoying a risk-taking adventure
 - Experiencing a greater sense of independence
 - Savoring the total sensory—sight, sound, and smell—experience of a natural landscape
- Community
 - Nurturing my own spiritual values and growth
 - Developing a greater understanding of the region
 - Feeling good about the way our cultural heritage is being protected
 - Greater cultivation of natural resource stewardship ethic
- Economic
 - Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits
 - Maintenance of community's distinctive recreation/tourism market niche or character
- Environmental
 - Maintenance of distinctive recreation setting character
 - Greater retention of distinctive natural landscape features
 - Increased awareness and protection of natural landscapes

RSC Descriptions

Desired Physical RSCs

- Remoteness: Primitive
 - More than 0.5 mile from both mechanized or motorized trails and routes
- Naturalness: Primitive to Backcountry
 - The natural landscape is undisturbed; a few locations of natural landscape with modifications in harmony with surroundings and not visually obvious
- Facilities and Structures: Primitive
 - No structures; foot and horse trails only. Some structures exist, i.e., range line shacks for grazing permittees. These structures will remain and be maintained.

Desired Social RSCs

- Contacts: Primitive
 - Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes
- Group Size: Primitive
 - Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes
- Evidence of Use: Primitive
 - No alteration of the natural terrain. Footprints only observed. Sounds of people are rare.

Desired Administrative/Operational RSCs

- Public Access: Primitive to Middlecountry
 - Foot and horse travel; no mechanized/motorized travel
 - Four-wheel-drive vehicles, ATVs, dirt bikes, in addition to non-motorized mechanized use along roadways
- Visitor Services/Information
 - No maps or brochures available on site. Staff rarely present to provide onsite assistance.
- Management Controls: Primitive
 - No onsite posts/signs of visitor regulations, interpretive info, or ethics. Few use restrictions.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.

- Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
- Allow camping in designated campgrounds and dispersed camping areas.
- Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
- Require human waste disposal systems in proximity to water sources.
- Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed.
- Allow groups up to 12 people and 12 pack stock unless a larger group size is approved by the authorized officer.
 - On the Fiftymile Bench, allow groups up to 25 people unless a larger group size is approved by the authorized officer (Alternative C).
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Close to location and mineral leasing and disposals (Alternative B) or apply restrictions on mineral leasing and disposals (Alternative C).
 - Apply restrictions on the issuance of ROWs (Alternative B).

Escalante Canyons SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C - 411,766 acres

The Escalante Canyons Unit is a focal point and receives the highest recreation visitation among all the areas within GSENM. The region provides multiple canyons and streams that support a Backcountry recreational experience as well as auto touring along primary and secondary roadways. Recreational destinations include the Escalante River Gorge, Escalante Natural Bridge, Box Death Hollow, Boulder Mail Trail, Lower Escalante River, Calf Creek Recreation Area (RMZ), the Burr Trail Scenic Byway (RMZ), Deer Creek Recreation Area, Spencer Flat (RMZ), the Gulch Outstanding Natural Area, Harris Wash, Red Breaks, and Phipps Hollow and Arch. Most locations have been published in multiple guidebooks on the region and have become destination locations in the SRMA.

The SRMA provides a Primitive and unconfined recreation experience in a unique canyon system in south-central Utah. The SRMA provides deep-walled canyons with many perennial streams/riparian areas in a high desert landscape. The canyons are separated by sandstone benches supporting a pinyon-juniper forest with the occasional ponderosa stands offering the adventurous outdoorsman opportunities for unconfined cross-country travel. The SRMA hosts wagon roads, the historic Boulder Mail Trail used to deliver mail by mule from 1902 until 1940, and the original wagon road from Escalante to Boulder. The pioneer and cattle trails offer an insight into the challenges and industrial nature of the early settlers in this country.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, equestrian use, photography, wildlife viewing, canyoneering, and hunting.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Feeling good about how visitors are managed
 - Feeling good about how our cultural heritage is being protected
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Primitive
 - More than 0.5 mile from both mechanized or motorized trails and routes
- Naturalness: Primitive to Backcountry
 - The natural landscape is undisturbed; a few locations of natural landscape with modifications in harmony with surroundings and not visually obvious
- Facilities and Structures:
 - No structures; foot and horse trails only. Some structures exist, i.e., range line shacks for grazing permittees. These structures will remain and be maintained.

Desired Social RSCs

- **Contacts: Primitive to Backcountry**
 - Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes
- **Group Size:**
 - A group size of 4 to 6 people may be encountered on occasion.
- **Evidence of use:**
 - No alterations of the natural terrain. Footprints only, and the sounds of people are rare. Areas of alteration are rare with little surface vegetation wear observed; however, historic vegetation treatments have occurred but would not likely be apparent to the average person.

Desired Administrative/Operational RSCs

- **Public Access: Primitive**
 - Foot and horse travel; no mechanized/motorized travel
- **Visitor Services: Primitive**
 - No maps or brochures available on site. Staff rarely present to provide onsite assistance.
- **Management Controls: Primitive to Backcountry**
 - No onsite posts/signs of visitor regulations, interpretive info, or ethics. Few use restrictions.
 - Basic user regulations at key access points; minimum use restrictions

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate outside of the WSA, and prohibit other new road or trail development.
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Require human waste disposal systems in proximity to water sources.
 - Prohibit campfires (Alternative B) or prohibit campfires in canyon bottoms (Alternative C).
 - Allow groups up to 12 people and 12 pack stock unless a larger group size is approved by the authorized officer.

- Allow organized events and non-motorized competitive events on paved and primary dirt roads.
- Consider development of Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Close to location and mineral leasing and disposals (Alternative B).
 - Allow disposals at small community pits (Alternative C).
 - Apply restrictions on the issuance of ROWs (Alternative B).

Escalante Canyons SRMA / Calf Creek RMZ—GSENM

Alternatives B, C, and D

Size: Alternatives B, C, and D - 6,538 acres

Calf Creek Recreation Area was created in 1970 under the act of September 19, 1964, segregating the lands from appropriation under the agricultural lands laws.

Calf Creek Recreation Area receives the highest recreation visitation of any destination in GSENM. The recreation area has become an international destination and is marketed as a destination location by the Utah Office of Travel and Tourism. The recreational area supports a campground, day use area, and a 3-mile-long trail to Lower Calf Creek Falls. The Upper Calf Creek Falls has a 1-mile-long trail to another highly visited waterfall. The remainder of the recreation area is popular for day hiking, swimming, and enjoying a riparian corridor in close proximity to Highway 12. The area has been published in multiple guidebooks and is a focal point in the region.

SRMA/RMZ Objective(s)

The objective of Calf Creek RMZ is to retain the rural and rugged flavor through designed recreation developments in key locations, reduce user-created impacts in undesirable locations, and retain the visual qualities along the highway. Calf Creek provides a unique opportunity for the public to experience a world-class destination, providing a hike in the canyons along a riparian corridor to waterfalls adjacent to Highway 12. The BLM's objectives are to:

1. Provide the opportunity for a high-quality recreational experience on all lands within the Calf Creek Recreation Area.
 - a. Rationale: Due to the limited size of this area and unique recreational attractions present, all management actions should be directed toward enhancement of the recreation resource.
2. Maximize the variety of recreational uses that may be experienced within distinct portions of the recreation area.
 - a. Rationale: Natural zoning presently exists within the areas due to physical features and the location of man-made facilities. Compatible recreational uses should be enhanced within the RMZ.
3. Protect and preserve existing resource values for present and future recreational uses.
 - a. Rationale: All permitted uses should be of such a degree that natural values are not degraded.

4. Promote visitor safety through education, interpretation, and removal of existing and potential hazards.
 - a. Rationale: Hazards to public health and safety should be identified. Protective measures will be limited to those actions that produce the least impact on other resource values.

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, campground, photography, wildlife viewing, fishing, and swimming.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Feeling good about how visitors are managed
 - Feeling good about how our cultural heritage is being protected
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Rural
 - Within 0.5 mile of paved/primary roads and highways

- **Naturalness: Primitive and Frontcountry**
 - Undisturbed natural landscape
 - Character of the natural landscape partially modified but none overpower natural landscape. Highway 12 is visible along a short portion of the trail.
- **Facilities and Structures: Primitive and Rural**
 - No structures along the trails. Foot trails only outside of the campgrounds and trailheads.
 - Modern facilities such as campgrounds, group shelters, and occasional exhibits

Desired Social RSCs

- **Contacts: Backcountry to Rural**
 - 7–15 encounters per day on travel routes
 - Rural: People seem to be generally everywhere on the lower and upper Calf Creek trail.
- **Group Size: Middlecountry**
 - 7–12 people per group
- **Evidence of Use: Frontcountry to Rural**
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- **Public Access: Frontcountry to Rural**
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized use
 - Ordinary highway auto and truck traffic is characteristic.
- **Visitor Services/Information: Rural**
 - Information materials, plus experience and benefit descriptions. Staff regularly present.
- **Management Controls: Rural**
 - Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Develop mechanized trails where appropriate outside of the WSA, and prohibit other new road or trail development.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Allow camping in developed campgrounds or in designated camping areas.
 - Prohibit dispersed camping (Alternative B).

- Prohibit dispersed camping along the upper and lower Calf Creek Falls Trails (alternatives C and D).
- Require (Alternative B) or encourage (alternatives C and D) self-register permits for overnight camping.
- Require human waste disposal systems in proximity to water sources.
- Allow campfires only in designated fire grates (Alternative B) or encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (alternatives C and D).
- Allow up to 12 people, except:
 - Do not impose a group size limit on the lower or upper Calf Creek Falls Trail or campground.
 - Prohibit motorized groups.
- Prohibit competitive events, but allow organized events in the campground.
- Prohibit rappelling from the lower and upper falls for public health and safety.
- Consider development of Management Plans within high recreational use areas of the SRMA/RMZs.
- Allow parking only in designated parking areas.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Close to location and mineral leasing and disposals.
 - Exclude the issuance of ROWs (alternatives B and C) or avoid issuance of ROWs (Alternative D)
 - Lower Calf Creek Falls Canyon is unavailable for grazing (alternatives B and C)

Escalante Canyons SRMA / Burr Trail RMZ—GSENM and KEPA

Alternatives B, C, and D

Size: *Alternative B – 2,833 acres; Alternatives C and D – 5,839 acres*

The Burr Trail RMZ encompasses the Burr Trail Road, offering a premier auto touring road in the northern region of the Escalante Canyons Unit. Deer Creek Recreation Area is within the RMZ and provides a campground and trailhead adjacent to Deer Creek, a tributary of the Escalante River. The campground is 8 miles from Boulder Town and is popular for camping, hiking, equestrian use, and picnicking in the local community and with visitors. The Burr Trail is 37 miles in length traveling through Deer Creek Recreation Area, the Gulch, Long Canyon, and the Circle Cliffs (SRMA).

SRMA/RMZ Objective(s)

1. Provide the opportunity for a high-quality recreational experience on all lands within the Deer Creek Recreation Area.
 - a. Rationale: Due to the limited size of this area and unique recreational attractions present, all management actions should be directed toward enhancement of the recreation resource while managing for wilderness characteristics within the WSAs.
2. Maximize the variety of recreational uses that may be experienced within distinct portions of the recreation area.
 - a. Rationale: Natural zoning presently exists within the areas due to physical features and the location of man-made facilities. Compatible recreational uses should be enhanced within the RMZ.
3. Protect and preserve existing resource values for present and future recreational uses.

- a. Rationale: All permitted uses should be of such a degree that natural values are not degraded.
4. Promote visitor safety through education, interpretation, and removal of existing and potential hazards.
 - a. Rationale: Hazards to public health and safety should be identified. Protective measures will be limited to those actions that produce the least impact on other resource values.

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, campground, photography, wildlife viewing, fishing, and swimming.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Feeling good about how visitors are managed
 - Feeling good about how our cultural heritage is being protected
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Rural

- Within 0.5 mile of paved/primary roads and highways
- Naturalness: Primitive and Frontcountry
 - Undisturbed natural landscapes
 - Character of the natural landscape partially modified but none overpower natural landscape
- Facilities and Structures: Rural
 - Modern facilities such as campgrounds, group shelters, and occasional exhibits

Desired Social RSCs

- Contacts: Frontcountry
 - 30 or more encounters per day on travel routes
- Group Size: Middlecountry
 - 7–12 people per group
- Evidence of Use: Frontcountry to Rural
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- Public Access: Frontcountry to Rural
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized use
 - Ordinary highway auto and truck traffic is characteristic.
- Visitor Services/Information: Frontcountry
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
- Management Controls: Frontcountry
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Allow camping in designated campgrounds and dispersed camping areas. Allow dispersed camping until designated camp sites are developed.

- Require human waste disposal systems in proximity to water sources.
- Allow groups up to 25 people unless a larger group size is approved by the authorized officer.
- Allow organized events and non-motorized competitive events on paved roads.
- Consider development of Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Close to location and mineral leasing and disposals (Alternative B) or apply restrictions on mineral leasing and disposals (alternatives C and D).
 - Apply restrictions on the issuance of ROWs.

Escalante Canyons SRMA / Spencer Flat RMZ—GSENM

Alternatives B and C

Size: Alternatives B and C – 2,053 acres

The Spencer Flat RMZ lies within the Escalante Canyons SRMA and offers recreational access and semi-primitive camping opportunities.

SRMA/RMZ Objective(s)

The objective of the Spencer Flat RMZ is to provide close-to-town/roadside dispersed camping opportunities and access to remote areas near the Escalante River corridor. The RMZ will be managed to retain the rural and rugged flavor through designed recreation developments, reduce user-created impacts in undesirable locations, retain visual qualities along the road, and provide recreational and educational opportunities on the unique characteristics of the area.

Spencer Flat Road provides recreational access to primitive and unconfined recreation opportunities for day hiking, backpacking, canyoneering, and equestrian users.

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, equestrian use, auto and OHV touring, photography, wildlife viewing, canyoneering, hunting, and education and interpretation of the area's historic sites.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying exploring on my/our own
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure
- Learning more about this specific area

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others

- Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
- Stronger ties with family and friends
- Enhanced sense of personal freedom
- Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Feeling good about how visitors are managed
 - Feeling good about how our cultural heritage is being protected
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
- Environmental
 - Maintenance of distinctive recreation setting character
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Backcountry to Middlecountry
 - Within 0.5 mile of mechanized trails/routes (e.g., unpaved county roads)
 - Within 0.5 mile of four-wheel-drive, ATV, and motorcycle routes
- Naturalness: Backcountry to Middlecountry
 - Natural landscape with modifications in harmony with surroundings and not visually obvious (stock ponds, historic structures)
 - Character of the natural landscape retained. A few modifications contrast with character of the landscape (fences, ditches).
- Facilities and Structures: Middlecountry to Frontcountry
 - Maintained and marked trails, simple trailhead developments, and basic toilets
 - Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays

Desired Social RSCs

- Contacts and Group Size: Backcountry to Middlecountry
 - 7–15 encounters per day on travel routes
 - 15–29 encounters per day on travel routes
- Group Size: Middlecountry
 - 7–12 people per group

- Evidence of Use: Middlecountry to Rural
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard.
 - A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- Public Access: Frontcountry
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use
- Visitor Services: Backcountry to Middlecountry
 - Basic maps, staff infrequently present (e.g., seasonally high-use periods) to provide onsite assistance
 - Area brochures and maps; staff occasionally present to provide onsite assistance.
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekends and holidays).
- Management Controls: Middlecountry to Front Country
 - Some regulatory and ethics signs. Moderate use restrictions (e.g., camping, human waste).
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Manage for historic values and to provide recreational opportunities where historic and recreational uses are compatible.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop designated dispersed camping facilities, restrooms, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate; prohibit the development of other new roads and trails.
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Allow dispersed camping until designated camp sites are developed (Alternative B and C).
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Require human waste disposal systems in proximity to water sources.

- Allow propane/non-wood fires only. Prohibit wood collection for campfires (Alternative B). Allow only in designated fire grates, designated fire pits, or mandatory fire pans. Prohibit wood collection for campfires (Alternative C).
 - Allow OHVs or mechanized vehicles to pull off designated routes up to one vehicle length (Alternative B). Allow OHVs or mechanized vehicles to pull off designated routes into existing disturbed areas within 50 feet for dispersed camping access (Alternative C).
 - Group size:
 - Allow groups up to 12 people unless a larger group size is approved by the authorized officer (Alternative B).
 - Allow groups up to 25 people unless a larger group size is approved by the authorized officer (Alternative C).
 - Allow non-motorized competitive events (Alternatives B and C).
 - Allow motorized events/activities on designated roads and trails (Alternatives B and C).
 - Allow organized group events/activities up to 12 people (Alternative B) or up to 25 people (Alternative C) unless a larger group size is approved by the authorized officer.
 - Consider development of Management Plans and Corridor Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes (alternatives B and C).
 - Allow cross-country travel for hiking and equestrian use and events/activities.
 - Minerals:
 - Close to location and mineral leasing, disposals and entry (alternatives B and C).
 - ROW and renewable energy:
 - Manage as ROW exclusion area (Alternative B) or as ROW avoidance area (Alternative C).

Escalante Canyons SRMA / Hole-In-The-Rock Road RMZ—KEPA

Alternatives B, C, and D

Size: *Alternatives B and D – 15,227 acres; Alternative C – 80,140 acres*

The Hole-in-the-Rock Road (HITRR) is the most traveled road within the region, providing the only route to trailheads to access the Escalante River from the west side of the canyon system within the Escalante Canyons Unit of GSENM and Glen Canyon National Recreation Area (NRA). Key destinations and trailheads include Harris Wash, Devil’s Garden, 20 Miles Dinosaur Tracks, Egypt, Early Weed, Twentyfivemile Wash, Dry Fork, Red Well, Chimney Rock, Hurricane Wash, Crack in the Wall, Dance Hall Rock, Willow Gulch, and Hole-in-the-Rock historic site.

HITRR parallels the historic wagon road created by the 1879–1880 expedition and is popular today with members of the Church of Jesus Christ of Latter Day Saints (Mormons). Dance Hall Rock and Fortymile Springs are adjacent to HITRR and are locations where the pioneers camped and held social gatherings during the journey to Fort Bluff. The entirety of Hole-in-the-Rock Trail and Dance Hall Rock are on the National Register of Historic Places and are in consideration as Traditional Cultural Properties.

Considering the road’s popularity for recreation access as well as its historic significance, HITRR would be managed to provide public access and to include developed and dispersed recreational use, while retaining the historic significance and pioneer character. Interpretation

and recreational opportunities will be developed to educate the public on the area's cultural significance, emphasizing public health and safety and stewardship of public lands.

SRMA/RMZ Objective(s)

The objective of the HITRR SRMA/RMZ is to provide access to multiple trailheads accessing the Escalante River corridor, retain the rural and rugged flavor through designed recreation developments, reduce user-created impacts in undesirable locations, retain the visual qualities along the road, and provide recreational, educational, and interpretive opportunities on the historic values of the area.

The HITRR is historically significant to the 1879–1880 San Juan Expedition and is nominated as a Traditional Cultural Property. Dance Hall Rock and Fortymile Springs are two locations along the roadway that have significant importance in this section of the HITRR. The road also provides recreational access to trailheads for the Escalante Canyons within GSENM and Glen Canyon NRA, offering a remote and unconfined recreation experience for day hiking, backpacking, canyoneering, and equestrian users. The road also provides access to Fiftymile Bench and Fiftymile Mountain (SRMA).

All trailheads and parking areas along HITRR including the Dry Fork Slot Canyons are within the boundaries of the SRMA/RMZ.

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, equestrian use, auto and OHV touring, photography, wildlife viewing, canyoneering, hunting, and education and interpretation of the area's historic sites.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Feeling good about how visitors are managed
 - Feeling good about how our cultural heritage is being protected
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character

- More positive contributions to local-regional economy
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Middlecountry to Frontcountry
 - Within 0.5 mile of four-wheel-drive, ATV, and motorcycle routes
 - Within 0.5 mile of low-clearance or passenger vehicle routes (e.g., unpaved county roads)
- Naturalness: Middlecountry to Frontcountry
 - Character of the natural landscape retained. A few modifications contrast with character of the landscape (fences, ditches).
 - Character of the natural landscape partially modified but none overpower natural landscape (e.g., structures, utilities).
- Facilities and Structures: Middlecountry to Frontcountry
 - Maintained and marked trails, simple trailhead developments, and basic toilets
 - Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays

Desired Social RSCs

- Contacts and Group Size: Middlecountry to Rural
 - 30 or more encounters per day on travel routes
 - People seem to be generally everywhere along the roadway and at specific locations, e.g., Devils Garden and Dry Fork.
- Group Size: Middlecountry
 - 7–12 people per group
- Evidence of Use: Middlecountry to Rural
 - Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- Public Access: Frontcountry
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use

- **Visitor Services: Middlecountry to Rural**
 - Area brochures and maps; staff occasionally present to provide onsite assistance.
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekends and holidays).
 - Information materials, plus experience and benefits descriptions. Staff regularly present.
- **Management Controls: Middlecountry to Rural**
 - Some regulatory and ethics signs. Moderate use restrictions (e.g., camping, human waste).
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and or closures.
 - Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Manage for historic values and to provide recreational opportunities where historic and recreational uses are compatible.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate; prohibit the development of other new roads and trails.
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Allow dispersed camping until designated camp sites are developed (Alternative C).
 - Require (alternatives B and D) or encourage (Alternative C) self-register permits for overnight camping.
 - Require human waste disposal systems in proximity to water sources.
 - Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed.
 - Allow parking off designated routes for dispersed camping up to one vehicle length (alternatives B and D) or up to 50 feet (Alternative C).
 - Group size:
 - Allow groups up to 25 people unless a larger group size is approved by the authorized officer (Alternative B).
 - Allow groups up to 50 people unless a larger group size is approved by the authorized officer. Encourage and promote traditional uses and trail reenactments for large groups. A larger group size will support the traditional uses and the Traditional Cultural Property Ethnographic study being developed by the National Park Service and BLM (alternatives C and D).
 - Allow non-motorized competitive events on roads (alternatives B and D) or allow non-motorized/non-mechanized competitive events (Alternative C).
 - Consider development of Management Plans and Corridor Management Plans within high recreational use areas of the SRMA/RMZs.

Other Program Area Management

- Limit OHV and mechanized travel (including over-snow travel) to designated routes.
- Allow cross-country travel for hiking and equestrian use.
- Minerals:
 - Close to location and mineral leasing and disposals (alternatives B and C), except allow small community pits (Alternative C).
 - Open to location and disposals; restrict surface mineral leasing (Alternative D).
- Apply restrictions on the issuance of ROWs (Alternative B).

Circle Cliffs SRMA—KEPA**Alternatives B and C**

Size: Alternatives B and C – 100,611 acres

Circle Cliffs is a breached anticline with spectacular painted-desert scenery, the result of exposed sedimentary rocks of the Triassic Chinle and Moenkopi Formations. A nearly complete articulated skeleton of *Poposaurus*—a rare bipedal crocodylian fossil—was also found here (Presidential Proclamation 9682). The Circle Cliffs are part of the Waterpocket Fold, the inclusion of which completes the protection of this geologic feature begun with the establishment of Capitol Reef National Monument in 1938 (Presidential Proclamation No. 2246, 50 Stat. 1856) (Presidential Proclamation 6920).

The Circle Cliffs were largely unknown outside of the local region at the designation of GSENM in 1996. With the paving of the Burr Trail in 1994, two-wheel-drive access became a destination for auto touring and scientific and geologic research. The Circle Cliffs reveal remarkable specimens of petrified wood, such as large unbroken logs exceeding 30 feet in length, and provide access to the Wolverine Petrified Wood Natural Area established in 1970. The Circle Cliffs have a road network providing access to many hiking, backpacking, and equestrian trails into the eastern side of the Escalante River within GSENM and Glen Canyon NRA.

The Circle Cliffs are largely undeveloped and support a road network and trailheads leading into GSENM and Glen Canyon NRA. The SRMA provides for a unconfined recreational experience allowing visitors to enjoy viewing the unique geologic features; explore the region via the road network and hiking and equestrian use to old mining camps, geologic features, and the Wolverine Petrified Wood Natural Area; and explore the many hidden canyons. The Burr Trail leading to and within the Circle Cliffs is a key focal point for auto touring in the region and provides access to multiple trailheads leading into GSENM, Capitol Reef National Park, and the lower Escalante Canyons within Glen Canyon NRA.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Travel and tourism, auto touring, OHV, photography, day hiking, equestrian use, access to trailheads, camping, and hunting.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends

- Enjoying an escape from crowds of people

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Stronger ties with family and friends
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
 - Feeling good about how visitors are managed
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Primitive to Middlecountry
 - More than 0.5 mile from both mechanized or motorized trails and routes
 - Within 0.5 mile of mechanized trails/routes
 - Within 0.5 mile of four-wheel-drive, ATV, and motorcycle routes
- Naturalness: Primitive to Backcountry
 - Natural landscape in harmony with surroundings and not visually obvious
 - Character of the natural landscape retained. A few modifications contrast with the character of the landscape.
- Facilities and Structures: Primitive to Middlecountry
 - No structures; foot and horse trails only
 - Developed trail made mostly of native materials. Structures are rare and isolated.
 - Maintained and marked trails, simple trailhead developments, and basic toilets if needed

Desired Social RSCs

- Contacts: Primitive to Middlecountry
 - Fewer than 3 encounters per day at campsites and fewer than 6 encounters per day on travel routes

- 7–15 encounters per day on travel routes
- 15–29 encounters per day on travel routes
- **Group Size: Backcountry to Middlecountry**
 - 4–6 people per group
 - 7–12 people per group
- **Evidence of Use: Backcountry to Middlecountry**
 - Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
 - Small areas of alteration. Surface vegetation showing wear with some base soils. Occasional sounds of people.

Desired Administrative/Operational RSCs

- **Public Access: Primitive to Frontcountry**
 - Foot, horse, and non-motorized travel
 - Mountain bike and perhaps other mechanized use
 - Four-wheel-drive vehicles, ATVs, dirt bikes, in addition to non-motorized, mechanized use
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use
- **Visitor Services: Primitive**
 - No maps or brochures available on site. Staff rarely present to provide onsite assistance. Information will be available at Visitor Centers and online resources.
- **Management Controls: Backcountry to Frontcountry**
 - Basic user regulations at key access Points, minimum use restrictions
 - Some regulatory and ethics signs. Moderate use restrictions (e.g., camping, human waste).
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate.
 - Allow camping in designated campgrounds and dispersed camping areas.
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Require human waste disposal systems in proximity to water sources.

- Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed.
- Allow groups up to 25 people unless a larger group size is approved by the authorized officer.
- Allow motorized or non-motorized competitive events on paved and primary dirt roads (alternatives B and C) and allow other motorized events except high-speed events (Alternative C).
- Consider development of Corridor Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Apply restrictions on mineral leasing and disposals.
 - Apply restrictions on the issuance of ROWs (Alternative B).

Highway 12 SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C - 24,645 acres

Utah's Scenic Byway 12 is considered one of the most unforgettable roads in the country, stretching 124 miles in a remote and rugged region of the Colorado Plateau. Its outstanding scenery draws visitors from all over the world to journey through an extraordinary geologic landscape. Scenic Byway 12 was designated a Scenic Byway in April of 1990 and is the principal highway running from Panquitch (Highway 89) to Torrey, Utah (Highway 24). In 2001, local stakeholders started planning the future of the highway and secured an All American Highway designation. The goal is to make improvements where necessary and in a way that will be in harmony with the intrinsic qualities of the region.

Highway 12 is the key focal point for travel and tourism marketing for the region. The highway provides access to many popular recreational destinations in both Frontcountry and Primitive areas of GSENM and KEPA.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Highway transportation, travel and tourism, auto touring, photography, filming, and day hiking.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others

- Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
- Stronger ties with family and friends
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - Increased local tourism revenue
 - More positive contributions to local-regional economy
 - Feeling good about how visitors are managed
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Frontcountry to Rural
 - Within 0.5 mile of low-clearance or passenger vehicle routes
 - Within 0.5 mile of paved/primary roads and highways
- Naturalness: Frontcountry
 - Character of the natural landscape partially modified but none overpower natural landscape (e.g., structures, utilities)
- Facilities and Structures: Frontcountry to Rural
 - Rustic facilities, such as campsites, restrooms, trailheads, and interpretive displays
 - Modern facilities such as campgrounds, group shelters, and occasional exhibits

Desired Social RSCs

- Contacts: Frontcountry
 - 30 or more encounters per day on travel routes
- Group Size: Frontcountry
 - 13–25 people per group
- Evidence of Use: Frontcountry
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sound of people regularly heard.

Desired Administrative/Operational RSCs

- Public Access: Rural

- Ordinary highway auto and truck traffic is characteristic.
- Visitor Services: Frontcountry
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
- Management Controls: Middlecountry to Frontcountry
 - Some regulatory and ethics signs. Moderate use restrictions (e.g., camping, human waste); limit motorized travel to designated roads and trails.
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Along Highway 12, develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Allow camping in developed campgrounds or in designated camping areas.
 - Prohibit dispersed camping (Alternative B).
 - Prohibit dispersed primitive camping once campgrounds are developed and primitive camping areas are designated (Alternative C).
 - Do not impose group size limits.
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Allow campfires only in designated fire grates, designated fire pits, or mandatory fire pans and prohibit wood collection for campfires.
 - Within KEPA, encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).
 - Require human waste disposal systems in proximity to water sources.
 - Allow motorized or non-motorized competitive events.
 - Consider development of Corridor Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Little Desert RMZ portion of the SRMA open to cross-country OHV and mechanized travel (Alternative C).
 - Apply restrictions on mineral leasing and disposals.
 - Apply restrictions on the issuance of ROWs (Alternative B).

Highway 12 SRMA / Little Desert RMZ—KEPA

Alternatives B, C, and D

Size: Alternatives B, C, and D – 2,528 acres

The Highway 12 SRMA is intended to be a focal point for visitation by providing day-use opportunities in close proximity to adjacent communities (GSENM Management Plan, 2000, Ch. 2, p. 8). Highway 12 is the key focal point for travel and tourism marketing for the region. The highway provides Frontcountry access to many popular recreational destinations in both Frontcountry and Primitive areas of the national monument and adjacent KFO-managed lands.

The Little Desert RMZ offers day-use recreational opportunities in close proximity to the community of Escalante. The Little Desert RMZ is within the Highway 12 SRMA and offers opportunities for scenic driving, hiking, scenic and interpretive viewing, camping, road and mountain bicycling, four-wheel-drive touring, and OHV play. This RMZ is necessary to protect and enhance Backcountry to Frontcountry recreational experiences within the Highway 12 SRMA corridor.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Nature viewing, wildlife viewing, viewing geologic features, hiking, bicycling, camping, scenic and interpretive viewing, scenic driving, and vehicle and OHV/four-wheel-drive touring.

Experiences

- Enjoying easy access to natural landscapes and close-to-home outdoor amenities
- Enjoying the sensory experience—sight, sound, and smell—of a natural landscape
- Enjoying OHV and four-wheel-drive touring in a highly scenic landscape
- Enjoying an escape from crowds of people
- Having others nearby who could help if needed
- Savoring group/family affiliation and bonding
- Learning more about natural history and geology
- Encouraging visitors to help safeguard our lifestyle and quality of life

Benefits

- Personal
 - Restored mind from unwanted stress
 - Improved outdoor recreation skills
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Improved mental well-being and physical fitness and health maintenance
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - An improved stewardship ethic toward adjoining/host communities
 - Heightened sense of satisfaction with our area as a place to live
- Community
 - Heightened sense of satisfaction with our community
 - Enhanced lifestyle
 - Enlarged sense of community dependency on public lands
 - More informed citizenry about where to go for different kinds of recreation experiences and benefits

- **Economic**
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
 - Positive contributions to local-regional economic stability
 - Greater value-added local services/industry
 - Increased local tourism revenue
 - Increased property values
- **Environmental**
 - Reduced negative human impacts such as litter, vegetative trampling, and unplanned trails
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Maintenance of distinctive small-town atmosphere

RSC Descriptions

Desired Physical RSCs

- **Remoteness: Frontcountry**
 - Retain current remoteness within 0.5 mile of low-clearance or passenger vehicle routes.
- **Naturalness: Middlecountry to Frontcountry**
 - Character of the natural landscape retained. A few modifications contrast with the character of a landscape (fences, ditched).
 - Character of natural landscape partially modified but none overpower natural landscapes (e.g., structures, utilities).
- **Visitor Facilities: Middlecountry to Frontcountry**
 - Maintained and marked trails, simple trailhead developments, and basic toilets. Rustic facilities such as visitor centers campsites, restrooms, trailheads, and directional and interpretive displays.

Desired Social RSCs

- **Contacts (average): Backcountry to Frontcountry**
 - Visitors experience 7–30 or more encounters per day on travel routes (motorized and/or non-motorized trails). Visitors hiking cross-country or off established trail systems may experience a dramatically lower number of contacts. OHV users traveling in more remote portions of the unit may also experience a lower number of contacts.
- **Group Size (average): Backcountry to Frontcountry**
 - Group sizes encountered range between 4–6 people per group in Backcountry settings and 13–25 people per group in Frontcountry settings, especially at trailheads or staging areas.
- **Evidence of Use (average): Middlecountry to Rural**
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.

- A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- Access: Frontcountry
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use
 - Main access roads are natural surface or graded/gravel surface accessible by low-clearance and four-wheel-drive vehicles and OHVs, in addition to non-motorized methods of travel such as hiking, equestrian, and bicycling. Trails/roads within the unit are accessed via intersection with Highway 12. Motorized use within the unit is open, closed, and limited to designated roads and trails according to sensitivity of terrain and other environmental factors. Opportunities for designated single-track motorcycle and bicycle trails exist as well as the potential for development of open riding areas or constructed challenge/obstacle courses where riders could improve their skills.
- Visitor Services/Information: Frontcountry
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
 - BLM Visitor Information Services center is located in the nearby community of Escalante and is staffed 7 days per week during high-use season. Visitors have access to BLM public services staff and other amenities such as maps, supplies, and current condition/safety information relevant to the local area.
 - Directional/informational signs and interpretive/informative kiosks/displays present at key access points such as trailheads and staging areas.
 - Patrolled periodically by law enforcement officers and other BLM employees. Spike in BLM presence during high-use season.
- Management Controls: Frontcountry
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.
 - Close proximity to urban center enhances agency ability to monitor, manage, and maintain infrastructure and amenities in the Little Desert RMZ. Informational/regulatory signage posted at access points, trailheads, and staging areas. Directional and designation of use signage (open, limited, closed) exists along routes and within potential open riding areas within the unit. Informational material specific to site/resource protection, regulation, and safety featured at local visitor centers, access points, staging areas, and trailheads. Frequent patrolling of the area by BLM law enforcement, BLM employees, and volunteers/stewards is possible due to the close proximity of this area to Escalante and BLM headquarters.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop restrooms and other recreation facilities as necessary.

- Consider development of OHV skills park/course for special events, formal and informal training opportunities, and skills development with an emphasis on responsible motorized recreation.
- Develop appropriate physical barriers to limit recreationist damage to vegetation at high-use areas.
- Competitive events:
 - Prohibit competitive events (Alternative B).
 - Allow competitive events (alternatives C and D).
- Develop new trails for mechanized and OHV use as necessary (Alternative B).
- Overnight use permits:
 - Require self-register permits for overnight camping (Alternative B).
 - Encourage self-register permits for overnight camping (Alternative C).
 - Do not require or encourage self-register permits for overnight camping (Alternative D).
- Group size:
 - Allow groups up to 100 people (Alternative B) unless a larger group size is approved by the authorized officer.
 - No group size limits (alternatives C and D).
- Campfires:
 - Allow campfires only in designated fire grates, designated fire pits, or mandatory fire pans and prohibit wood collection for campfires (Alternative B).
 - Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).
 - No RMZ-specific restrictions on campfires or wood collection (Alternative D).
- Camping:
 - Allow camping in developed campgrounds or in designated primitive camping areas (Alternative B).
 - Allow dispersed primitive camping in designated staging and camping areas within the OHV open areas, and in other locations outside of OHV open areas (Alternative C).
 - No RMZ-specific restrictions on camping (Alternative D).
- Designate staging and camping areas for public safety (Alternative C).
- Develop areas for designated/dispersed camping where appropriate (Alternative B).
- Other Program Area Management
 - Livestock grazing:
 - Available for livestock grazing and trailing (alternatives B and D)
 - Unavailable for livestock grazing, but open to trailing (Alternative C)
 - Trails and travel management:
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes (Alternative B).
 - Open to cross country OHV and mechanized travel where identified, and limit OHV and mechanized travel (including over-snow travel) to designated routes across the remainder of the RMZ (Alternative C).
 - Open to cross country OHV and mechanized travel (Alternative D).
 - Allow cross-country travel for hiking and equestrian use (alternatives B, C, and D).
 - Minerals:
 - Close to location and surface mineral leasing and disposals (alternative B and C), except allow small community pits (Alternative C).

- Close to surface mineral leasing and disposals, and available for location (Alternative D).
- Exclude the issuance of ROWs

Highway 89 SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 41,302 acres

This SRMA is necessary to protect and enhance Frontcountry to Middlecountry recreational experiences within the Highway 89 corridor. The corridor offers world-class scenic viewing opportunities of unique geological features forming the Grand Staircase formation such as the Vermilion Cliffs and White Cliffs. This area encompasses the Highway 89 corridor within GSENM, including the Paria movie set, the old Pahreah Townsite, and the Paria Contact Station. Activities in this SRMA include scenic driving, day-use hiking, camping, road and mountain bicycling, and scenic and interpretive viewing. Recreation management of this area will sustain and enhance education and interpretation of local geology, history, biology, and paleontology, and protect the viewshed of highly scenic landscapes. Short interpretive trails and scenic overlooks will be developed to encourage visitors to learn more about these monument resources. Management in this area will support commercial filming endeavors and provide a range of recreational opportunities for visitors. This corridor will be managed in conjunction with the Vermilion Cliffs Highway Project.

World-class opportunities for scenic viewing along a major highway corridor with roadside access to diverse recreation opportunities such as hiking, OHV/four-wheel-drive/auto touring, bicycling, and interpretation of natural, historic, and geological resources

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Wildlife viewing, nature viewing, viewing geologic features, day-use hiking, bicycling, camping, scenic and interpretive viewing, scenic driving, and vehicle and OHV/four-wheel-drive touring.

Experiences

- Enjoying the sensory experience—sight, sound, and smell—of a natural landscape
- Enjoying OHV and four-wheel-drive touring in a highly scenic landscape
- Enjoying access to close-to-home outdoor amenities
- Feeling good about solitude; being isolated and independent
- Savoring group/family affiliation and bonding
- Learning more about natural history and geology

Benefits

- Personal
 - Closer relationship with the natural world
 - Restored mind from unwanted stress
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance

- Improved mental well-being and physical fitness and health maintenance
- Heightened sense of satisfaction with our area as a place to live
- Community
 - Greater interaction with visitors from other cultures
 - Enhanced lifestyle
 - More informed citizenry about where to go for different kinds of recreation experiences and benefits
- Economic
 - Positive contributions to local-regional economic stability
 - Greater value-added local services/industry
 - Increased local tourism revenue
 - Increased property values
- Environmental
 - Greater retention of the community's distinctive architecture and structures
 - Greater retention of distinctive natural landscape features
 - Improved care for community aesthetics

RSC Descriptions

Desired Physical RSCs

- Remoteness: Frontcountry to Rural
 - Retain current remoteness within 0.5 mile of low-clearance or passenger vehicle routes and within 0.5 mile of paved primary roads and highways.
- Naturalness: Frontcountry
 - Character of natural landscape partially modified but none overpower natural landscapes (e.g., structures, utilities)
- Visitor Facilities: Frontcountry
 - Rustic facilities such as visitor centers, campsites, restrooms, trailheads, and directional and interpretive displays

Desired Social RSCs

- Contacts (average): Frontcountry
 - Visitors experience 30 or more encounters per day on travel routes.
- Group Size (average): Middlecountry to Frontcountry
 - Group sizes of 7–10 people per group are encountered. Groups of 13–25 people per group may be encountered at developed facilities such as interpretive sites, during holiday periods, and during tours or special events.
- Evidence of Use (average): Frontcountry to Rural
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard.

- A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard.

Desired Administrative/Operational RSCs

- Access: Frontcountry to Rural
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use
 - Ordinary highway auto and truck traffic is characteristic.
- Visitor Services/Information: Frontcountry
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekdays and weekends).
 - Directional/informational signs and interpretive displays present at key access points and destinations.
 - Patrolled periodically by law enforcement officers, safety patrol volunteers, and other BLM employees. Spike in BLM presence during high-use season.
- Management Controls: Frontcountry to Rural
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and/or closures.
 - Informational/regulatory signage posted at access points, trailheads, and destination features/facilities. Signage and informational material are specific to site/resource protection, interpretation, and appreciation of natural and historic features.

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop appropriate parking and facilities for equestrian use for the Paria River trail.
 - Develop new trails for hiking, biking, and equestrian use as necessary.
 - Develop appropriate facilities to enhance visitor safety, such as additional signage and turnout lanes at intersection locations where sight distance is limited.
 - Develop appropriate physical barriers to limit recreationist damage to vegetation at high-use areas, as well as to exclude livestock from campgrounds and other developed recreation sites.
 - Develop designated camping areas as necessary.
 - Allow parking off designated routes for dispersed camping up to one vehicle length (Alternative B) or up to 50 feet (Alternative C).
 - Prohibit dispersed camping within 1,320 feet (Alternative B) or 660 feet (Alternative C) of Highway 89.
 - Allow propane/non-wood fires only (Alternative B) or encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).
 - Do not authorize Special Recreation Permits for competitive events within the Kaiparowits Unit portion of the SRMA.

- Allow non-motorized/non-mechanized competitive events (Alternative B) or allow competitive events, except prohibit high-speed motorized competitive events (Alternative C).
- Do not limit group size.
- Consider development of a Corridor Management Plan within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Close to surface occupancy for mineral leasing (alternatives B and C) disposals (Alternative B).
 - Exclude the issuance of ROWs (Alternative B).

Skutumpah SRMA—GSENM and KEPA

Alternatives B and C

Size: Alternatives B and C – 3,026 acres

This SRMA is necessary to protect and enhance Backcountry to Middlecountry recreational experiences within the Skutumpah Road corridor. The corridor offers world-class scenic viewing opportunities of unique geological features forming the Grand Staircase formation such as the White Cliffs and upper terraces below Bryce Canyon National Park. This area encompasses the Skutumpah Road corridor from Johnson Canyon Road to the town of Cannonville. Activities in this SRMA include scenic driving, day-use hiking, dispersed camping, backpacking, equestrian use, bicycling, and scenic and interpretive viewing. Recreation management of this area will sustain and enhance education/interpretation of local geology, history, biology, and paleontology, and protect the viewshed of highly scenic landscapes. Scenic overlooks and/or interpretive displays will be developed to encourage visitors to learn more about natural resources and environmental stewardship. Designated dispersed camping sites and/or campgrounds will be developed to meet public need and limit potential impacts on private landowners within the area. Management in this area will support a range of recreational opportunities for visitors.

World-class opportunities for scenic viewing along a remote road with access to diverse recreation opportunities such as hiking, slot canyons, OHV/four-wheel-drive/auto touring, bicycling, and interpretation of natural, historic, and geological resources. The Skutumpah Road corridor serves as a major transportation route between Kanab and Cannonville and is maintained as a means of access for passenger cars and light trucks, depending upon season/conditions.

SRMA/RMZ Objective(s)

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Wildlife viewing, nature viewing, viewing geologic features, day-use hiking, bicycling, camping, scenic and interpretive viewing, scenic driving, and vehicle and OHV/four-wheel-drive touring.

Experiences

- Enjoying the sensory experience—sight, sound, and smell—of a natural landscape
- Risk reduction—having others nearby who could help if needed
- Enjoying OHV and four-wheel-drive touring in a highly scenic landscape
- Enjoying access to close-to-home outdoor amenities
- Feeling good about solitude and being isolated and independent
- Savoring group/family affiliation and bonding
- Learning more about natural history and geology

Benefits

- Personal
 - Restored mind from unwanted stress
 - Closer relationship with the natural world
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
 - Greater sensitivity to/awareness of outdoor aesthetics and nature's art and its elegance
 - Improved mental well-being and physical fitness and health maintenance
 - Heightened sense of satisfaction with our area as a place to live
- Community
 - Greater family bonding
 - Enlarged sense of community dependency on public lands
 - Lifestyle improvement or maintenance
 - More informed citizenry about where to go for different kinds of recreation experiences and benefits
- Economic
 - Maintenance of a community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economic stability
 - Greater value-added local services/industry
 - Increased local tourism revenue
 - Increased property values
- Environmental
 - Improved respect for privately owned lands
 - Increased awareness and protection of natural landscapes
 - Greater retention of the community's distinctive architecture and structures
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Backcountry to Frontcountry
 - Retain current remoteness within 0.5 mile of mechanized trails/routes and within 0.5 mile of low-clearance or passenger vehicle routes (e.g., unpaved county roads, private land routes).

- **Naturalness: Middlecountry to Frontcountry**
 - Character of natural landscape retained. A few modifications contrast with the character of the landscape (e.g., fences, ditches).
 - Character partially modified but none overpower natural landscapes (e.g., structures, utilities).
- **Visitor Facilities: Middlecountry to Rural**
 - Maintained and marked trails, simple trailhead developments, and basic toilets. Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays. Modern facilities such as campgrounds, group shelters, boat launches, and occasional exhibits.

Desired Social RSCs

- **Contacts (average): Backcountry to Frontcountry**
 - Visitors experience 7–15 encounters per day on travel routes. Visitors experience 15–29 encounters per day on travel routes. Visitors experience 30 or more encounters per day on travel routes.
- **Group Size (average): Primitive to Frontcountry**
 - Group sizes encountered vary between fewer than or equal to 3 people per group, 4–6 people per group, 7–12 people per group, and 13–25 people per group. Group sizes encountered will vary widely along different sections of the corridor with a higher numbers of encounters at developed facilities such as campgrounds and visitor centers, and during holiday periods, tours, and special events especially near the northern end of the unit approaching Cannonville.
- **Evidence of Use (average): Backcountry to Frontcountry**
 - Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.
 - Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard.

Desired Administrative/Operational RSCs

- **Access: Middlecountry to Frontcountry**
 - Four-wheel-drive vehicles, ATVs, dirt bikes, or snowmobiles, in addition to non-motorized, mechanized use.
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use.
- **Visitor Services/Information: Frontcountry to Rural**
 - Visitor Information Services/Contact Station near Paria River is staffed 7 days per week during high-use season and provides information, maps, supplies, and condition/safety info for area visitors.
 - Directional/informational signs and interpretive displays present at key access points and destinations.
 - Patrolled periodically by law enforcement officers, safety patrol volunteers, and other BLM employees. Spike in BLM presence during high-use season.

- **Management Controls: Frontcountry to Rural**
 - Informational/regulatory signage posted at access points, trailheads, and destination features/facilities. Signage and informational material are specific to site/resource protection, interpretation, and appreciation of natural and historic features. Motorized regulations posted at access points, staging areas, and trailheads. Periodic patrols performed by BLM law enforcement, BLM employees, and volunteers/stewards.

Management and Allowable Use Decisions

To achieve the desired RSC:

- **Recreation and Visitor Services**
 - Develop appropriate stewardship, educational/interpretative, and directional signs, maps, and other materials. Messages could include respect for private property in the area.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop appropriate physical barriers to limit recreationist damage to vegetation at high-use areas, as well as to exclude livestock from campgrounds and other developed recreation sites.
 - Develop parking lots and designated dispersed camping areas as necessary.
 - Allow parking off designated routes for dispersed camping up to one vehicle length (Alternative B) or up to 50 feet (Alternative C).
 - Develop trails for hiking, biking, and equestrian use as necessary.
 - Allow dispersed primitive camping, except within 0.25 mile of trailheads.
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Allow groups up to 25 people (Alternative B) or 50 people (Alternative C) unless a larger group size is approved by the authorized officer.
 - Prohibit motorized or non-motorized competitive events (Alternative B) or allow motorized, except high-speed, and non-motorized competitive events (Alternative C).
 - Campfires:
 - Allow propane/non-wood fires only. Prohibit wood collection for campfires (Alternative B).
 - Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).
 - Consider development of Corridor Management Plans within high recreational use areas of the SRMA/RMZs.
- **Other Program Area Management**
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Minerals:
 - Close to surface mineral leasing and disposals (Alternative B).
 - Apply restrictions on mineral leasing and allow disposals for small community pits (Alternative C).
 - Apply restrictions on the issuance of ROWs (Alternative B).

Paria Canyons Vermilion Cliffs SRMA–KEPA

Alternatives B and C

Size: Alternatives B and C – 30,011 acres

This area encompasses Buckskin Mountain, West Clark Bench, and Cedar Mountain to connect to the BLM Arizona Strip Field Office’s “Canyons and Plateaus of the Paria Resource Conservation Area.” These areas are located south of Highway 89, with the monument boundary marking the east boundary. Activities in this SRMA include canyoneering, equestrian use, backpacking, hiking, hunting, and scenic touring along the House Rock Valley Road. The overall recreation experience will continue to be Primitive, uncrowded, and remote. Overall social encounters will remain low compared to other southwest canyon hiking opportunities. However, a range of social encounters occur.

The trailheads in the SRMA provide access to world-famous canyons (e.g., the Wave and Paria River Canyon), offering a remote and unconfined recreation experience for day hiking, backpacking, canyoneering, and equestrian users.

Management of this SRMA will be in coordination with the KFO and the Arizona Strip Field Office.

SRMA/RMZ Objective(s)

The objective of Paria Canyon Vermilion Cliffs SRMA is to provide an undeveloped, Primitive, and self-directed visitor experience while accommodating motorized and mechanized access on designated routes. Facilities will be rare and provided only when essential for resource protection.

Participants in surveys/assessments report an average 4.0 realization (4.0 on a probability scale where: 1 = not at all realized to 5 = totally realized) of the targeted experiences and benefits, 5 years after the beginning of implementation.

Activities: Day hiking, backpacking, equestrian use and horse packing, auto and OHV touring, photography, wildlife viewing, canyoneering, hunting, and education and interpretation of natural geologic settings of the area’s historic sites.

Experiences

- Escaping physical pressures
- Enjoying the closeness of family and friends
- Enjoying an escape from crowds of people
- Enjoying a risk-taking adventure

Benefits

- Personal
 - Improved skills for outdoor enjoyment with others
 - Greater sensitivity to/awareness of outdoor aesthetics and nature’s art and its elegance
 - Stronger ties with family and friends
 - Enlarged sense of personal accountability for acting responsibly on public lands
- Community
 - Enlarged sense of personal accountability for acting responsibly on public lands

- Feeling good about how visitors are managed
- Feeling good about how our cultural heritage is being protected
- Greater interaction with visitors from different cultures
- Economic
 - Positive contributions to local-regional economic stability
 - Maintenance of community's distinctive recreation/tourism market niche or character
 - More positive contributions to local-regional economy
 - Increased local tourism revenue
 - Greater physical capacity to maintain essential infrastructure and services
- Environmental
 - Increased ecologically friendly tourism operations
 - Greater community ownership and stewardship of park, recreation, and natural resources
 - Increased awareness and protection of natural resources
 - Greater retention of distinctive natural landscape features

RSC Descriptions

Desired Physical RSCs

- Remoteness: Backcountry, Middlecountry to Frontcountry
 - Maintain remoteness within 0.5 mile of mechanized trails/routes.
 - Within 0.5 mile of four-wheel-drive, ATV, and motorcycle routes
 - Within 0.5 mile of low-clearance or passenger vehicle routes (e.g., unpaved county roads)
- Naturalness: Backcountry, Middlecountry to Frontcountry
 - Natural landscape with modification in harmony with surroundings and not visually obvious (e.g., stock ponds, habitat treatments, historic structures)
 - Character of the natural landscape retained. A few modifications contrast with character of the landscape (fences, ditches).
 - Character of the natural landscape partially modified but none overpower natural landscape (e.g., structures, utilities)
- Facilities and Structures: Backcountry, Middlecountry to Frontcountry
 - Developed trails made mostly of native materials; structures are rare and isolated.
 - Maintained and marked trails, simple trailhead developments, and basic toilets
 - Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays

Desired Social RSCs

- Contacts and Group Size: Backcountry to Middlecountry
 - 7–15 encounters per day on travel routes
 - 15–29 encounters per day on travel routes
- Group size: Backcountry to Middlecountry
 - 4–6 per group
 - 7–12 people per group

- Evidence of Use: Backcountry to Middlecountry
 - Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.
 - Small areas of alteration. Surface vegetation showing wear with some bare soils. Occasional sounds of people.

Desired Administrative/Operational RSCs

- Public Access: Middlecountry to Frontcountry
 - Four-wheel-drive vehicles, ATVs, dirt bikes, in addition to non-motorized, mechanized use
 - Two-wheel-drive vehicles predominant, but also four-wheel-drive and non-motorized, mechanized use
- Visitor Services: Frontcountry to Urban
 - Information materials describe recreation areas and activities; staff periodically present (e.g., weekends and holidays).
 - Information materials, plus experience and benefits descriptions. Staff regularly present.
 - Information materials plus regularly scheduled outdoor demonstrations and clinics
- Management Controls: Frontcountry to Urban
 - Rules, regulations, and ethics clearly posted. Use restrictions, limitations, and or closures.
 - Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc.
 - Enforcement in addition to rules to reduce conflicts, hazards, and resource damage

Management and Allowable Use Decisions

To achieve the desired RSC:

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop parking lots, restrooms, culinary water, equestrian facilities, and other recreation facilities as necessary.
 - Develop mechanized trails where appropriate.
 - Allow camping in designated campgrounds and designated dispersed camping areas (alternatives B and C).
 - Prohibit camping along House Rock Valley Road (Alternative B).
 - Require human waste disposal systems in proximity to water sources.
 - Campfires:
 - Allow campfires only in designated fire grates, designated fire pits, or mandatory fire pans and prohibit wood collection for campfires in campgrounds. Allow propane/non-wood fires only and prohibit wood collection for campfires in the House Rock area (Alternative B).
 - Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (Alternative C).

- Allow groups up to 12 people (Alternative B) or 25 people (Alternative C) unless a larger group size is approved by the authorized officer.
- Prohibit competitive motorized events (alternatives B and C) and competitive non-motorized events (Alternative B).
- Consider development of Management Plans within high recreational use areas of the SRMA/RMZs.
- Other Program Area Management
 - Limit OHV and mechanized travel (including over-snow travel) to designated routes.
 - Allow cross-country travel for hiking and equestrian use.
 - Minerals:
 - Close to location, surface mineral leasing, and disposals (Alternative B).
 - Apply restrictions on mineral leasing, allow disposals for small community pits, and close to location (Alternative C).
 - Apply restrictions on the issuance of ROWs (Alternative B).

Kanab-Escalante ERMA—GSENM and KEPA

Alternatives B, C, and D

Size: Alternatives B and C – 678,694 acres; Alternative D – 1,835,630 acres

The Kanab-Escalante ERMA encompasses a wide array of often overlapping land designations/classifications such as WSAs, Natural Areas, Research Natural Areas, Relict Plant Communities, lands with wilderness characteristics, ROWs, riparian areas, cultural and paleontological sites, hunting units, developed recreation areas, and motorized and non-motorized/mechanized travel zones.

The Kanab-Escalante ERMA offers a wide variety of recreation opportunities in diverse physical recreation settings that facilitate a visitor's freedom to participate in a variety of developed, undeveloped/primitive, dispersed, motorized, mechanized, and non-mechanized recreational activities.

ERMA Objective(s)

The Kanab-Escalante ERMA will offer recreation opportunities in a relatively unchanged physical recreation setting that facilitate the visitor's freedom to participate in a variety of dispersed, developed, motorized, non-motorized, mechanized, and non-mechanized recreation activities. The ERMA designation encompasses the four planning units (Grand Staircase, Kaiparowits, and Escalante Canyons Units and KEPA) identified in Presidential Proclamation 9682. While recreation would not be the specific management focus throughout the ERMA, recreational resources and values would be managed commensurately with other resource areas to accommodate a variety of multiple uses that support the health and productivity of the land. It is important to note that in some cases recreation opportunities may be constrained by decisions to benefit other resources.

Activities: day hiking, backpacking, sightseeing, equestrian use, auto and OHV touring, photography and filming, wildlife viewing, canyoneering, climbing, hunting/fishing, education and interpretation of cultural and historic areas, special recreation permit activities, and rock hounding/collecting.

Desired Social RSCs

- Manage Primitive areas for fewer than 6 encounters per day on and off travel routes in WSAs.
- Manage Middlecountry for 7–12 people per group along secondary and tertiary travel routes.
- Manage Frontcountry for 13–25 people per group along collector roads.
- Manage Rural areas for 26–50 people per group along paved roads OR do not limit group size on paved and dirt roads.

Management and Allowable Use Decisions

- Recreation and Visitor Services
 - Develop appropriate stewardship, educational/interpretative, and directional signs and maps.
 - Monitor visitor experiences and benefits through surveys/assessments, and visitor utilization and recreation setting condition through routine counts and observations.
 - Develop primitive trailheads at key access points where appropriate.
 - Require (Alternative B) or encourage (Alternative C) self-register permits for overnight camping.
 - Campfires:
 - Allow campfires only in designated fire grates, designated fire pits, or mandatory fire pans and prohibit wood collection for campfires (Alternative B).
 - Encourage fire pans and allow collection of dead and down wood in areas where campfires are allowed (alternatives C and D).
 - Require human waste disposal systems in proximity to water sources.
 - Competitive events:
 - Prohibit motorized and allow non-motorized competitive events (Alternative B).
 - Allow competitive events, including high-speed motorized competitive events in designated areas (Alternative C).
 - Allow competitive events (Alternative D).
 - Parking:
 - Allow parking off designated routes for dispersed camping up to one vehicle length (Alternative B) or up to 50 feet (Alternative C).
 - Allow parking off designated routes for dispersed camping up to 50 feet in existing disturbed areas (Alternative C).
 - Allow parking off designated routes for dispersed camping up to 50 feet (Alternative D).
 - Group size:
 - No group size limits, except only allow groups up to 25 people (Alternative B) or 50 people (Alternative C) along primary collector roads (e.g., Burr Trail, Hole-in-the-Rock, Cottonwood, Skutumpah Roads) unless a larger group size is approved by the authorized officer.
 - Allow groups up to 50 people unless a larger group size is approved by the authorized officer.
- Other Program Area Management
 - Apply restrictions on mineral leasing (alternatives B, C, and D), and close to disposals (Alternative B).
 - Apply restrictions on the issuance of ROWs (Alternative B).

Abbreviations-Acronyms

Term	Definition
ATV	All-terrain vehicle
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
ERMA	Extensive Recreation Management Area
GSENM	Grand Staircase-Escalante National Monument
HITRR	Hole-in-the-Rock Road
KEPA	Kanab-Escalante Planning Area
KFO	Kanab Field Office
NRA	National Recreation Area
OHV	Off-highway vehicle
RSC	Recreation Setting Characteristic
RMZ	Recreation Management Zone
ROW	Right-of-way
SRMA	Special Recreation Management Area
WSA	Wilderness Study Area

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area
Draft Resource Management Plans
Environmental Impact Statement***

Appendix S

***Areas of Critical Environmental Concern Evaluation
Report***

August 2018

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Appendix S: Areas of Critical Environmental Concern Evaluation Report

This report documents the process used to evaluate nominations for areas of critical environmental concern (ACECs) considered by the Bureau of Land Management (BLM) in developing the Grand Staircase-Escalante National Monument (GSENM) and Kanab-Escalante Planning Area (KEPA) Resource Management Plans (RMPs). In brief, the BLM interdisciplinary team (IDT) evaluated 1,193,077 acres that were nominated as ACECs (including some overlapping acreage). Of these, 14 areas totaling 308,683 acres met the criteria for relevance and importance values, resources, natural systems or processes, or hazards/safety/public welfare (referred to collectively as values) and were identified as potential ACECs.

The Law: FLPMA

In the development and revision of land use plans, the Secretary shall ... give priority to the designation and protection of areas of critical environmental concern. (Federal Land Policy and Management Act [FLPMA], Title II, Section 202(c)3)

The term “areas of critical environmental concern” (often referred to as “ACECs”) means areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards. (FLPMA, Title I, Section 103(a))

The Regulation: 43 CFR 1610.7-2

To be a potential ACEC, both of the following criteria shall be met:

- **Relevance:** There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.
- **Importance:** The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

The Policy: BLM Manual 1613

BLM Manual 1613, *Areas of Critical Environmental Concern*, provides direction for identifying, analyzing, designating, monitoring, and managing ACECs. Key points are as follows:

- The ACEC designation indicates to the public that the BLM recognizes that an area has significant values and has established special management measures to protect those values.
- Designation of ACECs is accomplished only through the RMP process, either in an RMP itself or in a plan amendment.
- Potential ACECs are identified as early as possible in the planning process.

- Existing ACECs are subject to reconsideration when plans are revised.
- Members of the public or other agencies may nominate an area for consideration as a potential ACEC. BLM personnel are encouraged to recommend areas for consideration as ACECs.
- No formal or special procedures are associated with nomination.

An area must meet relevance and importance criteria, and require special management attention, to qualify for consideration for designation as an ACEC. An area meets the relevance criterion if it contains one or more of the following:

- A significant historic, cultural or scenic value (including but not limited to rare or sensitive archaeological resources and religious or cultural resources important to Native Americans)
- A fish and wildlife resource (including but not limited to habitat for endangered, sensitive or threatened species, or habitat essential for maintaining species diversity)
- A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities that are terrestrial, aquatic, or riparian; or rare geological features)
- Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the resource management planning process that it has become part of a natural process.

The value, resource, system, process, or hazard described above must have substantial significance and values in order to satisfy the “importance” criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

- Has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource
- Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change
- Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA
- Has qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare
- Poses a significant threat to human life and safety or to property

Although it is only necessary for an area to meet the relevance and importance criteria for one value to qualify as an ACEC, many potential ACECs meet the criteria for several values.

To be designated as an ACEC, an area must require special management attention to protect the relevance and importance values. “Special management attention” refers to management prescriptions developed during preparation of an RMP or amendment expressly to protect the relevance and importance values of an area from the potential effects of actions permitted by the RMP, including proposed actions deemed to be in conformance with the terms, conditions, and decisions of the RMP. These are management measures that would not be necessary and prescribed if the relevant and important features were not present.

Evaluation Process

Existing Special Management Areas

The BLM did not designate any new ACECs in the 2000 GSENM Monument Management Plan, because it determined that resource protection would be substantially equivalent under either Monument authority or ACEC designation (BLM 1999:2.52). However, the BLM did retain pre-FLPMA special designations, including Outstanding Natural Areas (ONAs), Recreation Areas, and Historic Sites established under the Classification and Multiple Use Act of 1964, which predated monument designation. Under FLPMA, the BLM reviews the classifications and withdrawals made under the Classification and Multiple Use Act, along with other existing designations, as part of the land use planning process, and makes a recommendation regarding continuation of these designations. The Secretary reserves the authority to modify or terminate the classification consistent with the land use plan. The 1981 Escalante Management Framework Plan and 2000 GSENM Monument Management Plan continued all existing designations.

Provisions of 43 Code of Federal Regulations (CFR) 6225.0-5 of that era define ONAs as follows:

“Outstanding Natural Areas. These are established to preserve scenic values and areas of natural wonder. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas, and public use facilities are normally located on the periphery of the area. The public is encouraged to walk into the area for recreation purposes wherever feasible.”

A notice in the *Federal Register* in 1970 designated the multiple areas as ONAs, recreation areas or sites, or historic sites. The notice temporarily segregated Devils Garden ONA and Dance Hall Rock Historic Site from all forms of entry, location, or selection under the public land laws, including the general mining laws, but not the mineral leasing laws. These areas were also segregated from oil and gas exploration to the extent that notices of intent to explore require the approval of the manager before operations commence. Termination of the mineral segregation for these areas occurred on May 15, 1982, with a notice in the *Federal Register*.

In 1972, Glen Canyon National Recreation Area (NRA) was established and the public lands it encompassed were transferred to the National Park Service for management. This eliminated the majority of the Escalante Canyons ONA (originally 129,000 acres) but left five scattered tracts totaling 1,160 acres. Tract 5 is being analyzed in this ACEC evaluation process.

The Tract 5 ONA became an Instant Study Area as part of the Wilderness Inventory process beginning in 1979. This area has been managed as part of the Escalante Canyons Wilderness Study Area (WSA), and will continue to be managed according to the non-impairment mandate until Congress decides to designate this area as Wilderness or release this area from study.

Later in 1979, off-road vehicle closures were made on the ONAs under the authority of Executive Order 11644.

No Mans Mesa

On September 18, 1986, a *Federal Register* notice announced the designation of No Mans Mesa as a Research Natural Area (RNA) under the authority of 43 CFR 8200 and using a plan amendment. The management prescription included designating 1,335 acres of public land as

an RNA. Management was to give primary emphasis to educational, scientific, and research values. Management prescriptions included restricting off-highway vehicles to existing roads and trails, placement of a “no surface occupancy” stipulation on oil and gas leases, a requirement that the area be retained in public ownership, withdrawal of the RNA from mineral entry, completion of a management plan, and provision for determination of fire suppression on a case-by-case basis. Since the Presidential Proclamation, mineral recommendations and the retention objective have been superseded.

Wolverine Petrified Wood Area

Wolverine Petrified Wood Natural Environmental Area (2,560 acres) was withdrawn in 1960 from all forms of appropriation under the public land laws, including the mining, but not the mineral leasing laws. In 1981, 2,560 acres were closed to off-road vehicle use.

The 2000 GSENM Monument Management Plan approved the continuing designations of Devils Garden ONA, Dance Hall Rock Historic Site, Escalante Canyons Tract 5 ISA Complex, and Wolverine Petrified Wood Natural Environmental Area. The portions of these areas that are no longer in the monument were evaluated for relevance and importance during this ACEC evaluation process. The portion of Devils Garden ONA that is now outside the monument boundaries was found not to meet relevance and importance because it does not contain any of the outstanding geologic features associated with Devils Garden ONA; therefore, it was not carried forward as a potential ACEC. The portion of Dance Hall Rock Historic Site that is now outside the monument boundaries is analyzed as part of the Hole-in-the-Rock Trail ACEC. The portions of Escalante Canyons Tract 5 ISA Complex that were found to contain relevance and importance values are analyzed as part of the Scorpion Flat/Dry Fork ACEC. The small portions of Wolverine Petrified Wood Natural Environmental Area that are now outside the boundaries of the monument were found not to meet relevance and importance because they do not contain the petrified wood resources associated with this area; therefore, they were not carried forward as a potential ACEC.

Prior ACEC Nominations

During the development of the 2000 GSENM Monument Management Plan, numerous ACEC nominations were submitted during the scoping process; however, these ACECs were not evaluated as ACECs because the BLM determined that resource protection would be substantially equivalent under either monument authority or ACEC designation (BLM 1999:2.52). Because some areas are no longer in the monument, the BLM evaluated these areas for relevance and importance. The previously nominated areas include:

- US Highway 89
- Utah Highway 12
- Cottonwood Wash Road from Utah Highway 12 to US Highway 89
- Road to Pahreah Townsite from US Highway 89
- Burr Trail from Boulder to Capitol Reef
- Hole-in-the-Rock Road from Utah Highway 12 to Glen Canyon NRA
- Fourmile Bench Old Tree Area
- No Mans Mesa RNA
- Utah Highway 9
- Utah Highway 143

Of these, Fourmile Bench Old Tree Area and No Mans Mesa RNA remain in the Kaiparowits and Grand Staircase Units, respectively, and therefore were not carried forward for analysis. Utah Highways 9 and 143 are out of the Planning Area and therefore were not carried forward for analysis.

Outcomes for other previously nominated areas are as follows:

- US Highway 89: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Cockscomb East and West ACECs.
- Utah Highway 12: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Henderson/Pardner and Straight Cliffs/Fiftymile Bench ACECs.
- Cottonwood Wash Road from Utah Highway 12 to US Highway 89: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Butler Valley, Cockscomb East, and Cockscomb West ACECs.
- Road to Pahreah Townsite from US Highway 89: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Cockscomb East and Cockscomb West ACECs.
- Burr Trail from Boulder to Capitol Reef: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Circle Cliffs ACEC.
- Hole-in-the-Rock Road from Utah Highway 12 to Glen Canyon NRA: nominated for scenic values. The BLM IDT evaluated the area for scenic values and included relevance and importance scenic values in the Straight Cliffs/Fiftymile Bench and the Scorpion Flat/Dry Fork ACECs.

Nominated ACECs

Numerous ACEC nominations were received during the scoping process. Multiple areas received nominations, often with differing geographic extents. Nominations were evaluated in accordance with BLM Manual 1613. Values meeting relevance and importance criteria were identified and are the basis for establishing potential ACECs for further consideration in the RMPs. Criteria used for the relevance and importance evaluation are included in the *Evaluating Relevance and Importance Criteria* section.

Potential ACECs

Following the evaluation of identified values using the relevance and importance criteria, 308,683 acres were identified as potential ACECs (Maps 59 and 60). Descriptions of the potential ACECs and management are included in the *Evaluations of ACEC Nominations* section. Potential ACEC acreages vary from nominated ACEC acreage because the potential ACECs only include areas with relevance and importance values.

Table 1. Potential ACECs

	Area Name	Acreage with Relevance and Importance Values
1	Alvey Wash	29,769 acres

	Area Name	Acreage with Relevance and Importance Values
2	Bulldog Bench	361 acres
3	Butler Valley	15,780 acres
4	Circle Cliffs	26,706 acres
5	Cockscomb East	42,100 acres
6	Cockscomb West	40,475 acres
7	Collet Top	9,218 acres
8	Henderson/Pardner	12,259 acres
9	Hole in the Rock Trail	60,578 acres
10	Paria River	180 acres
11	Scorpion Flat/Dry Fork	30,691 acres
12	Straight Cliffs/Fifty Mile Bench	21,357 acres
13	Tibbet Head	19,079 acres
14	Wahweap Hoodoos	130 acres

Consideration of Potential ACECs in the Draft RMPs/EIS

Potential ACECs are considered in the Draft RMPs/EIS, as follows:

- **Alternative A:** Continue current management.
- **Alternative B:** Manage all nominated and evaluated areas as ACECs (308,683 acres).
- **Alternative C:** Manage Circle Cliffs, Cockscomb East, Cockscomb West, Straight Cliffs/Fiftymile Bench (portions bordering the Glen Canyon NRA), and Tibbet Head as ACECs (130,995 acres).
- **Alternative D:** Do not manage any areas as ACECs.

The environmental consequences of the proposals under each alternative, including threats of irreparable damage, are evaluated in Chapter 3 of the Draft RMPs/EIS.

Evaluating Relevance and Importance Criteria

The task of evaluating the ACEC nominations was done by the land use planning IDT. The team's tasks were to:

- Evaluate the ACEC nomination for relevance values, resources, processes, systems, and hazards/safety/public welfare (referred to collectively as *values*).
- Evaluate relevance values to determine which, if any, meet the importance criteria.

- Map the areas of relevance and importance. These maps define the potential ACECs that will be considered in the Draft RMPs/EIS.

Determining Relevance

Potentially relevant values were evaluated based on guidance in 43 CFR 1610.7-2, *Designation of Areas of Critical Environmental Concern*, and BLM Manual 1613, *Areas of Critical Environmental Concern*. Only one of the relevance criteria had to be met for the area to be considered further for importance.

Historic, Cultural, and Scenic Values

A historic or cultural value was determined relevant if it:

- Was determined significant by the staff archaeologist or paleontologist, with consideration of information provided by local stakeholders and interested public;
- Has been determined to be eligible for, or is listed on, the National Register of Historic Places (NRHP);
- Retains integrity and has research potential; or
- Is considered important by local Native American tribes, including for traditional uses or as a Traditional Cultural Property or sacred site.

A scenic value was determined relevant if it was inventoried as Class A scenery in the BLM's Visual Resource Inventory and included one or more of the following:

- High Sensitivity Rating in the Visual Resource Inventory;
- State or national scenic designations (e.g. national scenic byway, state scenic byway or backway);
- Wild and Scenic River suitable segments where outstandingly remarkable values include scenic resources; or
- Adjacency to specially designated lands (e.g., National Park Service lands, designated wilderness areas) within the foreground view area of 0 to 3 miles.

Fish and Wildlife Resources

A fish and wildlife resource (including habitat for endangered, sensitive, or threatened species or habitat essential for maintaining species diversity) was determined relevant if it or its habitat was documented as present within the nominated area.

Sources of information:

- Utah Natural Heritage Program Database, operated and maintained by the Utah Division of Wildlife Resources (UDWR)
- UDWR habitat maps for game species
- Lewis, Leah R., *Habitat Characteristics of Mexican Spotted Owls (*Strix occidentalis lucida*) in the Canyonlands of Southern Utah* (2014). All Graduate Theses and Dissertations. 3335. <https://digitalcommons.usu.edu/etd/3335>
- Lewis 2014 Mexican Spotted Owl Potential Habitat Model
- U.S. Fish and Wildlife Service (USFWS) habitat data maps, recovery plans, and other information
- BLM biologist records and/or observations

Natural Processes or Systems

Nominated natural processes or systems (e.g., plants, riparian areas, and geologic processes) were considered relevant if they were present within the nominated area and included the following:

- Endangered, sensitive, or threatened plant species (documented occurrences and/or habitat within the nominated area);
- Rare, endemic, or relict terrestrial, aquatic, or riparian plants or plant communities (documented occurrences and/or habitat within the nominated area);
- Rare geologic features; or
- Fragile soils, including areas with potential concentrations of late successional biological soil crusts.

Sources of information included the following:

- Utah Natural Heritage Program Database operated and maintained by UDWR
- UDWR habitat maps for game species
- USFWS habitat data maps
- Riparian area inventories
- Existing management plans
- Colorado Plateau Rapid Ecoregional Assessment
- National Natural Landmark Areas Survey (1980)
- U.S. Geological Survey data

Natural Hazards

A natural hazard was determined relevant if it was so determined by the IDT after reviewing the information about the hazard on a case-by-case basis.

Determining Importance

Only relevance values were evaluated for importance. In general, the value, resource, system, process, or hazard described as relevant had to have substantial significance and values to meet the importance criteria. Only one of the importance criteria had to be met for an area to become a potential ACEC. Criteria for importance are described in the following sections.

More Than Local Significance

Historic and Cultural Values

A relevant historic or cultural value was determined more than locally significant if it was:

- Listed on or eligible for listing on the NRHP
- Otherwise judged more than locally significant as a result of federal laws, regulations, and national BLM policies that mandate consideration and protection of cultural resources
- Serves as an important reference for new published fossil species or faunas (e.g., type localities or historic/significant fossil sites)

Scenic Values

A relevance scenic value was determined more than locally significant if it:

- Contained a national or state scenic designation such as an All-American Road, National Scenic Byway, or State Scenic Byway or Backway

- Was adjacent to National Park Service lands, designated wilderness areas, etc. within the foreground view area of 0 to 3 miles
- Was otherwise judged more than locally significant by the IDT

Fish and Wildlife Resources

A relevant fish or wildlife resource or botanical process or system was determined more than locally significant if the species is protected under Federal law, regulation, or BLM national policy that mandates the consideration and protection of species:

- Special status species, including:
 - Federally listed threatened or endangered species
 - BLM sensitive species
 - State of Utah species of concern
- Endemic to nominated area

Natural Processes or Systems

For all natural processes or systems found to have relevance values, the IDT determined whether a specific value had qualities or circumstances that made it more than locally significant.

Natural Hazards

No natural hazards were determined relevant; therefore, benchmarks for importance were not developed for natural hazards.

Fragile, Sensitive, Rare, Irreplaceable, Exemplary, Unique, Endangered, Threatened, or Vulnerable to Adverse Change

For all relevance values, the IDT determined whether a specific value had qualities or circumstances that made it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.

National Priority

Historic and Cultural Values

Protection of cultural and paleontological resources is a national priority; therefore, any cultural or paleontological resource identified as relevant was also determined to be important.

Scenic Values

A relevant scenic resource that also carried a national designation such as National Scenic Byway, All-American Road, or State Scenic Byway or Backway or was in the foreground (0 to 3 miles) of National Park Service lands or designated Wilderness was determined important.

Fish and Wildlife Resources

A relevant, federally listed threatened or endangered species was determined important because of the Endangered Species Act.

Natural Processes or Systems

The BLM developed the *National Riparian-Wetland Initiative for the 1990s*. This initiative established riparian areas as a national priority, developed goals and objectives for managing riparian-wetland resources on public lands, and included a strategy to focus management on

entire watersheds. The Utah BLM Riparian Management Policy is tiered to this overall national strategy.

Natural Hazards

No natural hazards were determined relevant; therefore, benchmarks for importance were not developed for natural hazards.

Safety and Public Welfare

For all relevance values, the IDT determined that the value met the importance criteria if it had qualities that warranted highlighting or protection in order to satisfy public or management concerns about safety and public welfare.

Threat to Human Life or Property

For all relevance values, the IDT determined that the value met the importance criteria if it poses a significant threat to human life and safety or property.

Mapping Potential ACECs

Values identified as having relevance and importance provided a basis for the potential ACECs. Initial nominations were revised and reconfigured based on the identified locations of specific relevance and importance values, resulting in the set of 14 potential ACECs. All potential ACECs will be evaluated in the Draft RMPs/EIS.

Evaluations of ACEC Nominations

Alvey Wash

- **General Location:** South and west of the town of Escalante, extending south along Alvey Wash to the north-central boundary of the Kaiparowits Unit
- **General Description:** A north-south trending canyon with many side canyons, containing numerous sites from the Archaic to Late Prehistoric periods but dominated by sites associated with the archaeological Fremont culture. Sites include habitations, camps, cliff structures (granaries), rock art, and rock shelters. Area also includes extensive outcrops of the lower and middle members of the Wahweap Formation that have yielded important dinosaur and other vertebrate fossils, including the type specimen of *Machairoceratops cronusi*.
- **Acreage:** 29,769 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	More than local significance: Northern portion of canyon contains numerous prehistoric sites. This area contains sites very important in the understanding of the local archaeological Fremont culture, believed to be the southern extension of the San Rafael Fremont. Sites include pit houses, rock shelters, storage granaries, and rock art.

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value: Paleontological values	More than local significance: Vertebrate fossil resources from area are rare on a global scale. There is widespread interest in the fossils from paleontologists who study the origins of mammals and other vertebrates. Many specimens from the area have been published in scientific journals and serve as the types for new species. Rare: Rare concentrations of terrestrial vertebrate fossils of middle Campanian age along the Camp Flats portion of the Smoky Mountain Road and along the ridges to the west. This includes Star Seep area where the type specimen of <i>Machairocertops</i> was collected.
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Atwood penstemon - endemic to GSENM.

R – relevance criteria, I – importance criteria, GSENM – Grand Staircase-Escalante National Monument

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Historic/cultural: Paleontological values	<p>Apply the following management:</p> <ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Plan and complete NHPA Section 110 inventories and site documentation in commonly used and likely recreational use areas and cattle congregation locations • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Require surface facilities incident to underground mining would be required to avoid known and documented archaeological sites. Apply stipulations to mitigate adverse effects of subsidence. • Apply NSO stipulation for fluid mineral leasing. • Prohibit rock climbing within 100 meters of archaeological structures. <p>Apply the following management in identified paleontological resource areas within the ACEC.</p> <ul style="list-style-type: none"> • Prohibit casual collection of fossils or other paleontological materials. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management. • Prioritize paleontological areas within ACEC (Wahweap Formation) for inventory to adequately assess distribution, condition, and significance of fossil resources. • Require inventories of all paleontological resources prior to surface-disturbing activities to document significant invertebrate and paleobotanical fossil sites, not just vertebrates.

Relevance and Importance Values	Alternative B Special Management
Natural Process or System: Atwood penstemon	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Prohibit vegetation treatments that are likely to harm, or will not benefit, special status species plants in known suitable habitat. • Conduct inventories and research to identify and document habitat and populations of sensitive species plants, including Atwood penstemon. • Monitor known populations of Atwood penstemon to document changes in species distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.

SRP – Special Recreation Permit, NHPA – National Historic Preservation Act, NSO – No Surface Occupancy, ACEC – Area of Critical Environmental Concern, BLM – Bureau of Land Management

Relationship to Wilderness Study Areas

Portions of the Alvey Wash ACEC overlap with portions of Carcass Canyon and Death Ridge WSAs.

Bulldog Bench

- **General Location:** Approximately half a mile west of Cannonville, immediately south of Tropic, and east of Bryce Canyon National Park
- **General Description:** Area includes vertebrate fossils of Cenomanian age that are rare on a global scale and help paleontologists better understand the origins of mammals and other vertebrates. It is located on the upper slopes and southern end of the top of Bulldog Bench.
- **Acres:** 361 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	<p>More than locally significant: Vertebrate fossil resources from area are rare on a global scale. There is widespread interest in the fossils from paleontologists who study the origins of mammals and other vertebrates. Many specimens from the area have been published in scientific journals and serve as the types for new species.</p> <p>Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Extremely rare concentrations of terrestrial vertebrate fossils of Cenomanian age (about 96 million years old) found in lower and middle members of Naturita on Bulldog Bench and surrounding areas. Type localities for published fossil species are present.</p>

R – relevance criteria, I – importance criteria

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Historic/cultural: Paleontological values	<p>Apply the following management:</p> <ul style="list-style-type: none"> • Prohibit casual collection of paleontological materials. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management. • Prioritize paleontological areas within ACEC (Wahweap Formation) for inventory to adequately assess distribution, condition, and significance of fossil resources. • Require inventories of all paleontological resources prior to surface-disturbing activities to document significant invertebrate and paleobotanical fossil sites, not just vertebrates.

ACEC – Area of Critical Environmental Concern

Relationship to Wilderness Study Areas

The Bulldog Bench ACEC does not overlap any WSAs.

Butler Valley

- **General Location:** Approximately 7 miles southeast of Henrieville, connecting with the northwest side of the Kaiparowits Unit
- **General Description:** Area contains portions of two scenic quality ratings units that rated as A quality scenery (Willis Creek SQRU-017: score of 19; and Butler Valley/Big Dry Valley SQRU-018: score of 20). It is characterized by strongly contrasting landforms of gentle valley bottoms, elevated benches, rugged hills, and dramatic sandstone cliffs. The area sits above the northernmost reaches of the White Cliffs layer of the Grand Staircase. It includes portions of the Paria River, State Scenic Backway Cottonwood Canyon Road, Rock Springs Bench, and Butler Valley. The area also includes known habitat for populations of the special status plant species Kodachrome bladderpod.
- **Acreage:** 15,780 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Scenic	Scenic Quality A & High Sensitivity
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Kodachrome bladderpod, an endangered plant.

R – relevance criteria, I – importance criteria

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Scenic	Apply the following management: <ul style="list-style-type: none"> • Manage as VRM Class II.
Natural Process or System	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Prohibit vegetation treatments in known suitable habitat for special status plant species. • Conduct inventories and research to identify and document habitat and populations of sensitive species plants, including Kodachrome bladderpod. • Monitor known populations of Kodachrome bladderpod to document changes in species distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies. • Prohibit development of new OHV routes within the ACEC to protect Kodachrome bladderpod from the impacts of increased recreation. • Recommend as withdrawn from mineral entry.

VRM – Visual Resource Management, BLM – Bureau of Land Management, OHV – off-highway vehicle, ACEC – area of critical environmental concern

Relation to Wilderness Study Areas

The Butler Valley ACEC does not overlap with any WSAs.

Circle Cliffs

- **General Location:** Approximately 10 miles northeast of Boulder, connecting with the northeastern most corner of the Escalante Canyons Unit
- **General Description:** This areas sits between the north reaches of the Circle Cliffs and State Scenic Backway Burr Trail Road and borders Capitol Reef National Park and Dixie National Forest. It is dominated by Ancestral Puebloan sites and represents a late Ancestral Puebloan intrusion into what was formerly Fremont territory and thus is very important for archaeological research. The northern and western edges of the area contain or are adjacent to the Circle Cliffs, dramatic red sandstone cliffs, and are part of a scenic quality rating unit that rated as A quality scenery (Upper Gulch/Wolverine Bench SQRU-044: score of 22). The area also includes habitat for threatened and endangered animal species (Mexican spotted owl).
- **Acreeage:** 26,706 acres for alternatives B and C

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	<p>More than local significance: This area is very important for archaeological research. The area is dominated by Ancestral Puebloan sites, which represent a late Ancestral Puebloan intrusion into what was formerly Fremont territory, probably in the early 1100s A.D., but seemingly without conflict. There is, instead, an apparent amalgamation of the two cultures into something new. By the mid-1200s, the area was abandoned by the Ancestral Puebloan/Fremont and returned to occupation by hunter-gatherers, today's Paiute.</p> <p>The concentrations of fossil wood on excluded lands in the north Circle Cliffs are equally abundant, well preserved, and significant as those in the Wolverine Trailhead area. Starting just northeast of the Lampstand and trending in a broad arc all the way to the western boundary with Dixie National Forest, there are spectacular concentrations of in situ and proximal ex situ wood. Some in situ logs are more than a meter in diameter and exposed for many tens of meters.</p>
Yes	Scenic	<p>More than local significance: Scenic quality A, high sensitivity, and adjacency to National Park Service.</p>
Yes	Fish and wildlife resource	<p>Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Mexican spotted owl designated critical habitat.</p> <p>National priority concern: Threatened and Endangered Species Act.</p>

R – relevance criteria, I – importance criteria

Alternatives B and C Special Management

Relevance and Importance Values	Alternatives B and C Special Management
Historic/cultural values	<ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Plan and complete NHPA Section 110 inventories and site documentation in commonly used and likely recreational use areas and cattle congregation locations. • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Require surface facilities incident to underground mining to avoid known and document archaeological sites. Apply stipulations to mitigate adverse effects of subsidence. • Apply NSO stipulation for fluid mineral leasing (Alternative B only). • Apply CSU stipulation for fluid mineral leasing. Avoid placement of oil and gas-related facilities and structures in areas where there are known or documented archaeological sites. Where setting is a component of a site’s eligibility, require a viewshed analysis and require facilities to be placed outside the viewshed, or require mitigation to avoid adversely affecting the setting (Alternative C only). • Promote archaeological research, site preservation, and stabilization. <p>Apply the following management in the Petrified Wood Resource Area:</p> <ul style="list-style-type: none"> • Prohibit casual or commercial collection of petrified wood. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management.⁽⁴⁾ • Prioritize wood deposits for inventory to adequately assess distribution, condition, and significance of resources. • Require inventories of paleontological resources prior to surface disturbing activities to document significant paleobotanical fossil sites (including petrified wood). • Avoid surface disturbance and placement of facilities near concentrations of wood or in situ logs.
Scenic	<ul style="list-style-type: none"> • Manage as VRM Class II
Fish and Wildlife Resource	<p>Require site-specific analysis of threatened and endangered resources to determine the potential for impacts, potential for habitats containing primary constituent elements of habitat, and the need for Section 7 consultation with USFWS.</p>

¹ Implementation decisions that are appealable to the Interior Board of Land Appeals
 SRP – Special Recreation Permit, NHPA – National Historic Preservation Act, NSO – No Surface Occupancy, CSU – Controlled Surface Use, VRM – Visual Resource Management, USFWS – U.S. Fish and Wildlife Service

Relation to Wilderness Study Areas

The Circle Cliffs ACEC does not overlap with any WSAs.

Cockscomb East

- **General Location:** Approximately 3 miles northwest of Big Water, connecting with the southern boundary of the Kaiparowits Unit

- General Description:** Shale badlands and tables and benches of the southwestern Kaiparowits Plateau and Paria Rimrocks. The area also includes the lower reaches of the Cockscomb geomorphic feature and contains a portion of a high potential segment of the Old Spanish National Historic Trail. Approximately 50 percent of the area contains portions of two scenic quality ratings units that rated as A quality scenery (Cockscomb SQRU-008: score of 23; Wahweap/Rimrocks SQRU-011: score of 19). The area includes habitat for sensitive animal and plant species and also contains some of the only Cenomanian terrestrial vertebrate fossil sites in North America.
- Acreage:** 42,100 acres for Alternative B; 32,683 acres for Alternative C

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Fish and wildlife resource	Southwestern willow flycatcher: endangered. National Priority Concern: Threatened and Endangered Species Act.
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: sensitive plants and native endemics. Sensitive plants: Gumbo milkvetch; Escarpement milkvetch; Silverleaf lupine, <i>Lupinus caudatus argophyllus</i> ; Utah spurge, Euphorbia nephradenia; and Cataract gilia, <i>Gilia imperialis</i> . Native endemics: Tompkins phacelia; Tropic goldeneye; Kane breadroot; Higgin's spring parsley.
Yes	Scenic	More than local significance: Scenic Quality A, Scenic Backway, & Wild and Scenic River suitable segment with scenic outstandingly remarkable values.
Yes	Historic/cultural value: Paleontological values	High density occurrences of Cenomanian age vertebrate fossils in the Paria Rimrocks. Important source for fossil species types including an early marsupial, <i>Pariadens kirklandi</i> . Some of the only Cenomanian terrestrial vertebrate fossil sites in North America. Also, marine reptile and other marine vertebrate fossils occur in the Tropic Shale, and highly significant vertebrate dinosaur and other vertebrate fossils occur in the Straight Cliffs Formation and overlying Wahweap Formation in the area. Includes portion of high potential segment of Old Spanish National Historic Trail.
Yes	Natural process or system	National priority concern: Riparian habitat around the Paria River.

R – relevance criteria, I – importance criteria

Alternatives B and C Special Management

Relevance and Importance Values	Alternatives B and C Special Management
Fish and Wildlife Resource	Require site-specific analysis of sensitive, threatened, and endangered resources to determine the potential for impacts, potential for habitats containing primary constituent elements of habitat, and the need for Section 7 consultation with USFWS.
Natural Process or System	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Conduct inventories and research to identify and document habitat and populations of endemic and sensitive plants. • Prohibit vegetation treatments that are likely to harm, or will not benefit, special status species plants in known suitable habitat (Alternative B only). • Allow vegetation treatments in known suitable habitat for special status species plants (Alternative C only). • Monitor known populations of endemic and sensitive plant species including distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.
Scenic	<ul style="list-style-type: none"> • Manage all areas outside of WSA as VRM Class II.
Historic/cultural: Paleontological value	<p>Apply the following management in identified paleontological resource areas within the ACEC:</p> <ul style="list-style-type: none"> • Prohibit casual collection of fossils or other paleontological materials. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management. • Prioritize paleontological areas within ACEC (Naturita, Tropic Shale, Straight Cliffs, and Wahweap Formations) for inventory to adequately assess distribution, condition, and significance of fossil resources. • Require inventories of all paleontological resources prior to surface-disturbing activities to document significant invertebrate (including methane reefs) and paleobotanical fossil sites, not just vertebrates.
Natural Process or System: Riparian	<ul style="list-style-type: none"> • Prioritize functioning-at-risk riparian zones for restoration and implement restoration projects to achieve properly functioning condition. • Do not designate spur routes in the ACEC. Area must be limited to designated routes.

USFWS – U.S. Fish and Wildlife Service, BLM – Bureau of Land Management, WSA – Wilderness Study Area, VRM – Visual Resource Management, ACEC – Area of Critical Environmental Concern

Relation to Wilderness Study Areas

The Cockscomb East ACEC overlaps with the Cockscomb WSA, and a very small portion of the Wahweap WSA.

Cockscomb West

- **General Location:** Approximately 11 miles west of Big Water, connecting with the southeastern boundary of the Grand Staircase Unit

- General Description:** Area includes very important archaeological sites along the lower flanks and foothills of the Vermilion Cliffs that date to the earliest attempts at prehistoric North American agriculture and contains some portion of a high potential segment of the Old Spanish National Historic Trail. The northwestern edges of the area contain portions of a scenic quality rating unit that rated as A quality scenery (Vermilion Cliffs/Paria-Hackberry SQRU-003: score of 22), which is typified by dramatic red sandstone cliffs associated with the Vermilion Cliffs layer of the Grand Staircase. The area includes habitat for several sensitive plant species and contains concentrated areas with potential for high coverage of late successional biological soil crust. It also contains riparian areas that are functioning at risk.
- Acreeage:** 40,475 acres for Alternative B; 40,462 acres for Alternative C

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Significant historic/cultural value	More than local significance: This area encompasses a very important set of sites along the lower flanks and foothills of the Vermilion Cliffs. Sites in this area date to the earliest attempts at prehistoric North American agriculture and represent the entire sequence of the rise of, dominance of, and final collapse of the Formative period and large-scale prehistoric agriculture on the northern Colorado Plateau. Includes portions of high potential segment of Old Spanish National Historic Trail.
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: biological soil crusts, riparian areas, and sensitive plants. Biological soil crusts: Concentrated areas with potential for high coverage of late successional biological soil crusts. Riparian areas determined to be functioning at risk. Sensitive plants: Kane breadroot; Gumbo milkvetch; Kanab thelypody; Escarpement milkvetch; Silverleaf lupine, <i>Lupinus caudatus argophyllus</i> ; Atwood's phacelia, <i>Phacelia phacelia</i> var. <i>Atwoodii</i> ; Murdock's evening primrose, <i>Oenothera murdockii</i> ; chia, <i>salvia columbariae</i> var. <i>argillacea</i> . Native endemics: Kane breadroot; Meager camissonia. Protection warranted to satisfy national priority concerns or carry out mandates of FLPMA: Special Status Species 6840 Policy; Riparian-Wetlands Initiative for the 1990's.
Yes	Scenic	High Scenic Quality and High Sensitivity

R – relevance criteria, I – importance criteria, FLPMA – Federal Land Policy and Management Act

Alternatives B and C Special Management

Relevance and Importance Values	Alternatives B and C Special Management
Historic/cultural value	<ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Require surface facilities incident to underground mining to avoid known and documented archaeological sites. Apply stipulations to mitigate adverse effects of subsidence (Alternative B only). • Apply NSO stipulation for fluid mineral leasing (Alternative B only). • Allow oil and gas leasing subject to moderate constraints (CSU). Avoid placement of oil and gas-related facilities and structures in areas where there are known or documented archaeological sites. Where setting is a component of a site's eligibility, require a viewshed analysis and require facilities to be placed outside of the viewshed, or require mitigation to avoid adversely affecting the setting (Alternative C only).
Natural Process or System - Sensitive and Endemic Plants; Biological Soil Crusts; and Riparian Systems	<ul style="list-style-type: none"> • Verify the ecological site and: <ul style="list-style-type: none"> ○ Avoid vegetation treatments that disturb soils in previously untreated areas that are either Semidesert Shallow Loam (Pinyon-Juniper) or Semidesert Shallow Gypsum (Mormontea) Ecological Sites; limit method to hand-thinning (lop and scatter). ○ Avoid designating these areas for cross-country OHV use. ○ Limit other surface-disturbing activities in these areas. • Prohibit collection of BLM or State sensitive plants without a research permit. • Conduct inventories and research to identify and document habitat and populations of endemic and sensitive plants. • Monitor known populations of endemic and sensitive plant species including distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.
Scenic	<ul style="list-style-type: none"> • Manage as VRM Class II.

SRP – Special Recreation Permit, NHPA – National Historic Preservation Act, CSU – Controlled Surface Use, NSO – No Surface Occupancy, OHV – off-highway vehicle, BLM – Bureau of Land Management, VRM – Visual Resource Management

Relation to Wilderness Study Areas

The Cockscomb West ACEC does not overlap with any WSAs.

Collet Top

- **General Location:** Approximately 24 miles south of Escalante, stretching southward below the Left Hand Collet/Croton Road junction, roughly surrounded by the Kaiparowits Unit
- **General Description:** At the northern end of what is considered Fiftymile Mountain along the eastern edge of the larger Kaiparowits Plateau, this ACEC includes the Collet Top area containing many significant Ancestral Puebloan sites and the rugged dissected ridges and canyons between Reese and Rogers Canyons. It falls within the Upper Kaiparowits Plateau

SQRU-026, which has an A scenic quality rating score of 19. The area also includes habitat for special status plant species (*Atwood's penstemon*).

- **Acreage: 9,218 acres**

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Significant historic/cultural value	More than local significance: Numerous sites display the transition from Fremont Habitation to a Late Pueblo II, Ancestral Puebloan influx, and a unique interface between the two cultural areas.
Yes	Scenic	More than local significance: Scenic Quality Rating A and High Sensitivity.
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: <i>Atwood's penstemon</i> .

R – relevance criteria, I – importance criteria

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Historic/cultural value	<ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Plan and complete NHPA Section 110 inventories and site documentation in commonly used and likely recreational use areas, research locations, and cattle congregation locations. • Develop a Collet Top Cultural Resources Resource Management Plan. • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Prohibit exclusive commercial mineral material sites. • Prohibit community pits larger than 5 acres in size. • Require surface facilities incident to underground mining to avoid known and documented archaeological sites. Stipulations would be necessary to mitigate adverse effects of subsidence. • Allow oil and gas leasing subject to major constraints (NSO). • Promote research into area archaeological sites. • Prohibit rock climbing within 100 meters of archaeological structures.
Scenic	<ul style="list-style-type: none"> • Manage all areas outside WSAs as VRM Class II.
Natural Process or System	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Conduct inventories and research to identify and document habitat and populations of endemic and sensitive plants. • Monitor known populations of endemic and sensitive plant species including distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.

SRP – Special Recreation Permit, NHPA – National Historic Preservation Act, NSO – No Surface Occupancy, WSA – Wilderness Study Area, VRM – Visual Resource Management, BLM – Bureau of Land Management

Relation to Wilderness Study Areas

The outer edges of Collet Top ACEC overlap with small portions of the Burning Hills and Fiftymile Mountain WSAs.

Henderson/Pardner

- **General Location:** Approximately 4 miles northeast of Henrieville, connecting with a northeastern boundary of the Kaiparowits Unit
- **General Description:** Consists of golden-hued, rugged canyons, ridges, and benches in Straight Cliffs, Wahweap, and Kaiparowits Formations north of Highway 12, south of Dixie National Forest boundary directly below Powell Point, and approximately 6 to 10 miles northeast of Henrieville. Area includes the upper third of the Henderson/Pardner/Mud Spring Canyons SQRU-020 that inventoried as A quality scenery, scoring 21.5. It also contains Kaiparowits Formation fossils that are the best preserved examples of Late Campanian dinosaur ecosystems preserved in the southern United States.
- **Acreage:** 12,259 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Scenic	Scenic Quality A and High Sensitivity
Yes	Significant historic/cultural value: Paleontological values	Rare paleontological resource—PFYC 5. Fossils from Kaiparowits Formation have elevated global significance to the scientific community and the public. Resources would qualify as world heritage status. Kaiparowits fossils are the best preserved examples of Late Campanian dinosaur ecosystems preserved in the southern United States. Included many unique and exceptionally well preserved specimens. One of the most important Late Campanian terrestrial fossil resources in North America. Also includes many important Turonian, Coniacian, and Santonian age fossil vertebrate sites in the Straight Cliffs Formation yielding type specimens for new species.

R – relevance criteria, I – importance criteria, PFYC – Potential Fossil Yield Classification

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Scenic	<ul style="list-style-type: none"> • Manage all areas outside of WSA as VRM Class II.

Relevance and Importance Values	Alternative B Special Management
Historic/cultural: Paleontological values	<p>Apply the following management in identified paleontological resource areas within the ACEC.</p> <ul style="list-style-type: none"> • Prohibit casual collection of fossils or other paleontological materials. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management.⁽¹⁾ • Prioritize paleontological areas within ACEC (Straight Cliffs, Wahweap, and Kaiparowits Formations) for inventory to adequately assess distribution, condition, and significance of fossil resources. • Require inventories of all paleontological resources prior to surface-disturbing activities to document significant invertebrate and paleobotanical fossil sites, not just vertebrates.

¹ Implementation decisions that are appealable to the Interior Board of Land Appeals
 WSA – Wilderness Study Area, VRM – Visual Resource Management, ACEC – Area of Critical Environmental Concern

Relation to Wilderness Study Areas

The Henderson/Pardner ACEC overlaps with the Blues WSA.

Hole-in-the-Rock Trail

- **General Location:** Approximately 4 miles southeast of Escalante, extending along Hole-in-the-Rock Road to the boundary with Glen Canyon NRA
- **General Description:** Area follows the Mormon Pioneer Hole-in-the-Rock Historic Trail, which is listed on the NRHP. Trail follows closely along the Hole-in-the-Rock Road, which is also a State Scenic Backway. Area contains habitat for a special status plant species (*Barneby milkvetch*).
- **Acreage:** 601,578 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	Has more than locally significant qualities: Hole-in-the-Rock Trail is listed on the NRHP.
Yes	Natural process or system	Barneby milkvetch

R – relevance criteria, I – importance criteria, NRHP – National Register of Historic Places

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Historic/cultural values	<ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Conduct surveys to identify Hole-in-the-Rock Trail. • Develop a Hole-in-the-Rock Trail management and recreational plan. • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Require surface facilities incident to underground mining to avoid known and documented archaeological sites. Apply stipulations to mitigate adverse effects of subsidence. • Allow oil and gas leasing subject to major constraints (NSO).
Natural Process or System	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Conduct inventories and research to identify and document habitat and populations of endemic and sensitive plants. • Monitor known populations of endemic and sensitive plant species including distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.

SRP – Special Recreation Permit, NSO – No Surface Occupancy, BLM – Bureau of Land Management

Relation to Wilderness Study Areas

The Hole-in-the-Rock Trail ACEC overlaps with a corner of the Devils Garden ISA and the Scorpion WSA.

Paria River

- **General Location:** The Paria River/Sheep Creek corridor between the Grand Staircase and Kaiparowits Units
- **General Description:** Area follows along Sheep Creek from Skutumpah Road to its confluence with the Paria River and then down the Paria River to where it meets Cottonwood Canyon Road within the Grand Staircase, beginning above the White Cliffs and passing down through the Vermilion Cliffs. It contains a proliferation of historic inscriptions and very significant prehistoric sites and rock art panels. The riparian areas are either not functioning or functioning at risk. It crosses through three scenic quality rating units, all of which are inventoried as A quality scenery (Vermilion Cliffs/Paria-Hackberry SQRU-003: scored 22; White Cliffs SQRU-002: scored 21.5; Willis Creek SQRU-017; scored 19).
- **Acreeage:** 180 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Scenic	Scenic Quality A and High Sensitivity

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	More than local significance and vulnerability to adverse change: This corridor contains numerous historic inscriptions and some very significant prehistoric sites and rock art panels, and was a major travel route between the Paria and Cannonville areas during the pioneer settlement period. It was undoubtedly a major travel corridor in prehistoric times as well and also includes the northernmost Virgin Ancestral Puebloan site yet documented.
Yes	Fish and wildlife	Mexican spotted owl: designated critical habitat. More than local significance and vulnerability to change. This river corridor contains five canyon systems that are known to have Mexican Spotted Owl. Three of these canyon systems contain Protected Activity Centers for Mexican spotted owl, while two have confirmed owl use and suspected breeding. National Priority Concern: Threatened and Endangered Species Act.
Yes	Natural process or system	Riparian areas determined to be functioning at risk or not functioning. Protection warranted to satisfy national priority concerns or carry out mandates of FLPMA: Riparian-Wetlands Initiative for the 1990's.

R – relevance criteria, I – importance criteria, FLPMA – Federal Land Policy and Management Act

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Scenic	<ul style="list-style-type: none"> Manage all areas outside WSAs as VRM Class II.
Historic/cultural value	<ul style="list-style-type: none"> Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. If the Paria River corridor is opened to vehicular traffic, require vehicles to stay on designated routes (no cross-country travel) and work with State and local officials to develop a plan to record and manage vehicle traffic. Prohibit vehicular access to side canyons.
Natural Process or System	<ul style="list-style-type: none"> Do not designate spur routes in the ACEC. Area must be closed or limited to designated routes. Prioritize functioning-at-risk and not-functioning riparian zones for restoration and implement restoration projects to achieve properly functioning condition.
Fish and Wildlife	<ul style="list-style-type: none"> Require site-specific analysis of resources to determine the potential for impacts and the need for timing and distance buffers. Do not designate spur routes in the ACEC. Area must be closed or limited to designated routes.

WSA – Wilderness Study Area, VRM – Visual Resource Management, SRP – Special Recreation Permit, ACEC – Area of Critical Environmental Concern

Relation to Wilderness Study Areas

The Paria River ACEC overlaps with the Paria-Hackberry WSA.

Scorpion Flat/Dry Fork

- **General Location:** Approximately 22 miles southeast of Escalante, on the east side of Hole-in-the-Rock Road abutting Glen Canyon NRA to the east above the Escalante River
- **General Description:** Area includes most of Scorpion Flat/Dry Fork SQRU-032 that inventoried as A quality scenery with a score of 19.5. It contains rolling, jumbled sandstone expanses with shallow drainages feeding into dramatic hidden canyons and narrow slots. Area includes Dry Fork Slot Canyons (including Peekaboo and Spooky), Twentyfivemile Wash and the Egypt Slots, which are popular recreational destinations.
- **Acreage:** 30,691 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Scenic	High scenic quality, high sensitivity, and foreground adjacency to Glen Canyon National Recreation Area.

R – relevance criteria, I – importance criteria

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Scenic	<ul style="list-style-type: none"> • Manage all areas outside of WSA as VRM Class II.

WSA – Wilderness Study Area, VRM – Visual Resource Management

Relation to Wilderness Study Areas

The Scorpion Flat/Dry Fork ACEC overlaps with the Scorpion WSA and a small portion of the Escalante Canyons Tract 5 ISA.

Straight Cliffs/Fiftymile Bench

- **General Location:** Two discontinuous areas, located approximately 3 and 35 miles southeast of Escalante, respectively, along the west side of Hole-in-the-Rock Road
- **General Description:** Area is composed of two discontinuous areas of the Straight Cliffs faces and benches. They are contained within the Straight Cliffs/Fiftymile Bench SQRU-030 and were inventoried as A quality scenery with a score of 19. The Straight Cliffs are a long, narrow band extending from near the Colorado River northward to Escalante, creating the eastern edge of the Kaiparowits Plateau. Landforms include a bold, vertical, banded cliff face above rugged, drainage-braided benches with both pyramidal erosional features and sandstone outcrops at the base.
- **Acreage:** 21,357 acres for Alternative B; 12,270 acres for Alternative C

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Scenic	Scenic Quality A and High Sensitivity. Lower segment is adjacent to National Park Service.
Yes	Historic/cultural values	Fiftymile Bench is considered important as a mid-level habitat wintering location in relation to the Ancestral Puebloan sites and Fremont sites above, on Fiftymile Mountain, and below, in the Escalante River canyons and benches.

R – relevance criteria, I – importance criteria

Alternatives B and C Special Management

Relevance and Importance Values	Alternatives B and C Special Management
Scenic	<ul style="list-style-type: none"> • Manage as VRM Class II.
Historic/cultural values	<ul style="list-style-type: none"> • Work with SRP holders and site stewards to increase monitoring of known and documented archaeological sites. • Plan and complete NHPA Section 110 inventories and site documentation in commonly used and likely recreational use areas, research locations, and cattle congregation locations • Develop a Fiftymile Mountain Cultural Resources Resource Management Plan. • Prohibit exclusive commercial mineral material sites. • Prohibit community mineral material pits larger than 5 acres in size. • Allow oil and gas leasing subject to major constraints (NSO) (Alternative B only). • Require surface facilities incident to underground mining to avoid known and documented archaeological sites. Apply stipulations to mitigate adverse effects of subsidence (Alternative B only). • Allow oil and gas leasing subject to moderate constraints (CSU). Avoid placement of oil and gas-related facilities and structures in areas where there are known or documented archaeological sites. Where setting is a component of a site's eligibility, require a viewshed analysis and require facilities to be placed outside of the viewshed, or require mitigation to avoid adversely affecting the setting (Alternative C only). • Promote research into area archaeological sites • Prohibit rock climbing within 100 meters of archaeological structures.

VRM – Visual Resource Management, SRP – Special Recreation Permit, NHPA – National Historic Preservation Act, CSU – Controlled Surface Use, NSO – No Surface Occupancy

Relation to Wilderness Study Areas

The northern portion of the Straight Cliffs/Fiftymile Bench ACEC overlaps with a portion of the Carcass Canyon WSA. The southern portion of the Straight Cliffs/Fiftymile Bench ACEC does not overlap with any WSAs.

Tibbet Head

- **General Location:** Approximately 7 miles northeast of Big Water

- **General Description:** Table lands, benches, and canyons underlain by Wahweap Formation, located between Smoky Mountain Road and just west of Nipple Spring. Area contains globally rare vertebrate fossils.
- **Acreage:** 19,079 acres for Alternative B; 18,874 acres for Alternative C

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Historic/cultural value	Rare paleontological resource–PFYC 5 units plus. More than local significance: Vertebrate fossil resources from area are rare on a global scale. There is widespread interest in the fossils from paleontologists who study the origins of mammals and other vertebrates. Many specimens from the area have been published in scientific journals and serve as the types for new species. Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Rare concentrations of terrestrial vertebrate fossils and petrified wood of middle Campanian age throughout the Nipple Spring, Tibbett Spring, Tibbett Bench and Head of the Creeks areas. Includes a potential future type locality for new hadrosauromorph dinosaur at Nipple Spring, the Tibbett Bench Bonebed, and unusually large concentrations of petrified wood in the Head of the Creeks area. Other bonebeds known to exist in area that have not been tested.
Yes	Natural process or system	Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: Cataract gilia, <i>Gilia imperialis</i> (regional endemic and BLM Sensitive); and Smokey Mountain mallow, <i>Sphaeralcea fumariensis</i> (local endemic and BLM Sensitive).

R – relevance criteria, I – importance criteria, PFYC – Potential Fossil Yield Classification

Alternatives B and C Special Management

Relevance and Importance Values	Alternatives B and C Special Management
Historic/cultural: Paleontological values	<ul style="list-style-type: none"> • Within identified paleontological resource areas in the ACEC, prohibit casual collection of fossils or other paleontological materials. • Conduct annual monitoring for impacts on paleontological resources and use this information to inform appropriate adaptive management.⁽⁴⁾ • Prioritize paleontological areas within the ACEC (i.e., Wahweap Formation) for inventory to adequately assess distribution, condition, and significance of fossil resources. • Require inventories of all paleontological resources prior to surface-disturbing activities to document significant invertebrate and paleobotanical fossil sites, not just vertebrates.

Relevance and Importance Values	Alternatives B and C Special Management
Natural Process or System	<ul style="list-style-type: none"> • Prohibit collection of BLM or State sensitive plants without a research permit. • Conduct inventories and research to identify and document habitat and populations of endemic and sensitive plants. • Monitor known populations of endemic and sensitive plant species including distribution, trends, and habitat conditions. Use this information to inform appropriate adaptive management strategies.

¹ Implementation decisions that are appealable to the Interior Board of Land Appeals
 ACEC – Area of Critical Environmental Concern, BLM – Bureau of Land Management

Relation to Wilderness Study Areas

The southwestern end of the Tippet Head ACEC overlaps with the Wahweap WSA.

Wahweap Hoodoos ACEC

- **General Location:** Approximately 5 miles northwest of Big Water
- **General Description:** Area includes the formations known as the Wahweap Hoodoos, a grove of capped white columns of Entrada Sandstone topped with caps of Dakota Sandstone. The location is a popular destination for hikers and photographers.
- **Acreage:** 130 acres

Meets Both R & I?	Relevance Criteria	Importance Criteria
Yes	Natural process or system: Hoodoos	Rare and unique geologic formations. Fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change: hoodoos. Depositional setting of formations has resulted in fragile columns of soft sediment supporting more durable capstones.

R – relevance criteria, I – importance criteria

Alternative B Special Management

Relevance and Importance Values	Alternative B Special Management
Natural Process or System: Hoodoos	<ul style="list-style-type: none"> • Develop an education and interpretation plan to prevent visitors from damaging unique geological features. Design trail systems to prevent human-caused erosion.

Relation to Wilderness Study Areas

The Wahweap Hoodoos ACEC overlap with the Wahweap WSA.

References

Bureau of Land Management (BLM). 1999. *Grand Staircase-Escalante Monument Management Proposed Management Plan and Final Environmental Impact Statement*. July. Retrieved from https://eplanning.blm.gov/epl-front-office/projects/lup/65870/79806/92584/GSENM_MP_FEIS.pdf. Accessed June 18, 2018.

Abbreviations-Acronyms

Term	Definition
ACEC	Area of critical environmental concern
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
FLPMA	Federal Land Policy and Management Act
GSENM	Grand Staircase-Escalante National Monument
IDT	Interdisciplinary team
KEPA	Kanab-Escalante Planning Area
NRA	National Recreation Area
NRHP	National Register of Historic Places
ONA	Outstanding Natural Area
RMP	Resource Management Plan
RNA	Research Natural Area
UDWR	Utah Division of Wildlife Resources
USFWS	U.S. Fish and Wildlife Service
WSA	Wilderness Study Area

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix T

Socioeconomic Baseline Report

August 2018

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Appendix T: Socioeconomic Baseline Report

Introduction

This document provides a “slice in time” overview of the baseline socioeconomic (SE) conditions in Garfield and Kane Counties in Utah and, to a lesser degree, Coconino County in Arizona, which exist as a backdrop for the Grand Staircase-Escalante National Monument (GSENM) regional planning effort, and lays out the general concepts of social and economic impacts analysis that will be applied as part of the planning, documentation, and decisionmaking processes. The purpose of this document is to describe the SE backdrop within which the National Environmental Policy Act process associated with Agency and Cooperating Agency decisions will take place.

For each of the following general subjects, this baseline report includes an overview for the study area as a whole plus some additional detailed discussion for each of the two counties within the study area boundaries: potentially affected communities and groups of people, cultural context, social conditions, and economic conditions.

As noted in this report, there are a few issues that are of particular concern to regional leaders: The predominance of Federal lands in the region means that many land use decisions are made by Federal officials; cooperation between Federal, State, county, and local leaders is important to successful economic development in the region. Over time, tourism has become an increasingly important part of the economy, and Federal and State lands play a central role in attracting visitors to the area. There are only limited routes through several parts of the region, and many tourists pass through without stopping for very long. The counties in the study area have expressed interest in engaging in ongoing efforts to develop destination tourism opportunities as a means of economic development. Also of high importance to leaders in the region is recognition of the important roles that grazing and the ranching sector play in the economy. In addition, ranchers and their livestock serve as an attraction for visitors who want to see real cowboys at work, providing a support service to the tourism industry. Potential mineral development could play an increasing role in the regional economy in future years, depending on specific energy market conditions over time.

Rangeland conditions play a role in the regional economy. Ranchers are dependent on healthy range conditions to provide forage for their livestock, and forage availability influences the populations of both game and non-game wildlife, which in turn create economic activity through wildlife-oriented tourism and hunting outfitting. To the degree that rangeland health deteriorates, fewer livestock and wildlife can be supported on the range without endangering the long-term viability of associated economic activities.¹ When rangelands are healthy, the probability of financial success in a given year increases for those economic sectors that depend on healthy landscapes.

Data included in this baseline report come from multiple sources. First, the bulk of data in the report was provided by individual- and multiple-county reports generated by the Economic

¹ Specific range conditions are outside the scope of this document.

Profile System (EPS), an SE data compilation and analysis software program maintained by Headwaters Economics, a non-profit research organization.² The development of this program was funded by the Bureau of Land Management (BLM), United States Department of Agriculture (USDA) Forest Service (FS), and other public entities. EPS reports are based on data from multiple Federal and non-Federal sources, including the U.S. Census Bureau, the Bureau of Economic Analysis, the USDA Economic Research Service, the Bureau of Labor Statistics, the Office of Management and Budget, industry data sources, and more. Products associated with EPS and Headwaters Economics are available at no cost to the public and include individual county reports for all counties in the United States in addition to subject matter reports related to public lands, regional economics, and other topics of interest to government officials, public land managers, and public citizens (Headwaters Economics undated). Additional sources of data used in this baseline report include BLM archives, local officials and agricultural producers within the region, and BLM employees who work in the area.

This report also describes the socioeconomic workshop and socioeconomic comment period that the BLM held to solicit input on socioeconomic issues from the public and stakeholders and a summary of the comments received during the socioeconomic comment period.

Study Area Overview

The study area is situated in south-central Utah just north of the Utah-Arizona border. The SE study area includes the two counties that are most closely tied to the proposed action. Coconino County in northern Arizona is also affected by land use management decisions made within the region, but because the population of Coconino County that is potentially affected is very small, it will not be included in detailed statistics or in discussion beyond general overviews.

Potentially Affected Communities

SE analysis presents unique challenges within a natural resource planning setting due to the nature of the available data. SE data are gathered by multiple government and private agencies and organizations and are usually available in geographic areas that are demarcated by the U.S. Bureau of the Census, the U.S. Bureau of Labor Statistics, State offices of planning and budget and economics, counties, and others. Because of the methods and limitations on the collection of SE data, the study area is not the same as the Planning Area. In this instance, the study area expands beyond the boundaries under consideration and includes the entirety of Garfield and Kane Counties in Utah. In addition to data availability, there is another reason for expanding the boundaries of the SE study area: although there are some private inholdings within its boundaries, the special designation BLM-administered surface land within the region is uninhabited. It is only the impacts on surrounding communities, regional economies, State-level entities, and other outside interested parties that are relevant in evaluating the SE

² Data sources used in this report include the following: 2000 Decennial U.S. Census (U.S. Department of Commerce), American Community Survey (U.S. Department of Commerce), Census of Agriculture (USDA), County Business Patterns (Department of Commerce), Local Area Unemployment Statistics (U.S. Department of Labor), National Bureau of Economic Research, Population Division (U.S. Department of Commerce), Protected Areas Database v 1.3 (U.S. Geological Survey), Quarterly Census of Employment and Wages (U.S. Department of Labor), Regional Economic Information System (U.S. Department of Commerce), TIGER/Line County Boundaries 2012 (U.S. Department of Commerce), Bureau of Land Management, U.S. Census of Governments (U.S. Department of Commerce), U.S. Fish and Wildlife Service, U.S. Forest Service, and U.S. Office of Natural Resources Revenue.

impacts of decisions made regarding the management of resources in the special designation land units.

The bulk of this report focuses on Garfield and Kane Counties, although Coconino County, Arizona, is also discussed. The towns between which GSENM is situated, and which are the most directly connected with and affected by GSENM management decisions, include Kanab, Big Water, Mount Carmel Junction, Orderville, Glendale, Alton, Tropic, Cannonville, Henrieville, Escalante, and Boulder in Utah, and Page and Fredonia in Arizona. People who do not live within the immediate area around the study area but who are interested in or who are affected by impacts on the communities within the region are also stakeholders in the proposed management actions.

Non-special designation BLM-administered surface land in the surrounding area are managed by the Kanab Field Office, the Arizona Strip Field Office, and the Richfield Field Office. The special designation lands in question are managed by the BLM, and in addition to managing livestock grazing on BLM-administered surface land within the Planning Area, the BLM administers livestock grazing on approximately 318,000 acres of National Park Service (NPS) Glen Canyon National Recreation Area lands. In addition to BLM-administered surface land, there are other Federal lands outside of the area that could potentially be affected by decisions regarding GSENM management. Lands managed by Dixie National Forest, NPS at Bryce Canyon and Capitol Reef National Parks, State Institutional Trust Lands, and Utah State Parks all fall within the study area. In addition to the three local counties, Arizona, Utah, and the United States as a whole are included in the economic and social statistics reported.

Under the provisions of the Federal Land Policy and Management Act of 1976, as amended, the BLM is directed to the extent consistent with Federal law and purposes of the act to manage the lands within its jurisdiction in alignment with State and local laws and ordinances. Recently adopted Utah State legislation and county ordinances in the area highlight grazing as a key component of the region's economy and culture.

Garfield County Plans and Policies

The *Garfield County Resource Management Plan* (Garfield County 2017) includes a variety of guidelines, principles, desired future conditions, findings, and policies related to socioeconomics. The *Garfield County Resource Management Plan* identifies the following socioeconomic standards:

1. "Conservation and management shall prevent overuse and depletion of resources while achieving, on a continual basis, optimum use of the resources and optimum socio-economic benefit to local communities.
2. Socio-economic considerations shall be based on the best scientific information and processes available.
3. Management actions shall not discriminate against local communities. If it becomes necessary to allocate resources, such allocation shall be: a) fair and equitable to local individuals and communities; b) reasonably calculated to promote the health, safety and economic welfare of local communities; and c) carried out in a manner that provides the greatest benefit to local individuals and communities.
4. Management actions, where practicable, shall consider efficiency of resource use and shall have positive impacts on the stability of local communities.
5. Management actions shall avoid negative impacts on local communities and where avoidance is impossible shall minimize and mitigate negative impacts.

6. Management actions shall be consistent with the plans, policies and programs of Garfield County.
7. Management actions, to the extent possible, shall promote and enhance the health, safety, welfare, economies, prosperity, and stability of local communities.
8. Unintended consequences shall be minimized and socio-economic analysis shall consider adaptive mitigation techniques should management actions result in negative impacts to local economies.
9. Managers shall disclose uncertainties in socio-economic analysis.
10. Socio-economic impact assessments shall be proportionate to likely impacts from the proposed action.
11. Socio-economic assessments shall identify methods to reduce burdens placed by the various alternatives of proposed actions.
12. Socio-economic assessments shall support and integrate social and economic goals and objectives of impacted communities as identified by duly elected officials.
13. Whenever possible, socio-economic assessments shall prioritize incorporation of quantifiable data and expected impacts over demographics (Garfield County 2017).

In 2013, Garfield County passed a county ordinance establishing the Escalante Historic/Cultural Grazing Region (EHCGR) and recognizing grazing as a historically and culturally significant activity that has contributed to local values for more than a century. In part, the ordinance states that the highest management priority for lands within the EHCGR is responsible management, enhancement, and development of existing and future grazing resources in order to provide protection for resources, objects, customs, culture, and values associated with grazing in the American West.

The Garfield County ordinance also specifically recognizes “multiple use” management as being compatible with grazing activities within the EHCGR and encourages responsible development of mineral and recreation resources within the EHCGR.

Kane County Plans and Policies

In 2014, the Utah State Legislature passed House Bill 158, which established Utah Grazing Agricultural Commodity Zones and Utah Timber Agricultural Commodity Zones. This bill was amended during the 2015 legislative session to add Washington County, Utah, and to clarify some language included in the 2014 bill. Among other purposes, this law was written for the purpose of preserving and protecting the “agricultural livestock industry” and to “maximize efficient and responsible restoration, reclamation, preservation, enhancement, and development of grazing and water resources.” In response to the newly passed State law, the *Kane County General Plan*, as adopted on August 12, 2013 and under amendment as of 2017, added Chapter 27 of the Escalante Region Multiple Use/Multiple Functions Grazing Zone, as outlined in House Bill 158, to the Kane County land use ordinance (Kane County 2017a). Kane County’s *Resources Management Plan* as amended by Kane County Resolution No. 2015-5 (Kane County 2017b), along with the general plan, has been in place since 1998 and has been undergoing revisions during the past few years. These two documents describe in extensive detail the county’s policies with respect to grazing and other resource-related subjects, and they provide information central to the process of coordination and cooperation between the county and land management agencies.

Kane County Ordinance No. 2014-6 outlines in detail the value of grazing to the local community within Kane County, specifying the many aspects of county life that are connected with and affected by livestock grazing, both from an economic standpoint and as related to

general local culture. The ordinance states, in part, “The highest management priorities for lands within the Escalante Region Grazing Zone are responsible management, enhancement, and restoration of historic sagebrush steppe landscapes and development of existing and future livestock grazing resources, in order to provide protection for resources, customs, culture, and values of Kane County.” In addition, Kane County Ordinance No. 2014-11 recognizes the value of the ranching history of the region for reasons beyond production of cattle, stating, “The cowboy lifestyle has helped develop the character of Kane County, and this has been represented in multiple western movies filmed in the area. It is surprising how many people visit the county just to see where the movies were filmed, and take pictures of livestock and cowboys. The local festival and tradition called *Western Legends* depends on the cowboy icon and is centered on that historical figure. In essence, ranching and livestock grazing has a direct link to the local tourism industry.”

Potentially Affected Groups and Individuals

The BLM-managed region in the center of Garfield and Kane Counties is used and/or visited by people from the local community, the surrounding region, other areas of the United States, and other nations. To better understand the social and cultural context within which this planning effort is taking place, some key groups are described below. Although these are shown as separate categories, many interactive and iterative effects ripple back and forth between them as economic and social activities spread and compound both positive and negative effects from changes in BLM management.

Traditional Land Users

Prior to the arrival of settlers of European descent, ancient peoples including the Ancestral Puebloan people (also known as the Anasazi and Fremont archaeological cultures) lived within the south-central area of Utah. In more recent years, the Paiute and Shoshone peoples inhabited areas of south-central Utah, while the Navajo settled in the Four Corners area, including southeastern Utah and northern Arizona. With the arrival of Spanish explorers and then Latter-day Saint (Mormon) immigrants, native communities were forcefully displaced from the area. Although few Native Americans live within Garfield and Kane Counties, there are many Native Americans living in Coconino County. Members of various tribes in Utah and Arizona continue to have a stake in how GSENM and its archaeological resources are managed. The BLM conducts formal consultation annually with the Hopi, Zuni, Navajo, Ute Tribes, as well as with the Kaibab Band of Paiute Indians and Paiute Indian Tribes of Utah (Annenberg Learner 2016).

Ranchers

In the late 1880s, as Mormons colonized areas of the Intermountain and Southwest regions of the United States, ranching quickly became an important part of the economic and cultural landscape in the desert regions of the West. In the early days of ranching in the region, herds of both sheep and cattle were grazed on what is now Garfield and Kane Counties. Many families that currently ranch in the region and that run cattle on GSENM are descendants of those early settlers. Multi-generational ranching and the traditional cowboy culture that has become largely invisible in many areas of the West, due to urbanization, are still prominent aspects of the region.

Local Private Landowners

Within the communities, landowners and citizens are also affected by the BLM and NPS land management decisions. Because only a small percentage of the study area is private land, any public land management decision that affects private property values and other economic activities on private land would generate disproportionate impacts on both landowners and the counties in comparison with places where publicly owned land makes up a small fraction of all land. Because of this disproportionate importance of public land management, local residents are sensitive to how decisions are made by the BLM, FS, and other land management agency decisionmakers. In contrast, in places where public land makes up only a small percentage of land, public land management decisions have little or no impact on the majority of individual private landowners.

Recreational Users

Recreation has long been a primary use of public lands in Kane and Garfield Counties. In recent decades, traditional local recreation has continued as increasing numbers of visitors from outside the region have made the area a popular stopping point on tours of the western United States. Hikers, backpackers, photographers, car campers, drivers out to enjoy the scenery, canyoneers, climbers, people interested in wildlife viewing, off-highway vehicle riders, picnickers, horseback riders, hunters, mountain and road bicyclists, ecotourists, artists, writers, participants in spiritual retreats, bus tour groups, and other tourists and recreationists are affected by BLM and NPS decisions. In turn, these users' spending and visitation patterns affect the local communities that host them and serve their needs for lodging, meals, supplies, and public safety services.

Scientific Researchers

For many years, researchers have visited the region, studying aspects of the area within multiple specific scientific disciplines such as geology, geomorphology, paleontology, social sciences, archaeology, watershed science, soil science, wildlife biology, and botany. Unique aspects of the regional geography draw scientists from around the world. Beyond its singular geologic structure, the remoteness and relatively unaffected nature of the area provide opportunities for learning that are unavailable in places that are more heavily affected by human visitation. The scientific community has a strong interest in how BLM special designation lands are managed, especially as that relates to areas where changes in management could either enhance or detract from prospective and/or ongoing research programs or could alter the investigated environment.

Others

In addition to the specific groups described above, other individuals and groups have the potential to be affected by area management decisions. Multiple non-governmental, environmental, conservation, and other organizations, both within and outside of Utah, as well as individuals aligned with them, have expressed interest in BLM management decisions. It is possible that many people who have spent time in the past visiting the region from other places in the United States or from overseas, who deeply enjoyed the scenery and solitude that they experienced, have a strong sense of attachment to the area. Some of these people will likely be keenly interested in the management planning process as it becomes more visible to the public, and some of them could feel deeply affected on a personal level by potential changes in the BLM's management of special designation land units. Another category of people who

could potentially be affected by BLM management decisions is travelers who pass through the area but who do not fall into any of the tourist or recreational user categories outlined above. Should a change in management result in a change in local economic activity, that increase or decrease could translate into a corresponding increase or decrease in the services available in one or more of the remote communities that serve travelers. Additional local and regional parties who could be directly or indirectly affected by changes in regional BLM land management include business owners not mentioned above, workers, educators, government workers, developers, and others.

Federal land managers are required by executive order to consider potential disproportionate impacts of their decisions on low-income, minority, and/or tribal populations. This area of analysis, called environmental justice, is to be addressed in other documents connected with the special designation lands being analyzed and is not discussed in detail within this baseline report.

Cultural Context

Study Area Overview

Life in the Garfield and Kane Counties region has never been easy. The arid climate, rough topography, and isolated location have all contributed to the difficulty with which both ancient and modern communities in the area have been able to establish basic economic security. The rivers that flow through the region provide much-needed water but also have created great challenges due to flooding, both causing repeated damage to structures and making transportation corridors difficult to develop and maintain. Although the development of modern transportation routes and vehicles has vastly improved the flow of people, goods, and services into, out of, and within the region, most of the communities within the area remain vulnerable to impacts from severe weather, loss of industries, and changes in how the vast public land holdings in the region are managed. The individual and community characteristics and values that developed over time within those difficult circumstances have been a source of pride for long-term residents for many years: independence, adaptability, maintenance of local traditions, devotion to religious faith, and appreciation for the natural resources and scenic beauty of their surroundings are all aspects of the local culture that are deeply valued by many residents of the region. The cowboy culture that once was widespread within the American West, but that is no longer as prevalent as it once was in some of the West's more urbanized places, is still a central part of life within the area. It is important to many long-time residents of the region to preserve and celebrate the traditional cowboy lifestyle and the skills, knowledge, and cultural arts that are connected with it.

Since the late 1990s, an ongoing project collecting the thoughts and memories of residents of the area surrounding the BLM-administered surface land in the region has documented experiences related to many aspects of life in south-central Utah:

“The Southern Oral History Project began in July 1998 when Grand Staircase-Escalante National Monument (GSENM) was established and BLM wanted to gather historical life ways and land use information from the surrounding communities. Local citizens in the small communities in Kane and Garfield counties of southern Utah that border the Monument manifest great interest in documenting and preserving the cultural history of the area. Funding for the project came from Bureau of Land Management. Grand Staircase-Escalante National Monument and Utah State Historical Society staffs

entered into a partnership to carry out the project with Kent Powell of the Utah State Historical Society manager for the project. The aim of the oral history project is to preserve some of the memories and culture of long-time residents of the area. Preserving cultural history through oral history collection allows communities to survive by continuing to retell their stories, building bridges between the past and present, and enabling local residents and visitors to the Monument and surrounding communities to engage in the area's unique culture" (Holland and Eaton 2007).

When interviewed, some of the Oral History Project participants discussed various aspects of grazing in the region. While some mentioned specific issues related to BLM management of grazing, most raised issues such as the physical and logistical difficulty of running sheep or cattle in the landscape in the region. For some, working through family conflicts, drought cycles, and market ups and downs have been long-term challenges. Those who run cattle in the region today are faced with many of the same problems and challenges that faced those who were grazing in the area back in the early 1900s, as being in the livestock industry has always been a risk-laden endeavor.

Since 1909, when the predecessor of Zion National Park was set aside for special protection by President Taft, an increasing number of national monuments, State and National Parks, and recreation areas of various types have been designated in southern Utah. Zion, Arches, Canyonlands, Bryce Canyon, and Capitol Reef National Parks, plus several national monuments, the Old Spanish National Historic Trail, and Glen Canyon National Recreation Area, Goblin Valley, and other State parks all draw tourists and recreationists to the region surrounding the study area. From the turn of the twentieth century, tourism has played a central role in the economies of the communities that grew in the region. Prior to the designation of GSENM, lands within it were also used for recreation. However, since the 1980s, more recreation attention has begun to focus in the area. Visitors from other areas of Utah, the rest of the United States, and other nations have provided a source of revenue flows and a catalyst for economic development in the region for many decades. In recent times, newcomers to communities within the region have brought with them ideas and ways of life that have added to the cultural complexities of the area. New businesses, new industries, facilities of various types that cater to the needs and interests of tourists, and non-traditional groups that have moved into the region have all altered and added to the social networks of Garfield, Kane, and Coconino Counties.

Garfield County Culture

Garfield County is characterized by widely varied, beautiful topography and the internationally popular attractions created by it, including parts of Bryce Canyon and Capitol Reef National Parks, Glen Canyon National Recreation Area, and Dixie National Forest, and portions of GSENM, as well as Anasazi and Escalante State Parks.

As mentioned in the overview above, many long-time local residents place a high value on the traditional cowboy and ranching way of life. The remote locations of Escalante and Boulder and other smaller communities within the county have led their residents to develop a spirit of independence as well as a combination of self-reliance and a degree of community solidarity that lend themselves to supporting and protecting tradition and history within the region. In addition to long-standing pioneer and ranching traditions, however, an appreciation for unique newcomers and their contributions to local business communities and societies has enabled the cultural aspects of Garfield County to develop and grow in complexity and variety over time.

Local residents cherish the history of the Mormon pioneers who either settled in the region or passed through on their way to locations farther south. The Hole-in-the-Rock pioneer route in particular, which runs south from Escalante down to and across the Colorado River, is a monument to perseverance in the face of adversity. Taking that type of approach to life in general, when faced with difficult challenges, is described by locals as being central to community and personal endeavors in the region.

Kane County Culture

Like Garfield County, Kane County contains a variety of beautiful geologic features that attract visitors from around the world. Within the county boundaries are parts of Zion and Bryce Canyon National Parks, Glen Canyon National Recreation Area, Dixie National Forest, and portions of GSENM, in addition to Coral Pink Sand Dunes and Kodachrome Basin State Parks. The county has a subculture associated with outfitters who run the Grand Canyon. It is also known as a central location for base camps for visiting several of the highly popular regional destinations, including the North Rim of the Grand Canyon, Zion and Bryce Canyon National Parks, and Lake Powell/Glen Canyon National Recreation Area, among others.

And as in Garfield County, Kane County geology has played a dominant role in shaping the economic opportunities and cultural fabric of local communities. Independence and resilience were necessary conditions for physical and economic survival in the region prior to the establishment of reliable trucking of goods into the area. Locals take pride in perpetuating the traditional values of self-reliance and maintenance of the skills necessary to living in harsh and often dangerous conditions. In the Kanab area, red rock mesas and extensive Navajo sandstone canyon walls complicate ranching operations. They have also provided the backdrop for many Hollywood movies. Kanab is famous for hosting a long string of film production crews and Hollywood stars that came to the area to make movies. That history is important to many residents of the area, who are proud of the role their local landscape has played in the film industry for many decades.

Another aspect of local culture in Kanab that has arisen in recent decades is the establishment and continued development of the Best Friends Animal Sanctuary a few miles north of Kanab. This no-kill animal sanctuary is nationally known for its humane approach to animal rescue and rehabilitation. It is the nation's largest animal sanctuary of its kind and is Kane County's top employer. Visitors to the sanctuary, who come from across the United States and from other countries, and the businesses that cater to them add a different element to local culture than had existed in the region prior to when Best Friends gained its current status.

Coconino County Culture

Coconino County, Arizona, is the second largest county in the United States in terms of land mass. Its cities, towns, and small communities are spread across a large area and are distinct from each other in terms of geography, economic structure, and demographics. Accordingly, there are wide differences in culture from one part of the county to another. Coconino County is home to Grand Canyon National Park. The county's largest city is Flagstaff, which is more than 100 miles from the Utah border. The communities of Fredonia and Page are both close to Utah. Multiple ranchers who hold grazing permits on the BLM-administered surface land in Utah are based in the Page area.

Arizona culture is strongly influenced by Native American (primarily Navajo), Mexican, and Latter-day Saint peoples and their traditions. The Fredonia-Page slice of northern Arizona is

closely tied to southern Utah due to both its location north of the Grand Canyon and the Colorado River and the long travel distances between this region and the larger communities within the County. The drive from Page to Flagstaff is more than 2 hours. From Fredonia to Flagstaff is nearly a 3.5-hour drive. In contrast, to drive from Page to Kanab, Utah, takes just over 1 hour in good road conditions, and the drive from Fredonia to Kanab is only a few minutes long. Fredonia and Kanab are closely connected from an economic standpoint, and some workers commute to work across the Utah-Arizona State line. Retail shopping in Fredonia is very limited, and local residents rely on businesses in Kanab to meet many of their everyday needs.

Page provides accommodations and services for visitors to Lake Powell and travelers headed between Utah and the South Rim of the Grand Canyon and other Arizona destinations, and serves the basic needs of workers at Glen Canyon Dam and the Navajo Generating Station power plant, which is east of Page on the Navajo Reservation.

Coconino County is home to members of at least 27 different Alaska Native and American Indian tribes, including the Kaibab Band of Paiute. Although there is quite a bit of diversity of tribes represented within the population, in 2013 the Navajo Nation made up more than 87 percent of native peoples within the county. The Pueblo, Apache, and Yuman tribes were the only other tribes that made up more than 1 percent each of the total Alaska Native/American Indian population in Coconino County in that same year. Within northern Coconino County, the Navajo tribe is the predominant American Indian tribe.

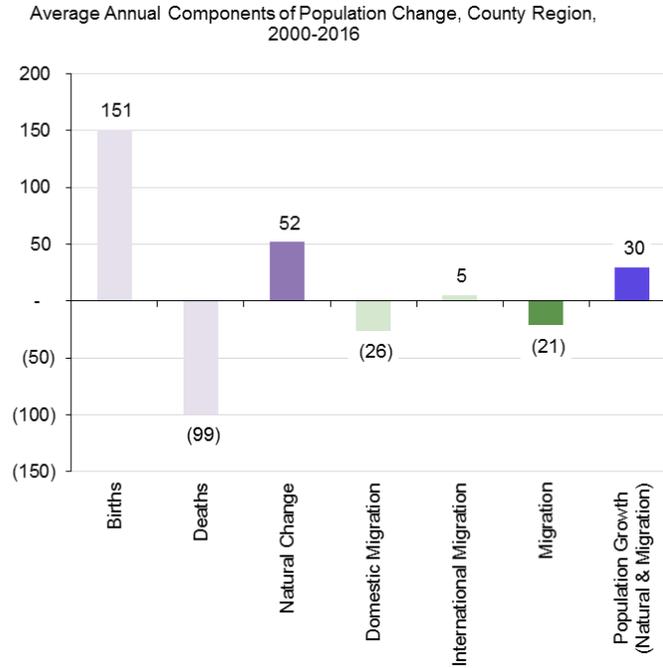
Social Conditions

Study Area Overview

The basic demographic makeup within the SE study area varies between Garfield and Kane Counties in comparison with the State of Utah. In the period from 2000 to 2016, at 5 percent and 4.7 percent, respectively, population growth in Garfield and Kane Counties was lower than that in Utah, which experienced 11 percent growth during the same period of time (see Table 1). At 36.1 years and 43.4 years, respectively, in 2016, both Garfield and Kane Counties had older median ages than did Utah as a whole, at 30.3 years, although Garfield County saw their median age slightly decrease between 2010 and 2016. In contrast, Utah's median age increased by 5.2 percent during the same period, from 28.8 years to 30.3 years (see Table 1).

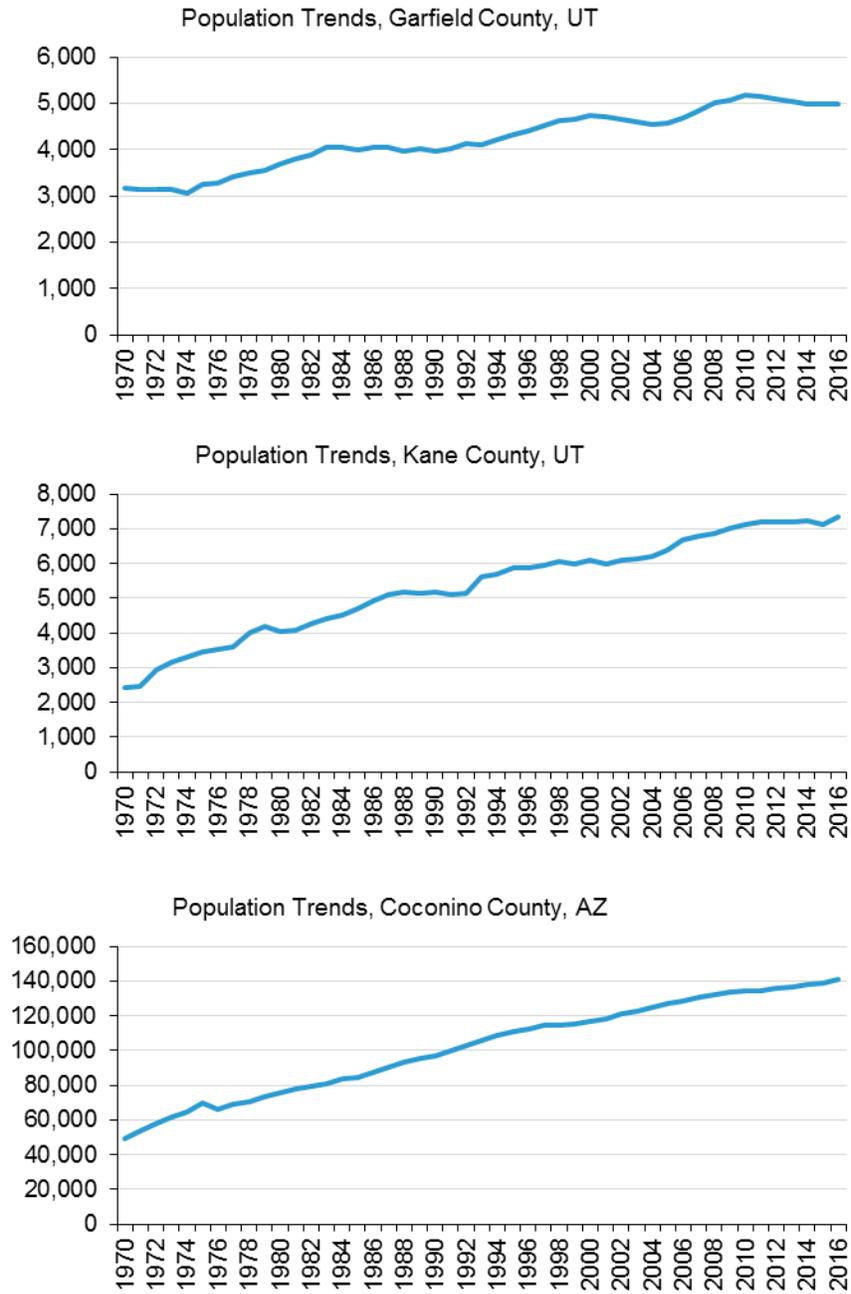
The counties in the study area have collectively experienced steady population growth since 1970. From 1970 to 2016, overall population in Garfield and Kane Counties grew by 120 percent, increasing from 5,599 to 12,320 people (see Figure 2). Most of the region's population growth has been internal, through births exceeding deaths, rather than being due to in-migration from outside. Rather, net migration has been negative, indicating that more people are moving out of the study area than are moving in (see Figure 1).

In comparison to the two-county study area in Utah, Coconino County, Arizona, has experienced both positive migration and a high number of births. From 2000 to 2016, the population of Coconino County grew by 21 percent.



The Census Bureau makes a minor statistical correction, called a “residual,” which is omitted from the figure above. Because of this correction, natural change plus net migration may not add to total population change in the figure.

Figure 1. Garfield and Kane Counties Population Growth, 2000 to 2016



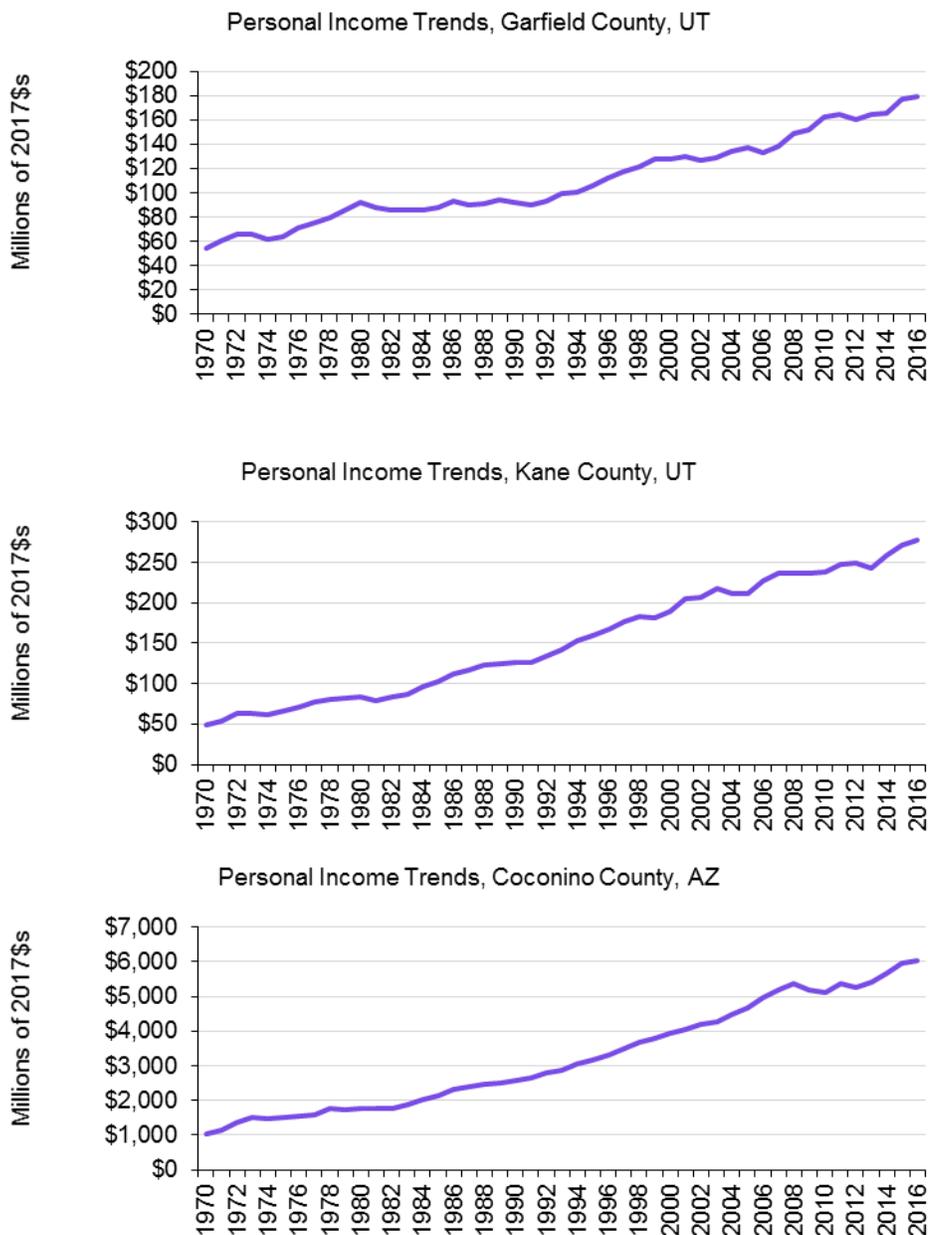
Source: Headwaters Economics undated

Figure 2. Population Trends, 1970 to 2016

Table 1. Basic Population Statistics

Basic Population Statistics	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Population (2016)	57,495	7,216	138,064	64,711	2,948,427
Population (2010)	54,761	6,893	131,824	61,654	2,657,236
Population Percent Change (2010–2016)	5%	4.7%	4.7%	4.85%	11%
Median Age (2016)	36.1	43.4	30.7	N/A	30.3
Median Age (2010)	34.4	45.3	30.8	N/A	28.8

Source: Headwaters Economics undated
 N/A – not available



Source: Headwaters Economics undated

Figure 3. Personal Income Trends, 1970 to 2016

Within counties in the study area, per capita, median, and mean income are reported as being lower than they are in the State of Utah (see Table 2). Nominal retirement income is lower in Garfield County than in the other two counties in the study area (see Table 3).

Since 1960, total personal income in the study area has increased in real terms (adjusted for inflation), with a few decreases that largely correspond to national recessions (see Figure 3). Garfield County's income growth was the slowest of the three, and Kane County's growth has

been robust. All three counties experienced economic disruption during the 2007–2009 recession, but personal income in all three counties has returned to an upward trend since that time.

Table 2. Household Income

Household Income (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Per Capita Income	\$21,006	\$24,488	\$24,711	N/A	\$25,600
Median Household Income	\$45,221	\$50,517	\$51,106	N/A	\$62,518
Mean Annual Household Income	\$53,927	\$60,030	\$66,392	\$57,444	\$78,007
Mean Household Social Security Income	\$15,848	\$17,993	\$17,781	\$17,202	\$18,920
Mean Household Retirement Income	\$21,111	\$26,688	\$25,660	\$24,604	\$25,790
Mean Household Supplemental Security Income	\$11,045	\$11,237	\$9,330	\$11,185	\$10,035
Mean Household Cash Public Assistance Income	\$132	\$5,137	\$3,203	\$3,317	\$3,196

Source: U.S. Department of Commerce 2017

N/A – not available

Table 3. Components of Household Income

Components of Household Income (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Labor Earnings	77.4%	67.2%	83.0%	71.2%	84.3%
Social SECURITY	41.2%	45.1%	22.3%	43.6%	24.1%
Retirement Income	25.3%	27.1%	16.7%	26.4%	15.9%
Supplemental Security Income	2.4%	4.2%	4.3%	3.5%	3.7%
Cash Public Assistance Income	1.7%	1.9%	2.1%	1.8%	1.9%
Food Stamp/SNAP	5.4%	7.3%	12.4%	6.5%	8.3%

Source: U.S. Department of Commerce 2017

Poverty rates for different categories of the population vary widely both within the study area and in comparison to the United States. In general, poverty rates are lower in Garfield and Kane Counties than in the United States, while in Coconino County they are higher than in the United States as a whole (see Table 4). When evaluated by race and ethnicity, poverty rates within the study area are similarly complex and varied. No clear patterns emerge when compared to the United States, an indication that economic conditions in the study area do not uniformly mirror national trends or statistics (see Table 5). What can be stated is that poverty rates for certain categories within the study area are markedly higher than for the State of Utah.

Table 4. Percentage of People in Poverty

Percentage of People Who are Below the Poverty Line (2016)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
People	13.5%	9.0%	22.2%	10.8%	11.7%
Families	8.5%	4.8%	14.5%	6.4%	8.4%
People under 18 years	16.8%	10.4%	25.8%	13.1%	13.4%
People 65 years and older	7.1%	7.4%	11.0%	7.3%	6.9%
Families with related children under 18 years	16.3%	6.7%	22.9%	10.7%	11.7%
Married couple families	6.1%	3.8%	8.3%	4.8%	5.3%
Married couple families with children under 18 years	11.5%	5.2%	13.4%	7.7%	6.9%
Female householder, no husband present	27.1%	20.0%	31.8%	24.1%	26.5%
Female householder, no husband present with children under 18 years	36.7%	25.9%	38.8%	32.6%	35.0%

Source: U.S. Department of Commerce 2017

Table 5. Poverty Rates since 1960

Poverty Rates (percentage of total population living in poverty)							
Location	1960	1970	1980	1990	2000	2010	2016
United States	22.1%	13.7%	12.4%	13.1%	12.4%	14.9%	15.1%
Utah	24.9%	15.3%	13.2%	15.7%	13.9%	17.2%	11.7%
Coconino County	34.8%	22.8%	20.4%	23.1%	18.2%	21.8%	22.2%
Garfield County	31.3%	16.1%	12.0%	14.8%	8.1%	12.3%	13.5%
Kane County	19.8%	12.4%	17.3%	16.3%	7.9%	7.6%	9.0%

Source: U.S. Department of Commerce undated; U.S. Census Bureau 2008–2012

Educational attainment statistics in the study area indicate that the people living within the study area tend to be high school graduates at a slightly higher rate on average than in Utah as a whole. For higher education, however, rates of completion tend to be lower within the study area (see Table 6). This could be evidence of either fewer opportunities for pursuing graduate degrees or a lower educational requirement for employment within the region, or both. It could also be that some people in the study area simply do not wish to pursue higher education or that some people, who are supported by others, do not work and therefore do not seek higher education, or both.

Table 6. Educational Attainment

Educational Attainment, Population Age 25 and Older (2008–2012), as Reported by Survey Respondents	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
No high school degree	9.3%	5.0%	11.1%	6.7%	8.5%
High school graduate	90.7%	95.0%	88.9%	93.3%	91.5%
Associate's degree	8.9%	9.9%	9.4%	9.5%	9.8%
Bachelor's degree or higher	20.1%	25.3%	34.2%	23.2%	31.7%
Bachelor's degree	14.8%	15.5%	19.9%	15.2%	21.0%
Graduate or professional	5.3%	9.8%	14.3%	8.0%	10.7%

Source: U.S. Department of Commerce 2017

Paying for housing in Garfield and Kane Counties requires a smaller percentage of household income than it does in Utah in general, while in Coconino County costs are similar to national housing costs (see Table 7).

Table 7. Housing Costs

Housing Costs as a Percentage of Household Income (2012)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Monthly cost <15% of household income	29.0%	30.4%	24.9%	29.8%	22.0%
Monthly cost >30% of household income	28.8%	28.8%	32.2%	30.2%	27.0%
Gross rent <15% of household income	20.7%	20.7%	13.2%	22.6%	12.6%
Gross rent >30% of household income	32.7%	32.7%	49.2%	33.1%	43.4%

Source: U.S. Department of Commerce 2017

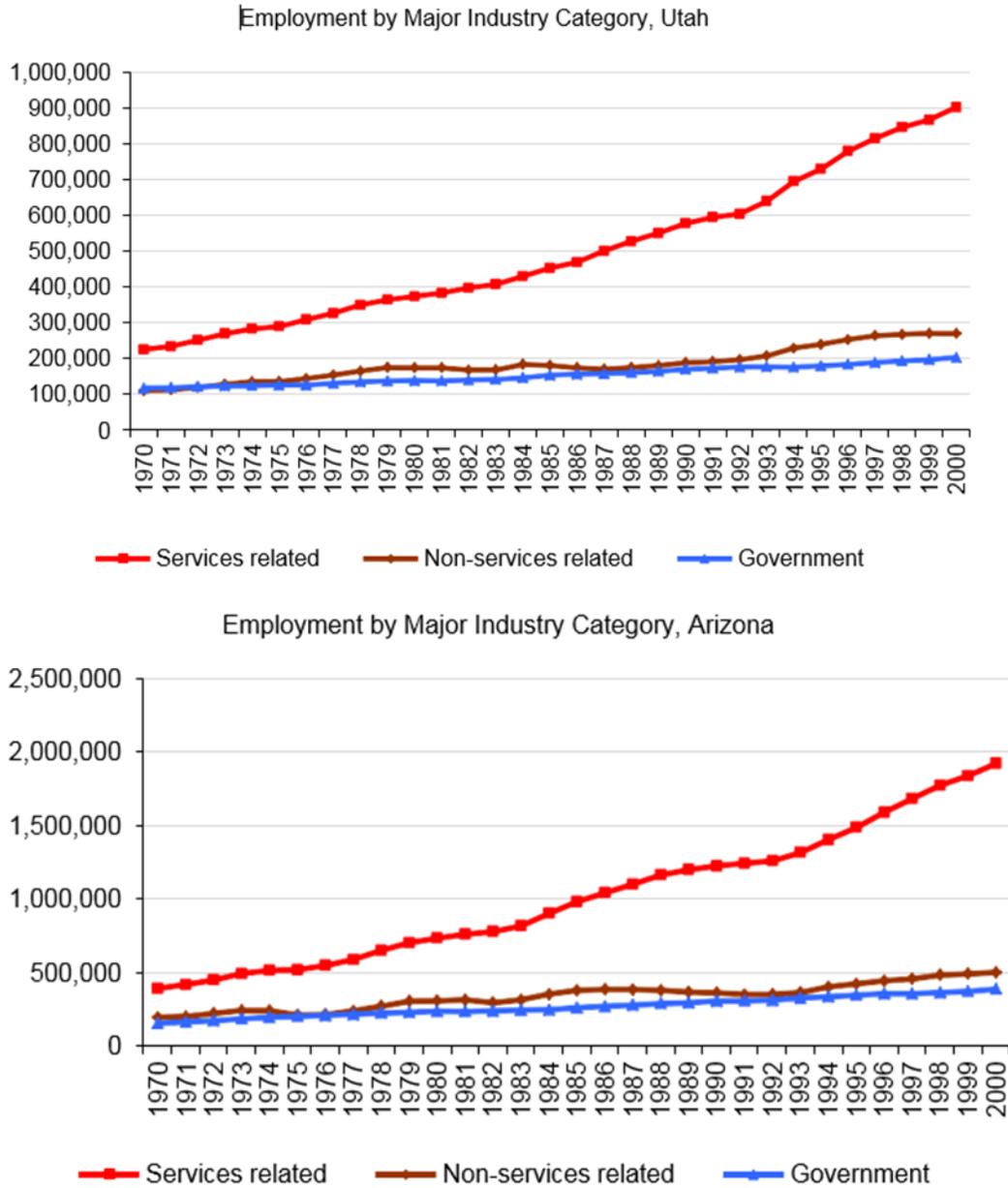
Economic Conditions

Study Area Economic Overview

Within the study area, most SE conditions vary from one county to another. For example, population growth from 1970 to 2016 ranged from 130 percent in Garfield County to 201 percent in Kane County. Population growth in Utah during the same period was 186 percent.

For some economic sectors, trends in economic conditions within the study area have followed the national trend. An example is in the growth of the service sector as a leading source of employment. Service sector industries include, among others: utilities; wholesale trade; retail trade; transportation and warehousing; information technology and information services; finance and insurance; real estate, rental, and leasing services; professional and technical services; management of companies and enterprises; administrative and waste services; educational services; health care and social assistance; arts, entertainment, and recreation;

accommodation and food services; and all other services except for public administration. Throughout the United States, service sector jobs have become an increasingly important source of household income as manufacturing and extractive industries have declined over time at the national level, with the exception of oil and gas extraction. Arizona, Utah, and the overall study area are no exceptions, with service sector employment steadily increasing from 1970 up to the present (see Figure 4). In contrast to those sectors in which the study area parallels trends for the United States as a whole, in some sectors there are marked differences. For example, in 2012, employment within the travel and tourism industry as a percentage of all employment in the study area was more than double that of the United States. Travel and tourism play a larger role in the economies of the counties around GSENM than they do in the United States in general.



Source: Headwaters Economics undated

Figure 4. Employment by Major Industry Category, Utah and Arizona, 1970 to 2000

A major reason for the importance of travel and tourism within the economy of the study area is the scenic nature of the region and the many opportunities for participating in recreation and leisure activities in the region. The geology and geography of the GSENM region have played prominent roles in determining the types of economic activity that occur in the area, in part due to the limited nature of what was economically feasible in the region: for many years, long transportation distances, limited infrastructure, and a rugged landscape contributed to the limited nature of economic enterprises within the study area. In part because the region did not lend itself to successful traditional homesteading in the way that the Great Plains did, a

significant percentage of land within the study area remained in Federal ownership after Utah and Arizona achieved statehood. As such, the very nature of the landscape itself contributed to a circumstance of both limited economic opportunity and a high percentage of Federal lands. In each of the three counties, total Federal ownership of land is greater than the percentage for the United States in general. In Garfield County, more than 90 percent of all land is federally owned. In comparison, the total percentage of Federal land ownership for the entire United States is just under 29 percent. The high percentage of federally owned land in Garfield County indicates that Federal management of land and resources plays an important role in social and economic conditions and presents a complex issue for economic development in Garfield County.

Out of the three counties within the study area, during the period from 1970 to 2016 Kane County experienced the highest rates of growth in population, employment, and personal income. In addition, Kane County had the lowest unemployment rate of the three counties, with unemployment sitting at 3.4 percent as of 2017. In contrast, unemployment in Garfield County was 7.6 percent for the same year.

In 2016, in all three counties in the study area, government employment was somewhat greater as a percentage of all employment than it was in Utah as a whole. In Utah, it was 13 percent. In Garfield and Kane Counties, government employment was around 15 percent of all employment, while in Coconino County it was 23 percent (see Table 8).

With higher non-labor income as a percentage of all income, the study area is less likely to be vulnerable to changes in the productive economy, but it is more likely to be vulnerable to changes in financial asset and other investment asset markets. As mentioned in the prior discussion of social conditions, the area appears to have a higher percentage of retired residents than does Utah as a whole. This means that investment and retirement income will flow into these three counties at a higher rate than they do for Utah in general.

Table 8. Selected Socioeconomic Statistics

Selected Socioeconomic Statistics	Garfield County, UT	Kane County, UT	Coconino County, AZ	Utah
Population % change, 1970–2016	58%	201%	187%	186%
Employment % change, 1970–2016	130%	360%	320%	324%
Personal income % change, 1970–2016	229%	471%	496%	436%
Unemployment rate, 2017	7.6%	3.4%	5.2%	3.2%
Average earnings per job (total earnings/total jobs), 2016 (2017 \$s)	\$30,915	\$34,836	\$46,933	\$50,516
Per capita income, 2016 (2017 \$s)	\$35,922	\$37,913	\$42,941	\$41,784
Non-labor % of total personal income, 2016	43.9%	43.5%	41.0%	32.4%
Services % of total private employment, 2016	72%	84%	84%	83%
Government % of total employment, 2016	19.6%	19.1%	22.5%	14.7%
Farms % of total employment, 2016	8.2%	3.7%	2.7%	1.1%
Mining (including fossil fuels) % of total employment, 2016	N/A	0.1%	0.2%	0.7%

N/A – not available

In the study area, the most important industries in the past decade, in terms of total employment, were: arts, entertainment, recreation, accommodation, and food; education, health care, and social assistance; and retail trade. While farming provided more than 8 percent of all employment in Garfield County in recent years, this category of employment played a lesser role in Kane County's and Coconino County's economy as a percentage of all employment.

Another economic sector within the region is coal mining in Kane County. Managers of Alton Coal's Coal Hollow Project, located just southeast of Alton, Utah, estimate that the mine will employ between 150 and 200 workers over the life of the mine.

Local Connections with Public Lands

Payments in Lieu of Taxes (PILT) are Federal payments to local governments that help offset losses in property taxes due to non-taxable Federal lands within their boundaries. The key law is Public Law 94-565, dated October 20, 1976. This law was rewritten and amended by Public Law 97-258 on September 13, 1982, and codified as Chapter 69, Title 31 of the United States Code. The law recognizes that the inability of local governments to collect property taxes on federally owned land can create a financial impact.

"PILT payments help local governments carry out such vital services as firefighting and police protection, construction of public schools and roads, and search-and-rescue operations. The payments are made annually for tax-exempt Federal lands administered by the Bureau of Land Management, the National Park Service, the U.S. Fish and Wildlife Service (all agencies of the Interior Department), the U.S. Forest Service (part of the U.S. Department of Agriculture), and for Federal water projects and some military installations. PILT payments are one of the ways the Federal Government can fulfill its role of being a good neighbor to local communities" (U.S. Department of the Interior undated).

FS payments are revenue-sharing payments that were originally based on timber operations within each county as authorized by the Twenty-Five Percent Fund Act of 1908. "In the late 1980s, due largely to declines in timber sale receipts, 1908 Act payments began to drop significantly and fluctuate. In 1994, Congress responded by providing 'safety net payments' to counties in northern California, western Oregon and western Washington. In 2000, Congress passed the Secure Rural Schools and Community Self-Determination Act that provided enhanced, stabilized payments to more States. It also created a forum for community interests to participate collaboratively in the selection of natural resource projects on the National Forests, and has assisted in community wildfire protection planning" (USDA 2015). Table 9 provides the FS payments in Garfield, Kane, and Coconino Counties as well as Utah.

Table 9. Federal Land Payments

Federal Land Payments (2015 in 2017 \$s)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
PILT	\$884,781	\$1,092,227	\$1,756,785	\$1,977,008	\$38,748,136
Forest Service payments	\$1,214,932	\$125,852	\$3,449,722	\$1,340,784	\$9,670,307
BLM payments ⁽¹⁾	\$76,848	\$55,471	\$26,189	\$132,319	\$1,424,525

Federal Land Payments (2015 in 2017 \$s)	Garfield County, UT	Kane County, UT	Coconino County, AZ	Kane-Garfield Two-County Region	Utah
Total Federal land Payments by geography of origin (\$)	\$2,176,562	\$1,273,555	\$5,232,696	\$3,450,117	\$169,581,702

Source: Headwaters Economics undated

¹ Bureau of Land Management (BLM) Revenue Sharing: BLM shares a portion of receipts generated on public lands with State and local governments, including grazing fees through the Taylor Grazing Act and timber receipts generated on Oregon and California grant lands.

PILT – Payments in Lieu of Taxes

Residents within the study area, as well as organizations of various types that exist and/or operate in the area, are connected with public lands in and around GSENM on multiple levels and in many different ways. Ranchers in the region are closely connected with the land through grazing their cattle on allotments on BLM-administered surface land and FS and State lands in the area. The ranchers who run livestock on GSENM and other public lands surrounding it are very familiar with the landscape. Local law enforcement and public safety workers spend time patrolling and providing rescue services on publicly owned land units in the region and become well acquainted with its physical characteristics. Local residents who recreate on the public lands that surround their communities often have deep emotional connections with the places they frequent. Even those residents who either rarely or never venture out onto public lands enjoy benefits from the scenic beauty that surrounds their communities. Ecologists have recognized that there is a special connection, often called a “sense of place,” that develops when someone lives close to or in a particular landscape.

In addition to benefitting from the land in terms of the flow of Federal payments to the community and the commodity values generated by the natural resource base it provides, local residents often enjoy emotional, physical, and spiritual benefits that come from that sense of place. Attachment to specific places can also develop in visitors who do not live in the local area but who have a deep appreciation for the characteristics of the landscape and the non-market benefits it can provide.

Ecosystem Services

Economists sometimes divide all goods and services into two broad categories: market and non-market. “Market” goods and services are those for which a market exists or can exist, meaning that it is possible to buy and sell those goods and services. On the other hand, “non-market” goods and services are those that, for one reason or another, whether it is physical or legal, are not available for purchase and that cannot be sold. Public lands provide both market and non-market goods and services that are beneficial to communities, economies, groups, and individuals (see Table 10). An example of a non-market good provided by public lands is the water filtering service provided by an intact wetland on public land.

Table 10. Millennium Ecosystem Assessment

Provisioning	Regulating	Cultural
Goods produced or provided by ecosystems	Benefits obtained from regulation of ecosystem processes	Non-material benefits from ecosystems

Provisioning	Regulating	Cultural
<ul style="list-style-type: none"> • Food • Fresh water • Fuel wood • Genetic resources 	<ul style="list-style-type: none"> • Climate regulation • Disease regulation • Flood regulation 	<ul style="list-style-type: none"> • Spiritual • Recreational • Aesthetic • Inspirational • Educational
Supporting		
Services necessary for production of other ecosystem services		
<ul style="list-style-type: none"> • Soil formation • Waste treatment and nutrient cycling • Primary production 		

Source: Millennium Ecosystem Assessment 2005

In 2008, the Sustainable Rangelands Roundtable published a report on sustainable management of grazing lands, titled “Sustainable Rangelands Ecosystem Goods and Services” (Maczko and Hidlinger 2008). In this report, the authors provided a list of examples of ecosystem goods and services. They divide these into three categories: biological, hydrological/atmospheric, and miscellaneous (see Table 11).

Table 11. Ecosystem Goods and Services Derived from Rangelands

Biological	Hydrological/Atmospheric	Miscellaneous
<ul style="list-style-type: none"> • Domestic Livestock • Other Food for Human Consumption • Forage for Livestock • Fiber • Biofuels • Fishing, Hunting, and Viewing Wildlife • Biochemicals • Genetic Material 	<ul style="list-style-type: none"> • Drinking Water • Water for Economic Benefit • Floods for Channel and Riparian Area Rejuvenation • Flood Mitigation • Water Bodies for Recreation/Tourism • Minimizes Contributions of Chemicals and Particulates • Contributes to Clean, Fresh Air • Hydrologic Energy Potential • Solar Energy Potential • Wind Energy Potential 	<ul style="list-style-type: none"> • Views and Scenes • Cultural or Spiritual Resources • Historical/Archaeological Sites • Scientifically Significant Sites • Recreation and Tourism Sites • Ornamental Resources • Ceremonial Resources

Source: Maczko and Hidinger 2008

Regardless of how they are defined or categorized, the region included in the study area provides a wide range of ecosystem goods and services, many of which are highly valued both by local residents and by visitors from outside the area.

Market Values

Some of the direct and indirect market goods and services provided by the Planning Area include: forage and water for livestock; game species of wildlife; locations for video recording and filming for television and cinematic productions; and locations for both commercial and non-commercial recreation activities. Although the activity of viewing the scenery in the Planning Area does not itself constitute a market good or service, in its many forms (such as

car tours, hiking excursions, backpacking trips, and so on) it does draw in customers for multiple business categories within the communities around the edges of GSENM. These businesses include motels, bed and breakfasts, grocery and other retail stores, restaurants, gas stations and convenience stores, clothing and souvenir shops, tour operators, auto repair and maintenance shops, medical service providers, and other retail and service establishments that cater to the needs of tourists and other visitors.

Non-market Values

GSENM provides a broad range of non-market goods and services to the communities close to the Planning Area and to visitors from outside, as well. Some examples include: the experience of solitude, as well as the opportunity to view uniquely sublime landscapes and scenery, and the spiritual and psychological benefits that can come from those experiences; opportunities for completing basic research, including research in both physical and social sciences; educational opportunities for students, both who visit the Planning Area and who participate in regional in-class programs and in a web-based, global curriculum used by teachers and students around the world; habitat for non-game wildlife species; and so on.

Socioeconomic Workshop and Comment Period

In accordance with the BLM Land Use Planning Handbook (H-1601-1), the BLM hosted a socioeconomic workshop on May 31, 2018. The workshop provided an opportunity for local government officials, community leaders, and other citizens to discuss regional economic conditions, trends, and strategies with BLM managers and staff. During the workshop, the BLM solicited comments from attendees; the BLM also accepted socioeconomic comments through June 8, 2018. During the workshop, five attendees provided oral comments and an additional 11 people submitted written comments during the comment period. The BLM considered input received at the socioeconomic workshop and during the comment period in the development of alternatives and in the analysis of environmental consequences.

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Abbreviations-Acronyms

Term	Definition
BLM	Bureau of Land Management
EHCGR	Escalante Historic/Cultural Grazing Region
EPS	Economic Profile System
FS	Forest Service
GSENM	Grand Staircase-Escalante National Monument
NPS	National Park Service
PILT	Payments in Lieu of Taxes
SE	socioeconomic
USDA	United States Department of Agriculture

***Grand Staircase-Escalante National Monument and
Kanab-Escalante Planning Area***

***Draft Resource Management Plans and
Environmental Impact Statement***

Appendix U

Economic Assessment Report

August 2018

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Appendix U: Economic Assessment Report

Introduction

This appendix describes the methods and results of the economic assessment conducted for the Grand Staircase-Escalante National Monument (GSENM) and Kanab-Escalante Planning Area (KEPA) Resource Management Plans (RMPs) and Environmental Impact Statement (EIS). This appendix primarily focus on the economic analysis methods and results. Refer to Section 3.21, *Social and Economic Considerations: Environmental Justice; Native American Religious Concerns, Hazardous Materials and Public Safety*, of the RMPs/EIS for additional information on social analysis, including environmental justice.

The analysis area for social and economic considerations (often referred to as socioeconomic) includes the extent of Garfield and Kane Counties in Utah and portions of Coconino County in Arizona. However, the economic assessment focuses primarily on Garfield and Kane Counties, as these areas are likely to experience the greatest economic impacts associated with decisions in the RMPs/EIS. The economic assessment used both quantitative and qualitative methods and analyses based on the best available existing information. Quantitative analysis was primarily conducting using the IMPLAN (IMPact analysis for PLANning model) economic model. Input-output models such as the IMPLAN model provide a quantitative representation of the production relationships between individual economic sectors and how these sectors and the economies in the analysis area could be affected under the various management alternatives in the RMPs/EIS. The quantitative impact analysis focuses on resource uses most likely to contribute to economic conditions in the analysis area including: recreation, livestock grazing, minerals development and production, and forestry. The economic assessment also included qualitative consideration of nonmarket values.

The following basic assumptions underlie the economic analyses:

- The analysis area will continue to experience increases in visitors and visitor uses consistent with recent trends.
- Market-based economic relationships, such as purchases between industries and relationships between value added, economic output, labor income, and employment, will remain similar to current relationships throughout the planning period.
- The pace and timing of mineral development activities is dependent on a variety of factors outside the management decisions of the Bureau of Land Management (BLM). These include national and international energy demand and prices, production factors within the Planning Area, and business strategies of operators. The *Mineral Potential Report for the Lands now Excluded from Grand Staircase-Escalante National Monument* (BLM 2018a) projects expected rates of oil and gas well drilling, and future production volumes. Economic impacts could vary depending on the actual level of development during the planning period.
- Tax and royalty revenues derived from activities on BLM-administered surface land would continue to be distributed among communities within the Planning Area, the State, and the Federal Government similar to the current distribution.
- BLM-administered surface land will continue to provide ecosystem services, and people will continue to experience nonmarket values from those services, at similar rates to those now

provided and experienced unless the conditions producing the ecosystem services or nonmarket values are altered by management actions.

The discussions below of the specific methodologies for each resource use provide additional assumptions used in the analyses.

The IMPLAN Model and Economic Term Definitions

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy—for this analysis, the region is Kane County and Garfield County. By combining the two counties, IMPLAN aggregates the two counties' economies into one region for modeling purposes. It should be noted that Kane and Garfield Counties have different economic situations, as described in Section 3.21 (*Social and Economic Considerations*) of the RMPs/EIS. While this analysis recognizes that the economic impacts may be overstated or understated for either county individually, the combined regional model provides an overview of how changes associated with each management alternative are expected to affect the region as a whole.

The IMPLAN model provides estimates of how a specific economic activity translates into jobs and income in the analysis area. The model includes the ripple effect (also called the “multiplier effect”) of changes in economic sectors that may not be directly affected by management actions, but are linked to industries that are directly affected. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly affected) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production). This analysis used IMPLAN 2016 data, the latest available for the counties in the analysis area. Prior to running the model, costs and price data were converted to a consistent dollar year (2017) and the values in this appendix are expressed in year 2017 dollars.

IMPLAN is created and maintained by the Minnesota IMPLAN Group, and was developed in the 1970s through a collaboration with the U.S. Department of Agriculture, Forest Service (USFS) and the University of Minnesota. The IMPLAN model is constructed with data from the U.S. National Income and Product Accounts and the Bureau of Economic Analysis, among a variety of other data sources. The model includes 536 industry sectors based on the North American Industry Classification System. The model uses region-specific multipliers to trace and calculate the flow of dollars from the industries that originate the impact to supplier industries. Three types of impacts are calculated in IMPLAN:

- **Direct Economic Impacts** are impacts in the primary industries associated with activity on BLM-administered surface lands (e.g., restaurants frequented by visitors to BLM-administered surface lands in the analysis area).
- **Indirect Economic Impacts** are impacts in the industries that supply or interact with the primary industries. For example, when a restaurant expands and purchases new materials, the industry sectors supplying the materials experience indirect impacts.
- **Induced Economic Impacts** represent increased spending by workers who earn money due to increased economic activity, such as when restaurant employees use their wages to purchase goods from local shops.

Whenever new industry activity or income is injected into an economy, it starts a ripple effect that creates a total economic impact that is larger than the initial input. This is because the recipients of the new income spend some percentage of it and the recipients of that share, in

turn, spend some of it, and so on. The *total impact* of the new activity is the sum of these progressively smaller rounds of spending within the economy. This total economic impact creates a certain level of value added (i.e., Gross State Product), jobs, and industry activity. The total impact is the sum of the multiple rounds of secondary indirect and induced impacts that remain in the study area (as opposed to “leaking out” to other regions).¹

The results of this analysis are reported using commonly used metrics, consistent with best practices. A summary of each metric is provided below:

- **Employment²:** Represents the jobs created by industry, based on the output per worker and output impacts for each industry.
- **Labor Income:** Includes all forms of employment income, including employee compensation (wages and benefits) and proprietor income.
- **Value added or Gross State Product:** The difference between an industry’s total output and the cost of its intermediate inputs; is the State-level counterpart to Gross Domestic Product.
- **Industry Activity:** Represents the total economic output generated by the direct spending.

Alternatives

The economic analysis assess the four management alternatives considered in the GSENM and KEPA RMPs/EIS, as summarized below and described in detail in Chapter 2, *Alternatives*, of the RMPs/EIS.

- **Alternative A (No Action)** is the continuation of existing management under the GSENM RMP. Alternative A represents continuing to manage the entire Planning Area as a national monument, and thus limits the potential for resource development uses of public lands.
- **Alternative B** emphasizes conservation of resources and applies the most restrictions and constraints on resource use on public lands in the Planning Area. As a result, Alternative B generally has less minerals development, livestock grazing, and resource use compared to other alternatives.
- **Alternative C** generally balances the need to maintain areas as open and available for multiple uses with the need to protect resources on public lands.
- **Alternative D** emphasizes resource use while protecting physical, biological, heritage, and visual resources to the extent required by existing laws, regulations, and agency guidance. As a result, Alternative D generally has more minerals development, livestock grazing, and resource use compared to the other alternatives.

Methodology

This section describes the economic impact analysis methodology for the resource uses modeled in IMPLAN. The methodology includes a brief overview of the approach, the rationale

¹ There is some amount of activity that leaks out to other counties or States, and thus is not included in the results presented here. For example, visitors to BLM-administered surface land may spend money at hotel chains that are owned by corporations based in other States. Some of these visitors’ spending stays in the region, but most of it does not. The IMPLAN model accounts for this leakage and reflects only the economic activity remaining in the analysis area.

² Due to the static nature of the IMPLAN model, the employment impacts are presented in terms of annual job-years as the model calculates the annual impact of annual activity. It is likely that once the job is created, it will be sustained; however, to ensure that the impact is not overstated, it is conservatively assumed that the job impact is annual.

for selecting the data inputs for the resource use, and a description of the IMPLAN inputs used for the management alternatives described in the GSENM and KEPA RMPs/EIS.

Recreation

Introduction

Recreation information considered and modeled includes information on the total number of visitors to GSENM; the proportion of local visitors (i.e., those who live in Kane County or Garfield County) versus non-local visitors; the average number of visitor days and/or nights spent in the area; spending patterns of visitors (what is spent on lodging versus food, for example); types of recreation and associated numbers of users; and permits obtained by visitors.

Recreation Data

The recreation economic analysis is informed by recent historical recreation visitation estimates for GSENM and KEPA taken from the BLM’s Recreation Management Information System (RMIS) (BLM 2018b). Recreation usage data in RMIS are expressed in “visits” and “visitor days.” A visit is defined as one individual who enters and recreates on BLM-administered surface land for an indeterminate period of time. A visit ends when that individual leaves BLM-administered surface land. The fact that some visits are of a single day or less, and some are for multiple days, is accounted for in the approach to estimating the direct impacts (expenditures) of visitors, as discussed below. One visitor day represents an aggregate of 12 visitor hours to a site or area. Table 1 shows the total visitor days in GSENM and KEPA for the past 7 years (generally 2011–2017).

Table 1. Total Annual Visitor Days in the Planning Area (2011–2017 annual average)

	Alternative A	Alternative B	Alternative C	Alternative D
KEPA	287,454	296,078	293,204	287,454
GSENM	407,953	420,191	416,112	407,953
Total	695,407	716,269	709,315	695,407

Source: BLM 2018b

KEPA – Kanab-Escalante Planning Area, GSENM – Grand Staircase-Escalante National Monument

The IMPLAN portion of the analysis considers how direct, non-local visitor spending that can be tied directly to the Planning Area has an effect on the local economy. Only non-local visitor spending is considered because locals generally spend in the surrounding area regardless and the estimated results provide a lower bound to estimated economic impacts resulting from GSENM and KEPA management. The IMPLAN analysis relies on a combination of data sources, including RMIS (BLM 2018b), BLM specialists (Beal 2018), the 2016 Economic Snapshot produced by the Department of the Interior/National Conservation Lands (BLM 2016), and outside sources.

Market Valuation

The recreation economic analysis involved:

- Estimating recreation usage (annual recreation visits) to the GSENM and KEPA areas;
- Calculating total recreation-related expenditures (direct impacts) in these areas; and
- Estimating the total economic impacts based on recreation expenditures.

The recreation economic analysis presents two perspectives on economic effects used by economists: economic contribution and economic impact. Economic contribution measures gross changes in economic activity and in the case of recreation includes: (1) expenditures made by visitors from outside the economic analysis area, and (2) expenditures made by local residents (roughly, individuals who live within Kane County and Garfield County). Local residents make considerable recreation-related expenditures (gas, food, and so on) on local recreation, so the economic contribution perspective includes those expenditures in an analysis of the economic role of recreation. In other words, the combined expenditures by local and non-local recreationists help support local businesses. Economic impact measures only the net new changes in economic activity within the economic analysis area; in the case of recreation, net new economic activity is only generated by the spending within the economic analysis area of recreational visitors from outside the economic analysis area. Net new economic activity is not generated by local resident spending on local recreation, as these residents would generally make other expenditures locally if they did not make expenditures on local recreation. Therefore, by only accounting for non-local visitors, this analysis presents a conservative estimate of the economic activity generated by recreation in the GSENM and KEPA areas.

Estimation of Recreation Usage

Recreation usage data in RMIS are expressed in “visitor days” with one visitor day representing an aggregate of 12 visitor hours to a site or area. This analysis uses visitor days to estimate total spending related to recreation. Table 2 shows the estimated total visits in GSENM and KEPA in recent years. The estimation of Alternative A is derived from the 3-year average and then multiplied by an estimated 5 percent increase in visitation, which reflects the general trending increase in recreation in GSENM and KEPA.

Table 2. Historical Recreation Visitor Days in GSENM and KEPA (2015–2017)

Fiscal Year	GSENM	KEPA	Total
2015	359,487	231,469	590,956
2016	447,604	292,174	739,778
2017	366,614	303,381	669,995
3-Year Average	391,235	275,675	666,910
Alternative A (No Action) Adjusted 3-Year Average	407,953	287,454	695,407

Sources: BLM 2018b; Beal 2018

KEPA – Kanab-Escalante Planning Area, GSENM – Grand Staircase-Escalante National Monument

As indicated in Table 2, the annual average of visits to GSENM and KEPA is estimated at 695,407 visitor days for Alternative A (No Action Alternative). Historical recreation visitor days are reported in RMIS as the total visitor days in the extent of the former GSENM boundaries. The breakdown of total visitor days in GSENM and KEPA is estimated through local, expert BLM knowledge and the areal breakdown of the former boundary of GSENM into the new boundaries. For example, visitation is given by recreation area and most of the recreation areas are exclusively in either the new boundaries of GSENM or KEPA. For the recreation areas not exclusively in either GSENM or KEPA, visitor days are either divided equally for recreation sites such as roads that make up the new boundaries or are divided proportionally by the percentage of GSENM and KEPA of the former monument boundary, 53.8 and 46.2 percent, respectively. Based on local, BLM expert knowledge, 82 percent of visitation to GSENM and KEPA is non-local and 18 percent is local (Beal 2018).

The BLM anticipates that recreation visitation will increase within the Planning Area as popularity and interest in outdoor recreation continues. This is likely the case for the majority of sites and activities, depending on social trends and the degree of external promotion (Beal 2018).

Recreation management varies across the alternatives in the GSENM and KEPA RMPs/EIS. In general, alternatives B and C provide for more intensive and targeted management of recreation, which may slightly increase visitor days compared to alternatives A and D. For purposes of analysis, Alternative B is assumed to support an estimated increase of 3 percent in visitor days during the planning period and Alternative C is assumed to support an estimated increase of 2 percent in visitor days during the planning period. Under Alternative D, recreation visitation is estimated to be similar to Alternative A.

Estimation of the Direct Economic Impacts of Recreation (Expenditures)

Due to the lack of recreation expenditure data for recreation on BLM-administered surface land in Utah, data from the National Visitor Use Monitoring (NVUM) program of the USFS were used to estimate recreation-related expenditures for the recreation economic analysis area. The NVUM program provides a robust data source that is widely used for recreation economic impact analysis for areas besides USFS-managed lands. This is done by applying the recreational expenditure data from NVUM to specific recreation use data or estimates for GSENM and KEPA extracted from RMIS.

The BLM used NVUM Recreation Visitor Spending Profiles (average dollars per party 2016\$) of non-local visitors for day trips and overnight visitation for the non-snow-related recreation activities in USFS Region 4 – Intermountain (Stynes and White 2006; White 2017). The NVUM recreation segment and expenditure data, by non-local visitors, were applied to the recreation economic analysis area as described below. All NVUM expenditures were assumed to be local expenditures (within Kane and Garfield Counties).

- The allocation of spending by non-local day and overnight recreation visitors—82 percent of all visitors as determined by local BLM recreation experts (Beal 2018)—is estimated as 33.3 percent day recreation and 66.7 percent overnight recreation (White 2017).
- Spending by non-local day and overnight recreation visitors are estimated for the entire recreation group. An average non-local recreation group not participating in winter recreation activities is estimated at 2.43 people per group.
- Non-local day recreation visitors are estimated to spend \$56.60 (2017\$) per party and non-local overnight recreation visitors are estimated to spend \$273.20 (2017\$) per party on items such as lodging, restaurants, groceries, gas, activities, and other items.

As shown in Table 3, spending per party per activity is multiplied by the number of visitor days and then divided by the average party size. The total direct spending is estimated as \$44,306,642 for the baseline.

Table 3. Spending Estimates of Non-Local Visitors: 3-Year Historical Average (in 2017 dollars)

Spending Activity	Spending Per Non-Local Party Per Day	Non-local Visitor Days, GSENM	Non-local Visitor Days, KEPA	Average Party Size	Spending, GSENM	Spending, KEPA	Spending, Total
Lodging	\$40.33	320,813	226,053	2.43	\$5,323,994	\$3,751,430	\$9,075,424
Restaurant/Bar	\$43.50	320,813	226,053	2.43	\$5,742,503	\$4,046,322	\$9,788,825
Groceries	\$31.77	320,813	226,053	2.43	\$4,194,329	\$2,955,437	\$7,149,766
Gas and oil	\$36.62	320,813	226,053	2.43	\$4,835,074	\$3,406,923	\$8,241,997
Other transportation	\$4.97	320,813	226,053	2.43	\$655,708	\$462,029	\$1,117,737
Activities	\$11.84	320,813	226,053	2.43	\$1,563,577	\$1,101,738	\$2,665,315
Admissions/Fees	\$9.91	320,813	226,053	2.43	\$1,308,775	\$922,198	\$2,230,973
Souvenirs/Other	\$17.94	320,813	226,053	2.43	\$2,368,029	\$1,668,577	\$4,036,606
Total	\$196.88	320,813	226,053	2.43	\$25,991,988	\$18,314,655	\$44,306,642

Sources: Beal 2018; Stynes and White 2006; White 2017

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

The BLM acknowledges that certain recreation activities on BLM-administered surface land may generate visitor expenditure patterns that differ from the NVUM expenditure values. However, the per-visit expenditure values averaged across the many different recreation activities that take place in GSENM and KEPA are a reasonable approximation of the per-visit expenditures that occur in the analysis area due to recreation on BLM-administered surface land in GSENM and KEPA.

The spending values shown in Table 4 were used as inputs into IMPLAN and were distributed by the sectors depicted in Table 4.

Table 4. IMPLAN Sectors Used for Recreation

Number	Sector Name
400	Retail - Food and Beverages
402	Retail - Gasoline Stations
404	Retail - Sporting Goods, Hobby, Book, Music
406	Retail - Miscellaneous
442	Automotive Equipment Rental and Leasing
493	Museums, Historical Sites, Zoos, and Parks
496	Other Amusement and Recreation Industries
499	Hotels and Motels
500	Other Accommodations
501	Full-Service Restaurants
62	Maintenance and repair construction of nonresidential structures

Livestock Grazing

Introduction

Livestock grazing information considered and modeled includes the active and suspended animal unit months (AUMs) within GSENM and KEPA, the cost per AUM,³ and the total AUMs, as well as the payments collected from grazing permittees and sales of permits to obtain a dollar-per-AUM estimate. The economic parameters for cattle were applied to these livestock types. The IMPLAN portion of this analysis considered the economic impact of grazing on BLM-administered surface land by modeling the activity associated with cattle production as well as revenue earned by the BLM from permits and leases.

Estimation Value of Production

The economic activity generated by grazing is directly related to the number of AUMs actually used by livestock operators. Each AUM of forage consumed contributes to the weight of marketable cattle and therefore affects the value of livestock production. Billed AUMs are the closest available approximation of actual use of AUMs. Billed use may exceed actual grazing use, so the economic analysis may overstate the actual economic impacts of grazing to some degree. Billed AUMs will vary from year to year, based on weather and market conditions.

³ An AUM is equal to the approximate amount of forage consumed by a cow and calf during a 1-month grazing period.

Because these variations cannot be predicted, the impact estimates assume a constant level of use throughout the planning period.

An economic impact analysis was also conducted based on hypothetical use of all permitted AUMs in the Planning Area. This represents the maximum possible economic impact of livestock grazing on BLM-administered surface lands in GSENM and KEPA. For analysis purposes, this hypothetical scenario would not vary from year to year and it is unlikely that this maximum economic impact scenario would occur.

Estimates of active and suspended AUMs are included in the description of alternatives in Chapter 2, *Alternatives*, of the RMPs/EIS and other available information and are presented below in Table 5.

Based on readily available information, the dollar value per AUM is estimated at \$61.17. Table 6 presents the direct economic impact of livestock grazing using the number of AUMs presented in Table 5 multiplied by the estimated dollar value per AUM.

Table 5. Active AUMs and Suspended AUMs, by Alternative

	Alternative A		Alternative B		Alternative C		Alternative D	
	Active AUMs	Suspended AUMs						
KEPA	48,852	13,452	29,046	13,453	35,150	13,453	49,678	0
GSENM	57,349	15,792	34,098	15,792	41,263	15,792	58,317	0
Total	106,202	29,245	63,144	29,245	76,413	29,245	107,995	0

Source: Active and suspended AUM values in Alternative A were provided by the BLM in a file titled "7June2018_GSENM-KFO-Allot-AUMs-County-Acres." AUM values for alternatives B-D are from the GSENM and KEPA Resource Management Plans/Environmental Impact Statement, Chapter 2.

Note: At the time of analysis, distribution of active and suspended AUMs in GSENM and KEPA were not readily accessible. For purposes of analysis, the distribution in Table 5 is based on the total surface area of GSENM and KEPA compared to the whole. GSENM encompasses 54% of the total Planning Area and therefore 54% of active and suspended AUMs were assumed to occur in GSENM, and KEPA encompasses 46% of the total Planning Area and therefore 46% of the active and suspended AUMs were assumed to occur in KEPA.

AUM – animal unit month, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Table 6. Direct Economic Impact of Livestock Grazing, by Alternative (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Active AUMs	Suspended AUMs						
KEPA	\$2,988,167	\$0	\$1,776,678	\$0	\$2,153,043	\$0	\$3,038,691	\$0
GSENM	\$3,507,909	\$0	\$2,085,698	\$0	\$2,527,451	\$0	\$3,567,119	\$0
Total	\$6,496,075	\$1,788,789	\$3,862,376	\$1,788,851	\$4,680,494	\$1,788,851	\$6,605,810	\$0

AUM – animal unit month, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Federal Grazing Fee Revenue

In addition to the value of production created from AUMs in GSENM and KEPA, the Federal Government raises revenues from grazing fees. Table 7 presents revenue raised based on 2017 grazing fees. The 2017 grazing fee is \$1.87 per AUM. In general, 50 percent of grazing fees collected are returned to the field office within the State as 8100 funds for range improvement. The remaining 50 percent of grazing fees collected by the BLM are distributed to a mix of the county, State, or U.S. Treasury general fund depending on the act governing the grazing land (e.g., Taylor Grazing Act and Bankhead-Jones Act). This analysis models only the 50 percent of the collected fee allocated toward range improvement, as this is generally the amount recognized within the two-county analysis area. Suspended AUMs do not generate grazing fee revenue and therefore are not modeled in IMPLAN.

Table 7. Federal Grazing Fee Revenue (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Active AUMs	Suspended AUMs	Active AUMs	Suspended AUMs	Active AUMs	Suspended AUMs	Active AUMs	Suspended AUMs
KEPA	\$45,677	\$0	\$27,158	\$0	\$32,911	\$0	\$46,449	\$0
GSENM	\$53,621	\$0	\$31,882	\$0	\$38,634	\$0	\$54,526	\$0
Total	\$99,298	\$0	\$59,040	\$0	\$71,545	\$0	\$100,975	\$0

Sources: BLM 2017; Stewart 2018

AUM – animal unit month, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

The values shown in Table 6 and Table 7 were used as inputs into IMPLAN and were distributed among the following sectors:

- 11-Beef and cattle ranching and farming, including feedlots and dual-purpose ranching and farming
- 9-Support activities for agriculture and forestry

Minerals Development

This analysis considers locatable mineral development, salable mineral development, fluid leasable minerals (oil and gas), and solid leasable mineral development (coal). In general, minerals development in GSENM would continue to be limited to valid existing rights that existed prior to the original monument designation. Minerals development in the lands that are now excluded from GSENM (i.e., KEPA) would be guided based on the management and allocations in the KEPA RMP as described in Chapter 2, *Alternatives*, of the RMPs/EIS.

Minerals data primarily came from local BLM subject matter experts as well as the Office of Natural Resources Revenue, obtained from BLM National Operations Center economic staff. Data were also sourced from the BLM *Mineral Potential Report* (BLM 2018a).

Oil and Gas

Historical sales value and revenues associated with fluid mineral leases on BLM-administered surface land cover the 3-year period from 2015–2017, and were converted to 2017 dollars. Table 8 presents the estimated annual revenue and Federal royalties/rent for Federal leases in the Planning Area, by alternative.

The revenue and Federal royalties from oil and gas development in Table 8 were estimated based on the following methods and assumptions:

1. Total revenue and royalties under Alternative A were calculated using the total values for all 17 producing wells in Garfield County, dividing by 17 to estimate the production from a single well, then multiplying the resulting value by 4 to account for the four producing wells in KEPA (Upper Valley Field). As a result, a 3-year average of total existing revenue from the four producing wells in KEPA is estimated at \$1,190,604 annually $((\$5,060,065/17)*4)$ and royalties are estimated at \$152,630 annually $((\$648,677/17)*4)$ for the 4 producing wells in KEPA. Production from these four wells is assumed to continue under all alternatives. The values for a single well within the Planning Area can be estimated by dividing the Alternative A values by 4, to represent the production from one well. As a result, one producing well in the Planning Area is estimated to generate \$297,651 of revenue annually $(\$1,190,604/4)$, and \$38,157 in royalties annually $(\$152,630/4)$.
2. The reasonably foreseeable development for the excluded lands (BLM 2018a) indicates up to 10 producing wells during the planning cycle. This analysis assumed all of these wells (10 producing) would be developed under Alternative D (maximum resource use alternative), half (5 producing) would be developed under Alternative C, and 2 wells would be developed under Alternative B (resource conservation alternative).
3. The analysis then applied the estimated annual averages for a single producing well in the excluded lands from #1 above to the estimated number of producing oil and gas wells for the alternatives identified in #2. These values were then added to the continued production of the four existing oil wells.

The values shown in Table 8 were used as inputs into IMPLAN and were distributed among the following sectors:

- 37-Drilling oil and gas wells
- 38-Support activities for oil and gas operations

Table 8. Annual Estimated Revenue and Federal Payments from Fluid Minerals Leases on Federal Land in the Planning Area (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Revenue	Federal Royalties/Rent	Annual Revenue	Federal Royalties/Rent	Annual Revenue	Federal Royalties/Rent	Annual Revenue	Federal Royalties/Rent
Total Planning Area	\$1,190,604⁽¹⁾	\$152,630⁽²⁾	\$1,785,906	\$228,945	\$2,678,858	\$343,417	\$4,167,113	\$534,205
GSENM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
KEPA	\$1,190,604	\$152,630	\$1,785,906	\$228,945	\$2,678,858	\$343,417	\$4,167,113	\$534,205

Sources: BLM subject matter experts (Bankert & Perkes); ONRR 2018; BLM 2018a

¹ Annual average revenue from the four existing producing oil wells (based on 3-year average 2015–2017). Adjusted to 2017 dollar value.

² Annual average Federal royalties from the four producing oil wells (based on 3-year average 2015–2017). Adjusted to 2017 dollar value.

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Coal

Although there is currently no coal mining within the Planning Area, the *Mineral Potential Report* indicates the potential for up to one underground coal mine in the Planning Area within KEPA (BLM 2018a). Table 9 presents the estimated revenue and Federal royalties for coal development during the planning period, by alternative.

Table 9. Annual Estimated Sales Value and Federal Payments from Coal on Federal land in the Planning Area (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Revenue	Federal Royalties						
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$208,000,000	\$16,640,000
GSENM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
KEPA	\$0	\$0	\$0	\$0	\$0	\$0	\$208,000,000	\$16,640,000

Source: BLM 2018a

Note: No coal mines exist in the Planning Area.

GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

The sales value and Federal payments from coal development presented in Table 9 were estimated based on the following methods and assumptions:

1. The *Mineral Potential Report* (BLM 2018a) indicates the potential for up to one underground coal mine in the Planning Area within the excluded lands in the same general area and of a similar size as the previously proposed Smoky Hollow Mine. The Smoky Hollow Mine had an estimated ultimate recovery of 182 million tons of coal over a 35-year period (5.2 million tons per year).
2. There are no existing coal mines under Alternative A and coal mines would not occur, as the existing GSENM management would continue. Alternatives B and C assume no coal mines, and Alternative D (maximum resource use alternative) assumes that the one coal mine would be developed.
3. To estimate revenue, the analysis multiplied the estimated 182 million tons of recoverable coal (from Smoky Hollow Mine) by the current estimated regional market value of coal (\$40 per ton; see explanation in 3.a below), which equals a total estimated revenue of \$7,280,000,000 or an annual estimate of \$208,000,000 (7,280,000,000 / 35-year life of Smoky Hollow estimate). Federal mineral royalties on this volume/value of coal were estimated based on a general 8.0 percent Federal royalty on coal production from an underground mine, equaling an estimated annual royalty of \$16,640,000.
 - a) Market price of \$40.00 per ton of coal was estimated based on U.S. Energy Information Administration reporting of Uinta Basin coal region average weekly spot-market price of \$41.40 for 11,700 British thermal unit, 0.8 sulfur dioxide coal as of June, 8, 2018. Rounded down to \$40.00 per ton.
 - b) This assessment assumed a royalty rate of 8.0 percent. However, it is recognized that the royalty value of production from Federal leases is based on gross proceeds accruing to the lessee from its arm's-length sale of coal. Regulations do allow for deductions in

royalty rates and payments for certain costs associated with washing coal and transportation. For purposes of analysis, a standard 8.0 percent royalty rate was used.

The values shown in Table 9 were used as inputs into IMPLAN and were distributed among the following sectors:

- 22-Coal mining
- 38-Support services

Locatable Minerals

The *Mineral Potential Report* (BLM 2018a) indicates relatively low potential for locatable mineral development in the Planning Area. While a variety of locatable minerals are known to occur in KEPA, only those deposits of sculpting-grade alabaster could be expected to see development in the foreseeable future. There is currently one mining claim for alabaster in KEPA. All action alternatives assume that this mine would continue. Table 10 presents the annual estimated revenue and Federal payments from locatable minerals development on Federal land in the Planning Area.

The annual revenue and Federal payments from locatable mineral development presented in Table 9 were estimated based on the following methods and assumptions:

1. The *Mineral Potential Report* (BLM 2018a) indicates relatively low potential for locatable mineral development. While a variety of locatable minerals are known to occur in KEPA, only those deposits of sculpting-grade alabaster could be expected to see development in the foreseeable future. There is currently one mining claim for alabaster in the excluded lands. All action alternatives assume that this mine would continue.
2. Alternative B (resource conservation alternative) assumes that only the single existing alabaster mine would be producing/developed. Alternative C assumes that one additional alabaster mine could be constructed (two total mines) with the same revenue and maintenance fees as the existing mine. Alternative D (maximum resource use alternative) assumes that two additional alabaster mines could be constructed (three total mines) with the same revenue and maintenance fees as the existing mine.
3. There are no Federal royalties collected on locatable mineral claims/production. There is an annual maintenance fee collected by the Federal Government for mining claims in the amount of \$155 per 20 acres. This maintenance fee was applied based on the estimate of mining activity in #2 above.

The values shown in Table 10 were used as inputs into IMPLAN and were distributed among the following sectors:

- 30-Stone mining and quarrying
- 38-Support activities for mining operations

Table 10. Annual Estimated Revenue and Federal Payments from Locatable Minerals Leases on Federal land in the Planning Area (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Revenue	Maintenance Fee to BLM	Annual Revenue	Maintenance Fee to BLM	Annual Revenue	Maintenance Fee to BLM	Annual Revenue	Maintenance Fee to BLM
Total Planning Area	\$131,767⁽¹⁾	\$155⁽²⁾	\$131,767⁽¹⁾	\$155⁽²⁾	\$263,534	\$310	\$395,301	\$465
GSENM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
KEPA	\$131,767⁽¹⁾	\$155⁽²⁾	\$131,767⁽¹⁾	\$155⁽²⁾	\$263,534	\$310	\$395,301	\$465

Source: Alternative A revenue and royalties provided by the BLM (R. Bankert)

¹ Annual average revenue value (3-year average 2015–2017), adjust to 2017 dollars. Values provided by the BLM (Roger Bankert).

² There are no Federal royalties collected on locatable mineral claims/production. There is an annual maintenance fee collected by the Federal Government for mining claims in the amount of \$155 per 20 acres.

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

Salable Minerals

As indicated in the *Mineral Potential Report* (BLM 2018a), the salable mineral commodities of sand and gravel, crushed stone, building stone, clay, and humates occur within the KEPA portion of the Planning Area; however, only sand and gravel are likely to be developed. This development would likely take the form of free-use permits issued to county road departments to serve as maintenance materials for unpaved roads in the Planning Area. As a result, there are no anticipated in-place values or payments on production expected based on salable mineral development.

Forestry

This section includes information about forestry activity within GSENM and KEPA for Christmas tree and wood product permits as well as stewardship contracts. The calculations for IMPLAN rely on the amount collected by the BLM from Christmas tree and wood product permits (Table 11).

To calculate the amount collected from permits, this assessment assumed all forest product sales occur in the two designated wood cutting areas within KEPA. As a result, all values are assumed to accrue in KEPA. The assessment also assumed that, based on the management alternatives, Alternative B would have limitations on wood permits and Christmas tree harvesting similar to current management (Alternative A). Alternatives C and D would generally allow wood permits and Christmas tree harvesting area-wide. As a result, the calculations assume that Alternative B would have a similar annual collection value as current management (\$2,538) and alternatives C and D would have approximately double the amount of collections as alternatives A and B (\$5,077).

Table 11. Annual Sales Value and Federal Revenues from Christmas Tree and Wood Products (in 2017 dollars)

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Revenue (i.e., sales value)	Amount collected by BLM	Annual Revenue (i.e., sales value)	Amount collected by BLM from permits	Annual Revenue (i.e., sales value)	Amount collected by BLM	Annual Revenue (i.e., sales value)	Amount collected by BLM
Total Planning Area	N/A	\$2,538 ⁽¹⁾	N/A	\$2,538 ⁽¹⁾	N/A	\$5,077	N/A	\$5,077
GSENM	N/A	\$0	N/A	\$0	N/A	\$0	N/A	\$0
KEPA	N/A	\$2,538 ⁽¹⁾	N/A	\$2,538 ⁽¹⁾	N/A	\$5,077	N/A	\$5,077

Source: Alternative A based on BLM-provided information in two files:

- 6 5 18 UT_GS_Christmas_Tree_Permits_2015_2018
- 6 5 2018_UT_GS_Wood_Permits_by_Entry_Measure_2015_2018

¹ 3-year average (2015–2017) with values adjusted to 2017 dollars of Christmas Tree Permits and Wood Permits. BLM – Bureau of Land Management, N/A – not applicable, GSENM – Grand Staircase-Escalante National Monument, KEPA – Kanab-Escalante Planning Area

This analysis also considered economic activity generated from stewardship contracts. The BLM provided stewardship contract data for Kane County and Garfield County for 2005 through 2013. Table 12 presents the estimated stewardship contract values paid to the BLM under the alternatives.

The stewardship contract values paid to the BLM in Table 12 were estimated based on the following methods and assumptions:

1. The BLM confirmed that no new stewardship contracts have been issued since 2013. To determine the amount spent per year in the Planning Area, county data were combined by adding total values across all years. It was assumed that all data provided by the BLM were in nominal dollars, and therefore all values were converted to 2017 dollars for comparison.
2. The average annual amount spent on stewardship contracts was calculated based on the 2005 through 2013 average for an average annual contract amount of \$95,849 in 2017 dollars. It was assumed that there will be some stewardship activity in the future, but that this activity will not change as a result of the alternatives. Therefore, the same amount was modeled for each alternative.
3. Data on stewardship contracts separated out between GSENM and KEPA were not readily available. For purposes of analysis, the distribution of stewardship contracts in Table 12 is based on the total surface area of GSENM and KEPA compared to the whole. GSENM encompasses 54 percent of the total Planning Area and therefore 54 percent of stewardship contracts are assumed to occur in GSENM, and KEPA encompasses 46 percent of the total Planning Area and therefore 46 percent of stewardship contracts are assumed to occur in KEPA.

Table 12. Stewardship Contract Payment Estimates, by Alternative (in 2017 dollars)

Stewardship Contracts	Alternatives A, B, C, and D
	Amount Paid by BLM
Total Planning Area	\$95,849
GSENM	\$51,759
Excluded Lands	\$44,091

Source: Stewardship information provided by the BLM in a document titled “6 20 2018 GSENM Stewardship Contracts.”

Note that numbers may not sum due to rounding.

BLM – Bureau of Land Management, GSENM – Grand Staircase-Escalante National Monument

The values shown in Table 11 and Table 12 were used as inputs into IMPLAN and were distributed among the following sectors:

- 15-Forestry, forest products, and timber tract production
- 19-Support activities for agriculture and industry

IMPLAN Modeling Results

The results of the IMPLAN modeling are presented in Table 13 through Table 23 below. Each table identifies the direct effect, indirect effect, induced effect, and total effect on employment, labor income, Gross State Product, and industry activity in the two-county analysis area. Refer to *The IMPLAN Model and Economic Term Definitions* for definitions of the types of effects and terminology referred to in this section. The results presented in Table 13 through Table 23 represent annual values.

Table 13 through Table 23 also show the economic impacts for alternatives A, B, C, and D to facilitate comparisons between the four alternatives. Where applicable, results are separated

by GSENM and KEPA to represent the differences in economic activity associated with the two areas and their management under the alternatives. Recreation, grazing, and forestry each had different inputs for GSENM versus KEPA, as described in *Methodology* of this report. However, all of the mining impacts are associated with KEPA, as new mineral development would generally be excluded from GSENM, subject to valid existing rights.

Table 13 shows the combined economic impact of all modeled activities related to minerals development, recreation, forestry, and grazing from GSENM management under the alternatives. Economic effects would generally be greatest under Alternative D, followed by Alternative A, then Alternative C, with Alternative B having the least economic effect. Alternative D would generally have the greatest economic effect due to the increased potential for resource use (e.g., livestock grazing) compared to the other alternatives. Alternative A would have a slightly higher economic effect than alternatives B and C due to a higher number of active AUMs under this alternative, compared to alternatives B and C. Total modeled employment ranges from 537 jobs supported in Alternative B to 549 jobs supported in Alternative D. Similarly, industry activity ranges from \$30.79 million in Alternative B to \$31.25 million in Alternative D.

Table 13. Summary of Annual Economic Impact of GSENM Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	461	\$7.86	\$10.01	\$21.84
	Indirect Effect	54	\$1.03	\$2.24	\$5.62
	Induced Effect	33	\$0.77	\$1.97	\$3.73
	Total Effect	548	\$9.66	\$14.21	\$31.20
B	Direct Effect	453	\$7.97	\$10.15	\$21.61
	Indirect Effect	51	\$0.99	\$2.19	\$5.42
	Induced Effect	33	\$0.78	\$1.98	\$3.76
	Total Effect	537	\$9.74	\$14.32	\$30.79
C	Direct Effect	455	\$7.93	\$10.10	\$21.67
	Indirect Effect	52	\$1.00	\$2.21	\$5.48
	Induced Effect	33	\$0.77	\$1.97	\$3.75
	Total Effect	540	\$9.71	\$14.28	\$30.90
D	Direct Effect	461	\$7.86	\$10.02	\$21.88
	Indirect Effect	55	\$1.04	\$2.24	\$5.64
	Induced Effect	33	\$0.77	\$1.97	\$3.74
	Total Effect	549	\$9.67	\$14.23	\$31.25

Note: Numbers may not sum due to rounding.

Table 14 shows the combined economic impact of KEPA-related management and activities including minerals development, recreation, grazing, and forestry. Economic effects would generally be greatest under Alternative D, followed by Alternative C, then Alternative A, with Alternative B having the least economic effect. Alternative D generally has the greatest economic effect due to the increased potential for minerals development and resource use

compared to the other alternatives. Total employment ranges from 396 jobs supported in Alternative B to 503 jobs supported in Alternative D. Similarly, industry activity ranges from \$23.41 million in Alternative B to \$38.42 million in Alternative D.

Table 14. Summary of Annual Economic Impact of KEPA Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	338	\$5.66	\$7.39	\$16.52
	Indirect Effect	41	\$0.78	\$1.66	\$4.22
	Induced Effect	24	\$0.56	\$1.42	\$2.70
	Total Effect	404	\$7.00	\$10.46	\$23.45
B	Direct Effect	333	\$5.77	\$7.59	\$16.60
	Indirect Effect	39	\$0.74	\$1.63	\$4.07
	Induced Effect	24	\$0.56	\$1.44	\$2.73
	Total Effect	396	\$7.07	\$10.66	\$23.41
C	Direct Effect	340	\$5.81	\$7.77	\$17.32
	Indirect Effect	41	\$0.77	\$1.67	\$4.24
	Induced Effect	24	\$0.57	\$1.45	\$2.76
	Total Effect	405	\$7.15	\$10.89	\$24.32
D	Direct Effect	418	\$6.86	\$12.72	\$29.32
	Indirect Effect	56	\$1.04	\$2.18	\$5.78
	Induced Effect	29	\$0.68	\$1.75	\$3.32
	Total Effect	503	\$8.58	\$16.65	\$38.42

Note: Numbers may not sum due to rounding.

Recreation

As described in this report, the quantitative analysis of recreation impacts considered visitor spending across a number of sectors (e.g., groceries, souvenirs). Visitor spending was estimated for both GSENM and KEPA based on location-specific data. Table 15 shows the economic activity associated with recreation in GSENM and Table 16 shows the impacts associated with recreation in KEPA. As indicated in Table 15 and Table 16, recreation-related employment, income, and economic activity would be greatest under alternatives B and C and least under alternatives D and A. It is important to note that continued trending increases in recreation use and visitation in the Planning Area are more likely to affect economic conditions than variations in recreation management in the alternatives.

Table 15. Annual Economic Impact of GSENM Recreation Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	410	\$7.58	\$9.63	\$19.80
	Indirect Effect	43	\$0.86	\$1.98	\$4.77

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
	Induced Effect	31	\$0.73	\$1.86	\$3.54
	Total Effect	484	\$9.16	\$13.48	\$28.11
B	Direct Effect	422	\$7.80	\$9.92	\$20.39
	Indirect Effect	44	\$0.88	\$2.04	\$4.92
	Induced Effect	32	\$0.75	\$1.92	\$3.64
	Total Effect	499	\$9.44	\$13.88	\$28.95
C	Direct Effect	418	\$7.73	\$9.82	\$20.20
	Indirect Effect	44	\$0.88	\$2.02	\$4.87
	Induced Effect	32	\$0.74	\$1.90	\$3.61
	Total Effect	494	\$9.35	\$13.75	\$28.67
D	Direct Effect	410	\$7.58	\$9.63	\$19.80
	Indirect Effect	43	\$0.86	\$1.98	\$4.77
	Induced Effect	31	\$0.73	\$1.86	\$3.54
	Total Effect	484	\$9.16	\$13.48	\$28.11

Note: Numbers may not sum due to rounding.

Table 16. Annual Economic Impact of KEPA Recreation Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	289	\$5.34	\$6.79	\$13.96
	Indirect Effect	30	\$0.61	\$1.40	\$3.36
	Induced Effect	22	\$0.51	\$1.31	\$2.49
	Total Effect	341	\$6.46	\$9.50	\$19.82
B	Direct Effect	298	\$5.50	\$6.99	\$14.38
	Indirect Effect	31	\$0.62	\$1.44	\$3.47
	Induced Effect	23	\$0.53	\$1.35	\$2.57
	Total Effect	351	\$6.65	\$9.79	\$20.42
C	Direct Effect	295	\$5.45	\$6.93	\$14.24
	Indirect Effect	31	\$0.62	\$1.43	\$3.43
	Induced Effect	23	\$0.52	\$1.34	\$2.54
	Total Effect	348	\$6.59	\$9.69	\$20.22
D	Direct Effect	289	\$5.34	\$6.79	\$13.96
	Indirect Effect	30	\$0.61	\$1.40	\$3.36
	Induced Effect	22	\$0.51	\$1.31	\$2.49
	Total Effect	341	\$6.46	\$9.50	\$19.82

Note: Numbers may not sum due to rounding.

Livestock Grazing

The quantitative analysis of livestock grazing impacts considered the economic activity generated per AUM, as well as the economic impact associated with the fees collected by the BLM, as described in *Methodology* of this report. Table 17 shows the estimated economic impact of livestock grazing activity and management within GSENM for each alternative and Table 18 presents estimated economic impacts for livestock grazing and activity in KEPA. As indicated in Table 17 and Table 18, livestock grazing-related employment, income, and economic activity would be greatest under Alternative D, followed by Alternative A, then Alternative C, with Alternative B having the least economic impact, primarily resulting from the reduced level of AUMs in Alternative B compared to the other alternatives. It is important to note that livestock grazing permittees may experience other market- and nonmarket-based impacts associated with livestock grazing management as described in Section 3.12, *Livestock Grazing*, of the GSENM and KEPA RMPs/EIS.

Table 17. Annual Economic Impact of GSENM Livestock Grazing Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	50	\$0.28	\$0.38	\$2.03
	Indirect Effect	12	\$0.17	\$0.25	\$0.85
	Induced Effect	2	\$0.04	\$0.10	\$0.20
	Total Effect	63	\$0.50	\$0.74	\$3.07
B	Direct Effect	30	\$0.17	\$0.23	\$1.21
	Indirect Effect	7	\$0.10	\$0.15	\$0.50
	Induced Effect	1	\$0.02	\$0.06	\$0.12
	Total Effect	38	\$0.30	\$0.44	\$1.83
C	Direct Effect	36	\$0.20	\$0.28	\$1.46
	Indirect Effect	8	\$0.13	\$0.18	\$0.61
	Induced Effect	1	\$0.03	\$0.07	\$0.14
	Total Effect	46	\$0.36	\$0.53	\$2.22
D	Direct Effect	51	\$0.29	\$0.39	\$2.07
	Indirect Effect	12	\$0.18	\$0.26	\$0.86
	Induced Effect	2	\$0.04	\$0.10	\$0.20
	Total Effect	64	\$0.51	\$0.75	\$3.13

Note: Numbers may not sum due to rounding.

Table 18. Annual Economic Impact of KEPA Livestock Grazing Activities and Management, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	43	\$0.24	\$0.33	\$1.73
	Indirect Effect	10	\$0.15	\$0.21	\$0.72

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
	Induced Effect	2	\$0.03	\$0.09	\$0.17
	Total Effect	54	\$0.42	\$0.63	\$2.62
B	Direct Effect	25	\$0.14	\$0.19	\$1.03
	Indirect Effect	6	\$0.09	\$0.13	\$0.43
	Induced Effect	1	\$0.02	\$0.05	\$0.10
	Total Effect	32	\$0.25	\$0.37	\$1.56
C	Direct Effect	31	\$0.17	\$0.23	\$1.25
	Indirect Effect	7	\$0.11	\$0.15	\$0.52
	Induced Effect	1	\$0.02	\$0.06	\$0.12
	Total Effect	39	\$0.31	\$0.45	\$1.89
D	Direct Effect	43	\$0.25	\$0.33	\$1.76
	Indirect Effect	10	\$0.15	\$0.22	\$0.73
	Induced Effect	2	\$0.03	\$0.09	\$0.17
	Total Effect	55	\$0.43	\$0.64	\$2.66

Note: Numbers may not sum due to rounding.

Oil and Gas

The quantitative analysis of oil and gas activity considered the sales value, royalties, bonus, rents, or other revenue from oil and gas leases within KEPA, as described in *Methodology* of this report. As noted above, any new oil and gas development would be limited to the KEPA portion of the Planning Area (i.e., no new oil and gas development in GSENM). Table 19 shows the economic activity associated with oil and gas production in KEPA. As indicated in Table 19, economic activity associated with oil and gas activities would be greatest under Alternative D, followed by Alternative C, then Alternative B, with Alternative A having the least effect.

Table 19. Annual Economic Impact of KEPA Oil and Gas Activities and Management, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	5	\$0.09	\$0.27	\$0.72
	Indirect Effect	1	\$0.02	\$0.03	\$0.09
	Induced Effect	<0.5	\$0.01	\$0.02	\$0.04
	Total Effect	7	\$0.11	\$0.32	\$0.86
B	Direct Effect	8	\$0.13	\$0.40	\$1.08
	Indirect Effect	2	\$0.02	\$0.05	\$0.14
	Induced Effect	1	\$0.01	\$0.03	\$0.06
	Total Effect	10	\$0.17	\$0.48	\$1.28
C	Direct Effect	12	\$0.19	\$0.60	\$1.62
	Indirect Effect	3	\$0.03	\$0.07	\$0.21

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
	Induced Effect	1	\$0.02	\$0.05	\$0.10
	Total Effect	16	\$0.25	\$0.72	\$1.93
D	Direct Effect	19	\$0.30	\$0.94	\$2.51
	Indirect Effect	4	\$0.05	\$0.11	\$0.33
	Induced Effect	1	\$0.03	\$0.08	\$0.15
	Total Effect	24	\$0.39	\$1.13	\$3.00

Note: Numbers may not sum due to rounding.

Coal

The quantitative analysis of coal mining activity considered the revenue and royalties associated with a potential coal mine constructed within the Planning Area, as described in *Methodology* of this report. New coal development would be limited to the KEPA portion of the Planning Area (i.e., no new coal development in GSENM). As indicated in Table 20, economic activity associated with coal development activities in KEPA would be greatest under Alternative D, as there is no coal development assumed under alternatives A, B, and C.

Table 20. Annual Economic Impact of KEPA Coal Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	0	\$0	\$0	\$0
	Indirect Effect	0	\$0	\$0	\$0
	Induced Effect	0	\$0	\$0	\$0
	Total Effect	0	\$0	\$0	\$0
B	Direct Effect	0	\$0	\$0	\$0
	Indirect Effect	0	\$0	\$0	\$0
	Induced Effect	0	\$0	\$0	\$0
	Total Effect	0	\$0	\$0	\$0
C	Direct Effect	0	\$0	\$0	\$0
	Indirect Effect	0	\$0	\$0	\$0
	Induced Effect	0	\$0	\$0	\$0
	Total Effect	0	\$0	\$0	\$0
D	Direct Effect	64	\$0.99	\$4.65	\$10.77
	Indirect Effect	11	\$0.21	\$0.42	\$1.24
	Induced Effect	5	\$0.10	\$0.26	\$0.50
	Total Effect	79	\$1.30	\$5.34	\$12.51

Note: Numbers may not sum due to rounding.

Locatable and Salable Minerals

The quantitative analysis of other mineral extraction activity considered the revenue generated by sales of minerals extracted as well as the maintenance fee paid to the BLM for locatable mineral leases, as described in *Methodology* of this report. Similar to other minerals, locatable and salable mineral development would be limited to the KEPA portion of the Planning Area (i.e., no new development in GSENM). Table 21 shows the economic activity associated with locatable and salable mineral development in KEPA. As indicated in Table 21, economic activity associated with locatable and salable mineral development activities in KEPA would be greatest under Alternative D, followed by Alternative C, with alternatives B and A having the least effect.

Table 21. Annual Economic Impact of KEPA Locatable and Salable Mineral Development Activities and Development in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	1	<\$0.01	<\$0.01	\$0.10
	Indirect Effect	<0.5	\$0.01	\$0.01	\$0.03
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	\$0.01	\$0.14
B	Direct Effect	1	<\$0.01	<\$0.01	\$0.10
	Indirect Effect	<0.5	\$0.01	\$0.01	\$0.03
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	\$0.01	\$0.14
C	Direct Effect	2	<\$0.01	<\$0.01	\$0.21
	Indirect Effect	1	\$0.01	\$0.02	\$0.07
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	2	<\$0.01	\$0.03	\$0.27
D	Direct Effect	3	<\$0.01	\$0.01	\$0.31
	Indirect Effect	1	\$0.02	\$0.03	\$0.10
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	4	<\$0.01	\$0.04	\$0.41

Notes: Numbers may not sum due to rounding.

Forestry

The economic analysis of forestry-related activity considered the permit fees received by the BLM for both Christmas tree and wood permits, as well as the amount spent on stewardship contracts, as described in *Methodology* of this report. The economic impact of forestry-related activities in GSENM is presented in Table 22 and the economic impact of forestry-related activities in KEPA is presented in Table 23. As indicated in Table 22 and Table 23, the overall economic activity associated with forestry activities and management would be minimal in the context of the analysis area economy and would generally be similar across the alternatives.

Table 22. Annual Economic Impact of GSENM Forestry Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
B	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
C	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
D	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01

Note: Numbers may not sum due to rounding.

Table 23. Annual Economic Impact of KEPA Forestry Activities and Management in the Analysis Area, by Alternative (in 2017 dollars)

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
A	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
B	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
C	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01
D	Direct Effect	1	<\$0.01	<\$0.01	\$0.01
	Indirect Effect	0	<\$0.01	<\$0.01	<\$0.01

Alternative	Type of Effect	Employment	Labor Income (\$ millions)	Gross State Product (\$ millions)	Industry Activity (\$ millions)
	Induced Effect	0	<\$0.01	<\$0.01	<\$0.01
	Total Effect	1	<\$0.01	<\$0.01	\$0.01

Note: Numbers may not sum due to rounding.

Nonmarket Values

Market values of BLM-administered surface lands and mineral estate are relatively straightforward to understand and assess. Commodities produced through use of BLM-administered surface lands (such as hard rock minerals, livestock, timber, and electricity from renewable energy projects) have a price in the marketplace that can be easily determined. Economic methods are readily available for measuring the flow of income and employment resulting from the production of commodities. Using economic impact models, economists can then estimate the business-related purchases that renewable energy developers and operators will make from other firms, and to estimate how employees will spend their wages on household-related purchases from businesses throughout the local economy. These economic market values and the associated impacts resulting from the GSENM and KEPA management alternatives are discussed above.

The term *nonmarket values* refers to the benefits individuals attribute to experiences of the environment or uses of natural and cultural resources that do not involve market transactions and therefore lack prices. Examples include the benefits received from wildlife viewing, hiking in a wilderness, or hunting for recreation. An understanding of nonmarket values in the analysis area helps to put economic values and impacts into a broader socioeconomic context. Estimates of nonmarket values supplement estimates of income generated from commodity uses to provide a more complete picture of the economic implications of proposed resource management decisions.

Although there are difficulties associated with measuring nonmarket values, it is well accepted that open space and natural and cultural resources can have monetary values. For example, it is common for real estate investors to pay more for view lots or property adjacent to open space, or for people to make financial donations to help protect old-growth forests, endangered species, or other resources. Even when it is not possible to estimate nonmarket values, it is still helpful to discuss these values qualitatively or to provide examples of these values in analogous situations.

In examining nonmarket values, economists distinguish between “use values” and “non-use values.” *Use value* refers to the benefits an individual derives from some direct experience or activity, such as climbing a spectacular peak, hunting, or wildlife viewing. In contrast, *non-use value* refers to the utility or psychological benefit some people derive from the existence of some environmental condition that may never be directly experienced: an unspoiled Grand Canyon or the continued presence of an endangered species. The following subsections further describe use and non-use values and other values that are generally addressed within a nonmarket value framework.

While nonmarket values are discussed here, this section is not inclusive of all nonmarket values associated with BLM-administered surface land. For instance, the sections of the EIS

that are focused on resources (e.g., water, wildlife, vegetation, wetlands, cultural resources, visual resources) will reveal important nonmarket values of those resources, even though those sections do not use the language of nonmarket values used by economists generally, and used specifically in the material below. The BLM considers nonmarket values in their many forms, as well as market values, throughout the National Environmental Policy Act process.

Nonmarket Use Values

Economists measure nonmarket use values by estimating the “consumer surplus” associated with these activities, which is defined as the maximum dollar amount, above any actual payments made, that a consumer would be willing to pay to enjoy a good or service. For instance, hikers pay a market price for gasoline used to reach a trail, but typically pay nothing to use the trail. Any amount that a recreationist would be willing to pay to use this otherwise free resource represents the nonmarket consumer surplus value of that resource to that consumer. There are many techniques for measuring this nonmarket use value. One common way is to collect data on variations in what recreationists do pay (e.g., gasoline, hotels, restaurants, entry fees, guides or outfitters); economists then use quantitative techniques to impute the additional willingness to pay that constitutes consumer surplus.

Nonmarket use values have been studied for valuing a wide variety of recreation “goods.” To help the reader understand the potential nonmarket value of some of the study area’s natural and cultural resources, Table 24 summarizes average nonmarket use values for recreation activities for USFS Region 4, which includes the GSENM and KEPA areas and encompasses all of Utah and Nevada, and parts of Idaho and Wyoming, according to the Recreation Use Values Database maintained by the Oregon State University College of Forestry (Rosenberger et al. 2017).

Table 24. Average Recreational Use Values, per Person per Day (in 2017 dollars)

Activity	Use Value
Backpacking	\$43.71
Biking	\$98.43
Cross-County Skiing	\$67.57
Developed Camping	\$46.22
Downhill Skiing	\$93.82
Driving for Pleasure	\$76.23
Fishing	\$82.89
Gathering Forest Products	\$76.23
Hiking/Walking	\$96.10
Horseback Riding	\$76.23
Hunting	\$88.91
Motorized Trail Activities	\$61.38
Motorized Boating Activities	\$69.47
Nature Center Activities	\$76.23
Nature Study	\$76.23
No Activity Reported	\$76.23
Non-motorized Boating Activities	\$121.09

Activity	Use Value
Off Highway Vehicle Use	\$61.38
Other Motorized Activities	\$61.38
Other Non-motorized Activities	\$76.23
Picnicking	\$60.08
Primitive Camping	\$43.71
Relaxing	\$76.23
Resort Use	\$76.23
Snowmobiling	\$61.38
Other Activities	\$76.23
Viewing Natural Features	\$71.26
Viewing Wildlife	\$71.26
Visiting Historic Sites	\$71.26

Source: Rosenberger et al. 2017

By applying values in Table 24 to recreational usage figures, or by applying values from specific individual studies that are most comparable to the study area, an estimate of the recreation-related nonmarket use value (the consumer surplus) can be derived for the analysis area. The resulting figure would represent the total nonmarket use value that recreationists derive from these activities, or alternatively, it could be seen as the total additional amount recreationists would likely be willing to pay for the related recreation activities if a fee for participation were required. Those who are accustomed to free access and use of public land tend to forget that it represents a recreation opportunity and experience for which many would be willing to pay.⁴ This type of calculation must be done very carefully, with great attention to the reliability of the recreational usage numbers and the validity of the consumer surplus values derived from the literature. The results must also be carefully interpreted, because consumer surplus estimates are not directly comparable to estimates of income derived from commodity uses (BLM 2013).

Non-use Values

Economists differentiate multiple types of non-use values, including option values and existence values. Option value represents the benefits from having natural or cultural resources available for future use, while existence value reflects the benefits derived from knowing these resources simply exist. Local, State, and national taxpayers support a large variety of conservation and protection programs (e.g., National Parks, State parks, local parks and parkways, open space initiatives) through their tax dollars—programs that are very popular but support many resources that taxpayers may never visit. A number of nonprofit organizations are devoted to a wide variety of conservation and wildlife-related causes; many of the donors to these groups derive little direct benefit from their contributions. The BLM acknowledges that non-use values are real, and can be substantial (BLM 2013).

Special Designations and Enhancement Values

Special designations, whether legislative designations, such as National Parks, wilderness areas, and national conservation areas, or administrative designations, such as Areas of Critical

⁴ This observation is not meant to suggest that such fees should be charged. There are many philosophical and practical issues associated with charging fees for recreational use of public land.

Environmental Concern, usually result in additional protections to the ecological and open space values of the areas that are designated. A common concern with special designations is that protections that may be put in place may affect traditional, commodity-based uses of public lands; for example, mining, fluid mineral development, and grazing. Restrictions on these activities may reduce economic activity for individual resource users and for local or regional communities. They may also have social impacts—for instance on local customs and lifestyles surrounding mining and ranching.

It is important to recognize the potential economic and social impacts from special designations. It is also important to recognize that special designations may have beneficial economic and social effects. These effects are typically less obvious, and therefore merit additional discussion.

Research on communities surrounding national monuments (Headwaters Economics 2017b) provides additional evidence that special designations are not incompatible with economic growth and, in some cases, help such growth. This research examined the 17 national monuments in the 11 western continental States that are larger than 10,000 acres and were established between 1982 and 2001. The research found that protected lands help create jobs and economic growth approximately two times faster than similar counties with the lowest share of protected Federal lands. The research also indicates that protected lands increase per capita income compared to similar counties without protected public land.

Another economic benefit of natural amenities is the enhancement effect of open space, including protected lands, on property values. The studies noted above, among others, have demonstrated that homes and properties close to open space are more valuable relative to properties farther away, holding all else constant. This relationship varies based on the various characteristics (e.g., type, size, location) of open space resources, including the quality of views provided by the open space near a property. Open space can indirectly affect property tax revenues realized by local jurisdictions through the effect open spaces have on property value assessments.

Tribal Uses

Tribal coordination and consultation through the years demonstrates that a wide range of tribal interests are often associated with public land. These include concerns about potential impacts on resources associated with practices such as gathering medicinal plants or native foods, and other natural products; access to traditional hunting and ceremonial areas; the availability of water and healthy plant and animal populations; and potential impacts on and threats to Native American archaeological sites, sacred sites, and traditional cultural properties. Tribal uses of BLM-administered surface land are not amenable to market valuation but can be considered a type of nonmarket value.

Ecosystem Service Values

Nonmarket values⁵ of open space and well-managed natural resources also include a broad range of human benefits resulting from healthy ecosystem conditions and functions. The

⁵ Note that confusion can arise regarding the difference between ecosystem service values and nonmarket values. A BLM instruction memorandum explains that “Ecosystem goods and services include a range of human benefits resulting from appropriate ecosystem structure and function, such as flood control from intact wetlands and carbon sequestration from healthy forests. Some involve commodities

benefits that humans derive from ecosystems are known as ecosystem services (Ruhl et al. 2007; De Groot et al. 2010), and these ecosystem services are commonly grouped into four broad categories based on how human beings interact with and derive value from them:

- *Provisioning services* provide products that are used directly by people (e.g., food, water, and raw materials).
- *Regulating services* are outputs from the normal functioning of ecosystems that benefit people in direct ways (e.g., regulation of climate, air and drinking water quality, soil formation and retention, moderation of extreme events, and biological control).
- *Supporting services* are processes that are necessary for the production of other ecosystem services (e.g., habitat for plants and animals, conservation of genetic diversity, and cycling of nutrients).
- *Cultural services* provide benefits to people through meaningful interactions with nature (e.g., aesthetic enjoyment, recreation, spiritual enrichment, and cognitive development).

The benefits that humans receive from ecosystem services can be categorized as use values and non-use values, as described above. Economists have developed a variety of methods and approaches for estimating the monetary values associated with ecosystem services. The ecosystem services framework encompasses the amenity, recreational, and other values discussed above. For purposes of this discussion, the emphasis is on the additional functional benefits ecosystems provide.

Table 25 presents an initial listing of ecosystem services present in GSENM and KEPA. These services, with examples in parentheses, are further defined by the value (use versus non-use), and a qualitative description of their importance (magnitudes of ecosystem service value and estimated vulnerability resulting from changing management of the resource).

Table 25. Ecosystem Services with Nonmarket Values in Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area

Resources and Uses	Value		Importance in Projects	
	Use	Non-Use	Magnitude of Value	Vulnerability
Provisioning Services				
Mining (Prospecting)	+		Low	Low
Fishing	+		Low	Low
Logging	+		Low	Low
Food (Grazing)	+		Moderate	Low
Regulating Services				
Air Regulation (Clean Air)	+		Low	Low
Climate Regulation (Carbon Storage and Sequestration)	+		High	Low
Waste Treatment (Nitrogen and Phosphorous Absorption)		+	Low	Low
Biological Control (Pest Control)		+	Low	Low
Water Quality (Clean Water)	+		Low	Low

sold in markets, for example, timber production. Others, such as wetlands protection and carbon sequestration, do not commonly involve markets, and thus reflect nonmarket values” (BLM 2013:2).

Resources and Uses	Value		Importance in Projects	
	Use	Non-Use	Magnitude of Value	Vulnerability
Erosion Prevention (Sediment Runoff)	+		Low	Low
Supporting Services				
Soil Formation		+	Low	Low
Photosynthesis		+	Low	Low
Biodiversity (Flora and Fauna)		+	High	Low
Habitat (Wilderness Characteristics)		+	Moderate	Low
Cultural Services				
Stewardship (Preserving History)		+	Low	Low
Aesthetic (Viewscapes)		+	Moderate	Low
Recreation	+		High	Low
Education	+		Low	Low

Following an accounting of ecosystem services present in a study site, the next step is to value these services employing one of three approaches:

1. **Conduct primary studies.** This option involves conducting original studies to estimate the value of nonmarket ecosystem services. Some nonmarket ecosystem service values can be estimated through revealed preference studies, which use observed or secondary data to infer the value of nonmarket ecosystem services. Economists also use stated preference methods to estimate nonmarket ecosystem service values, which involves asking people, in a survey setting, to ascribe a value to changes in the level of provision ecosystem services. Primary studies are viewed as the preferred method for ascribing value to ecosystem services, but they are costly in terms of both time and resources to conduct. It is thus not always possible to conduct primary studies for the purpose of estimating nonmarket values of ecosystem services.
2. **Benefit transfer approaches.** Benefit transfer methods involve taking the values of ecosystem services estimated in one context and customizing and adapting them to apply to ecosystem services in another context. The simplest approach to benefit transfer involves simply taking the original value and applying it in a new context. A preferred and more detailed approach involves utilizing the function that was used to estimate benefits and adapting that function to fit the new study conditions. This approach, called benefit function transfer, is preferred over the simpler benefit value transfer approach because it allows for more customization of the benefit values to match the new study context.
3. **Qualitative approaches.** In some cases it is not possible to estimate the value of nonmarket ecosystem services due to a lack of data or other analytical challenges. In these cases, it is often necessary to adopt a qualitative approach to evaluating the nonmarket values associated with ecosystem services.

Due to the time and resource constraints associated with conducting primary studies, ecosystem services are commonly valued by using benefit transfer methods to determine a per-

acre monetary value. For the purposes of this brief survey of ecosystem services in the Planning Area, an accounting of the monetary value of ecosystem services was not feasible. Rather, this assessment focuses on providing context for some of the ecosystem services that are most relevant, and presents a range of potential values. Benefit transfer methods will be used to determine monetary values of ecosystem services in the analysis of the alternatives in the GSENM and KEPA RMPs/EIS.

Provisioning Services

Provisioning services represent the products provided by ecosystem services that are most directly used by people. In the case of GSENM and KEPA, this includes traditional uses of the area, such as grazing, mining (prospecting), and fishing. Livestock grazing is a permitted use in GSENM and KEPA, and it will remain a permitted use in the future. Livestock grazing in GSENM and KEPA can be viewed as a small-scale commercial operation, and can be valued based on the market price and number of livestock. Other uses of GSENM are predominantly recreational rather than commercial operations.

Regulating Services

Regulating services represent the output from the normal function of ecosystems that people benefit from either directly or through indirect means. These functions include: air, water, and climate regulation; waste treatment; biological control; and water quality. The most important regulating services to GSENM and KEPA are climate regulation, air quality, and water quality. Climate regulating services include both the sequestration and storage of carbon dioxide from the atmosphere by vegetation. Similarly, air quality regulation represents the value of clean air resulting from the filtering of particulate matter, sulfur dioxide, nitrogen oxide, and other air pollution by trees and other vegetation. Regulating services include the value of clean water that results from waste treatment and water filtration. Such ecosystem services have important direct and indirect impacts on the recreation industry in the analysis area.

Supporting Services

Supporting ecosystem services represent those processes that are necessary for the production of other ecosystem services. Supporting services provide inputs to other categories of ecosystem services, including providing refuge and reproductive habitat to wild plants and animals, formation of soil, nutrient cycling, and primary productivity. Due to the importance of the Planning Area as a recreational resource, ecosystem services that support plant and animal habitats are of particular relevance. Healthy habitats and biodiversity help maintain rangeland health and grazing opportunities in the Planning Area.

The value ascribed to biodiversity and habitat can vary widely based on study location and topic. Valuation models, such as InVEST,⁶ value habitat quality based on forecasted threats such as development and land cover conversion and decay rates. Additionally, supporting ecosystem services are often not valued directly by economists because these services are viewed as intermediate services that support ecosystem services in other categories to which economists do ascribe a value. Valuing both the intermediate service and the end service that this intermediate service supports would result in double counting. For example, the value of supporting services associated with habitat are generally valued through the end uses of

⁶ Additional information about the InVEST model is available online at: <http://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/>.

habitat, such as the provision of timber, food, and fuel, or the provision of recreational amenities through wildlife viewing or consumptive uses such as hunting.

Cultural Services

Cultural services provide meaningful interactions between human beings and nature, including aesthetic enjoyment, cultural and artistic inspiration, science and education, and spiritual and historical purposes. Recreation is one of the largest draws of GSENM and KEPA, and travel and tourism made up 44 percent of total private wage and salary employment in 2015 (Headwaters Economics 2017a).

Cultural service values for recreation activities occurring in GSENM and KEPA were estimated using nonmarket recreation use values (Table 24) and visitation data from the BLM's RMIS⁷ in Table 26. Estimates of consumer surplus associated with each activity within GSENM over 1 year are presented in Table 26. The amount of participation is presented in visitor days, the standard unit of measurement for BLM activities, defined as aggregated 12-hour periods of time. The number of visitor days by activity represent a 3-year average. Using this methodology, the value of cultural ecosystem services provided by GSENM and KEPA is estimated at \$45 million annually. This estimate can be viewed as a lower bound of the value of ecosystem services provided by GSENM and KEPA, as it considers only a subset of services (recreation) within one single category of ecosystem services.

Table 26. Annual Consumer Surplus Value of Recreation in Grand Staircase-Escalante National Monument (2017\$)

Activity	Visitor Days^(1,2)	Average Consumer Surplus⁽³⁾	Total Value of Recreation
Camping	11,342	\$82.81	\$939,231
Backpacking	151,216	\$43.71	\$6,609,964
Biking	6,077	\$98.43	\$598,167
Developed Camping	107,156	\$46.22	\$4,953,184
Driving for Pleasure	127,798	\$76.23	\$9,742,450
Fishing	695	\$82.89	\$57,637
Gathering Forest Products	164	\$76.23	\$12,528
Hiking/Walking	114,342	\$96.10	\$10,988,669
Horseback Riding	14,170	\$76.23	\$1,080,224
Hunting	10,853	\$88.91	\$964,993
Nature Activities	11,680	\$76.23	\$890,378
Nature Activities - Environmental Edu.	7,619	\$76.23	\$580,821
Off-Highway Vehicle Use	23,842	\$61.38	\$1,463,341
Picnicking	7,893	\$60.08	\$474,230
Other Activities - Climbing	617	\$76.23	\$47,036
Other Activities - Photography	26,582	\$76.23	\$2,026,405

⁷ RMIS enables BLM employees to estimate recreation participation on BLM-administered surface lands in 65 types of recreational activities.

Activity	Visitor Days ^(1,2)	Average Consumer Surplus ⁽³⁾	Total Value of Recreation
Other Activities - Target Practice	277	\$76.23	\$21,117
Other Activities - Trapping	434	\$76.23	\$33,085
Other Activities - Misc.	7,335	\$76.23	\$559,170
Viewing Natural Features/Wildlife	54,234	\$71.26	\$3,864,770
Sum			\$44,968,169

¹ Visitor days are the standard unit of BLM recreation and represent aggregated 12-hour periods of time.

² Visitor days are an annual average of 2015–2017 RMIS data in GSENM.

³ Consumer surplus values from the Recreation Use Values Database maintained by the Oregon State University College of Forestry (Rosenberger et al. 2017).

BLM – Bureau of Land Management, RMIS – Recreation Management Information System, GSENM – Grand Staircase-Escalante National Monument

Social Values

Social values, such as the role of BLM-administered surface land in local customs and lifestyles, are a type of nonmarket value. Members of various tribes in Utah and Arizona continue to have a stake in how GSENM and KEPA and their archaeological resources are managed. GSENM conducts formal consultation annually with the Hopi, Zuni, Navajo, and Ute Tribes, as well as with the Kaibab Band of Paiute Indians and Paiute Indian Tribes of Utah.

Cowboy culture is still a central part of life within the GSENM area. It is important to many long-time residents of the region to preserve and celebrate the traditional cowboy lifestyle and the skills, knowledge, and cultural arts that are connected with it.

Traditional local recreation has continued as increasing numbers of visitors from outside the region have made the GSENM area a popular stopping point on tours of the western U.S. Hikers, backpackers, photographers, car campers, drivers out to enjoy the scenery, canyoneers, climbers, people interested in wildlife viewing, off-highway vehicle riders, picnickers, horseback riders, hunters, mountain and road bicyclists, ecotourists, artists, writers, participants in spiritual retreats, bus tour groups, and other tourists and recreationists are affected by BLM decisions. In turn, these users' spending and visitation patterns affect the local communities that host them and serve their needs for lodging, meals, supplies, and public safety services.

The scientific community has a strong interest in how the monument is managed, especially as that relates to areas where changes in management could either enhance or detract from prospective and/or ongoing research programs or could alter the investigated environment.

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Abbreviations-Acronyms

Term	Definition
AUM	Animal unit month
BLM	Bureau of Land Management
EIS	Environmental Impact Statement
GSENM	Grand Staircase-Escalante National Monument
IMPLAN	Impact analysis for planning
KEPA	Kanab-Escalante Planning Area
NVUM	National Visitor Use Monitoring
RMIS	Recreation Management Information System
RMP	Resource Management Plan
USFS	U.S. Department of Agriculture, Forest Service

***Grand Staircase-Escalante National Monument and
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Appendix V

Wild and Scenic Rivers

August 2018

Appendix V: Wild and Scenic Rivers

Introduction

This appendix provides an overview of the Wild and Scenic River (WSR) suitability recommendations determined in the 2000 Grand Staircase-Escalante National Monument (GSENM) Management Plan, under section 5(d)(1) of the WSR Act. WSR designations can be made only by Congress, or the Secretary of the Interior upon application of a State Governor. Representatives from GSENM, Bryce Canyon National Park, Glen Canyon National Recreation Area, and Dixie National Forest worked together, along with Cooperating Agencies, to determine river corridor suitability. With the exception of the Upper Paria-1 and Lower Sheep Creek determinations, which vary by alternative in these Resource Management Plans/Environmental Impact Statement, the original suitability determinations are carried forward.

Table 1 and Table 2 identify the length, tentative classification, and outstandingly remarkable values for suitable river corridors in the Escalante River system and Paria River system, respectively. Additional information on suitability determinations is contained in Appendix 4 of the 2000 Monument Management Plan.

Table 1. Suitable segments of the Escalante River System

Segment	Segment Description	Length (nearest 0.1 mile)	Tentative Classification	Outstandingly Remarkable Values
Calf Creek-1	Headwaters (T34S, R4E, S10) to Lower Calf Creek Falls (T34S, R4E, S24)	3.5	Wild	high scenic quality, Calf Creek Recreation Area, bird habitat, prehistoric site, and riparian area
Calf Creek-2	Lower Falls to Calf Creek Recreation Site (T35S, R4E, S1)	3.0	Scenic	
Calf Creek-3	Recreation Site to Escalante River (T35S, R4E, S12)	1.5	Recreational	
Coyote Gulch #2	Confluence of Big Hollow Wash with Coyote Gulch (T39S, R7E, Sec 10), downstream to confluence with Escalante River	0.7	Wild	scenic, recreational, geological, wildlife
Death Hollow Creek	BLM/private boundary (T34S, R3E, S3) to Mamie Creek (T34S, R3E, S36)	9.9	Wild	high scenic quality, part of an ONA, southwestern willow flycatcher habitat, prehistoric sites, dinosaur tracks, and riparian area
Escalante River-1	Confluence with Pine Creek (T35S, R3E, S9) to Highway 12 (T35S, R4E, S12)	13.8	Wild	high scenic quality, high recreational use, numerous geologic features, important fish and wildlife habitat, prehistoric sites, historic homestead and routes, riparian area, fossil tracks, petrified wood
Escalante River-2	Highway 12 to east side of private land (T35S, R4E, S13)	1.1	Recreational	
Escalante River-3	Private land to boundary (T36S, R6E, S4)	19.2	Wild	
Harris Wash	T36S, R5E, S36 to GCNRA	1.1	Wild	high quality scenery, recreational attraction, southwestern willow flycatcher habitat, historic route, prehistoric sites, scientific study opportunities
Lower Boulder Creek	Downstream side of T34S, R4E, S11 to Escalante River (T35S, R5E, S22)	13.5	Wild	high quality scenery, high recreational use, part of the Escalante Canyons ONA and prehistoric sites

Appendix V: Wild and Scenic Rivers

Segment	Segment Description	Length (nearest 0.1 mile)	Tentative Classification	Outstandingly Remarkable Values
Lower Deer Creek-1	Slickrock Canyon (T33S, R5E, S 33) to Burr Trail Road (T34S, R5E, S16)	3.7	Recreational	high quality scenery, Deer Creek Recreation Area, Escalante Canyons ONA, southwestern willow flycatchers, prehistoric sites, threatened plant, and riparian area
Lower Deer Creek-2	Burr Trail Road to Lower Boulder Creek (T35S, R5E, S9)	7.0	Wild	
Lower Sand Creek and tributary Willow Patch Creek	Sweetwater Creek (T34S, R4E, S8) to Escalante River (T35S, R4E, S10)	13.2	Wild	high scenic quality, part of an ONA, fish habitat, southwestern willow flycatcher habitat, historic trail, and riparian area
Mamie Creek and west tributary	BLM/private boundary (T34S, R3E, S16) to Escalante River (T35S, R4E, S7)	9.2	Wild	high scenic quality, part of an ONA, high recreational use, natural bridge, fish and wildlife habitat, prehistoric and historic sites including an historic mail trail, and riparian area
Scorpion Gulch	Headwaters in T38S, R7E, Sec 14 to GCNRA boundary	0.8	Scorpion Gulch	scenic
Slickrock Canyon	USFS/BLM boundary (T33S, R5E, S22) to Deer Creek (T33S, R5E, S33)	2.8	Wild	high quality scenery, recreational values, prehistoric sites, and riparian areas
Steep Creek	USFS/BLM boundary (T33S, R5E, S24) to The Gulch (T34S, R5E, S12)	6.4	Wild	high quality scenery, recreational values, and riparian areas
The Gulch-1	USFS/BLM boundary (T32S, R6E, S32) to Burr Trail Road (T34S, R5E, S13)	11.0	Wild	high quality scenery, outstanding recreation, natural arch, peregrine falcon habitat, riparian area and petrified wood
The Gulch-2	Along Burr Trail Road to T34S, R5E, S13	0.6	Recreational	
The Gulch-3	Below Burr Trail Road to Escalante River (T35S, R5E, S36)	13.0	Wild	
Twentyfive Mile Wash #2	T37S, R6E, S2 to GCNRA boundary (T37S, R6E, S25), does not include unnamed tributary on north side	6.8	Wild	high scenic quality, high recreation use, bird habitat, rock art, prehistoric structures, and riparian

BLM – Bureau of Land Management, ONA – Outstanding Natural Area, GCNRA – Glen Canyon National Recreation Area, USFS – U.S. Forest Service

Table 2. Suitable segments of the Paria River System

Segment	Segment Description	Length (nearest 0.1 mile)	Tentative Classification	Characteristics that Make the Area a Worthy Addition to NWSRS
Deer Creek Canyon	Headwaters (T40S, R3W, S1) to Paria River (T40S, R2W, S4)	5.2	Wild	high quality scenery and recreation values
Hackberry Creek	Top (T38S, R1W, S29) to Cottonwood Creek	20.1	Wild	recreational and scenic values, spotted owls, and riparian area
Hogeye Creek	Entire (T40S, R2W, S 1 to T40S, R2W, S26)	6.3	Wild	high quality scenery and recreation values
Kitchen Canyon	T40S, R2W, S28 to Starlight Canyon (T40S, R2W, S34)	1.3	Wild	high quality scenery
Lower Cottonwood Creek ⁽²⁾	Confluence with Hackberry Creek to Paria River	2.9	Recreational	recreational values and ecological continuity
Lower Paria River - 1	Downstream side of private property (T43S, R1W, S10) to Wilderness boundary (T43S, R1W, S23)	3.3	Recreational	high quality scenery, high recreation use, narrow canyon, peregrine falcon, and historic travelway
Lower Sheep Creek	Bull Valley Gorge (T39S, R2W, S7) to Paria River (T39S, R2W, S17)	1.5	Wild ⁽¹⁾	high quality scenery, recreational values, spotted owl sighting
Upper Paria River - 1	Little Dry Valley (T38S, R2W, S21 to T41S, R1W, S7)	21.7	Wild ⁽¹⁾	high quality scenery, recreational attraction, exposed geologic strata and arches, and historic sites
Upper Paria River - 2	T41S, R1W, S7 to downstream side of private property south of Highway 89 (T42S, R1W, S28)	16.9	Recreational	
Snake Creek	Entire (T39S, R2W, S26 to T40S, R2W, S10)	4.7	Wild	high quality scenery and recreation values
Starlight Canyon	Entire (T41S, R2W, S7 to T40S, R2W, S35)	4.9	Wild	high quality scenery

¹ Varies by alternative in Resource Management Plans/Environmental Impact Statement

² Note that this segment is identified as Hackberry Creek in the Analysis of the Management Situation
NWSRS – National Wild and Scenic River System

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Appendix W

Interdisciplinary Route Evaluation Forms and Analysis

August 2018

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Appendix W: Interdisciplinary Route Evaluation Forms and Analysis

Table 1. Flag Point Route Evaluation Form

Evaluation Form for Interdisciplinary Route Analysis									
1	Route ID	Flag Point – GAGRC347				2	Length	4.39 miles	
3	Location	Flag Point Trail (OHV), Kane County				4	Date	06/20/2018	
5	ID Team	Alan Titus, Allysia Angus, Allan Bate, Cameron McQuivey, Dana Backer, Ken Bradshaw, Jason Bybee, Jabe Beal, Mark Foley, Matt Zweifel, Raymond Brinkerhoff, Sean Stewart							
6	Route Type	<input type="checkbox"/>	Road	<input type="checkbox"/>	Primitive Road	<input checked="" type="checkbox"/>	Trail	<input type="checkbox"/>	Way
7	<p>Purpose & Need of Motorized and Non-Motorized Travel on the Route: While this route is currently not part of the approved travel plan, the route receives use from OHVs (primarily UTVs, with some ATV and motorcycle use). Hikers, mountain bikers, and equestrian riders also use the route. The estimated percentage of use along the route by OHV and non-motorized use is unknown. The route in its current form travels along the user-created route through a pinyon-juniper desert landscape composed of sandy benches and dry washes, making it difficult for larger vehicle access. The route winds through trees and over archaeological sites. The purpose and need of the current use of this route is to access a paleontological and archaeological site at the end of Flag Point. At the end of the OHV route, a 500-foot user-created foot trail provides access to the paleontological site (dinosaur tracks) and archaeological site (pictograph and petroglyphs).</p> <p>Additional Comments Regarding the Purpose & Need of Motorized and Non-Motorized Travel on the Route: The paleontological and archaeological sites are popular with local residents as well as tourists. It is expected that the public and commercial permit holders will continue to want access (motorized and non-motorized) to visit these resources. The trail appears to have been user created rather than designed or built using heavy equipment.</p>								
8	<p>Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: The field team started at the junction of open BLM roads #562 & #563. Hikers, bicycles, and OHV conflicts may arise, as the route is narrow, has blind spots along the trail, is sandy, and has few pullouts for passing, creating the potential for user conflicts and increased resource impacts. OHV use on the route is the primary contributor to erosion on the trail tread, has created exposed tree roots, and has caused erosion adjacent to tree trunks. The route provides access to a popular location emphasizing dinosaur tracks and an archaeological site. There is a high potential for theft, as the dinosaur site is close to the OHV route. Aside from the correlation and close proximity of the sites, these sites are not unique to other paleontological and archaeological sites in the immediate area.</p> <p>Additional Comments Regarding Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: The route has limited camping opportunities, as only one campsite was identified as the end of the route adjacent to the foot trail. Three pullouts/passing areas were documented along the route. Trees have been limbed, and broken limbs create safety hazards along the narrow route. It can be expected that additional resource damage will continue without defining the OHV route. A user-created foot trail has also been created from Seaman Wash Road (BLM 563) along the valley floor to access these sites. In total there are two access routes to this site: one OHV and foot trail route from the OHV trail and one foot trail from Seaman Wash Road.</p>								

Evaluation Form for Interdisciplinary Route Analysis								
<p>The association of a dinosaur track depicted in prehistoric rock art with actual fossil dinosaur tracks nearby is globally unique and potentially worthy of World Heritage status. It is estimated that there are fewer than five such sites known in the entire world. Special monitoring, education, and enforcement should accompany opening any route that would increase access to this site.</p> <p>Kane Country Travel Council has identified this site as a destination for the OHV community. It is expected the marketing and promotion of this site will continue.</p>								
9	<p>Route Designation Alternatives:</p> <p>Potential route designations include, but are not limited to, open to all forms of travel, open with mitigation, open to specific vehicles types, limited to non-motorized forms of travel, limited seasonally, and closed.</p>							
	No Action	Defer to future TMP	Alternative B	Defer to future TMP	Alternative C	Defer to future TMP	Alternative D	Add route via an implementation level decision included in the RMP
	<p>Comments: Under alternatives A, B, and C, if no additional measures are taken to close OHV access on the trail, it can be expected that OHV use will continue. Tools or infrastructure used to close the trail may include fencing, boulders, post and rail, and signage. Based on the remote location of the trail, monitoring would be intermittent and the closures would be difficult to maintain. Additional resource impacts would likely occur by OHV riders that may try to go around or destroy physical impediments placed to limit OHV use on the trail.</p>							
10	<p>Recommended Mitigation Measures to Minimize User and Resource Conflicts for Each Alternative:</p> <p>Alternatives A, B, and C: Do not incorporate route in the transportation plan.</p> <p>Alternative D: Flag Point trail would be open to OHV use. Mitigation measures may include: vehicle size restrictions (50 inches or less), human waste disposal systems, development of OHV parking areas and pull-outs for passing lanes, educational/interpretive signage, development of official foot trails at both access points, erosion control where needed, and route realignment around sensitive archaeological and paleontological sites.</p>							
	<p>11 Summary Regarding the Interdisciplinary Team's Proposed Action Recommendation:</p> <p>Under Alternative D, the route provides access to popular archaeological and paleontological sites. Designating the route as OHV limited (50 inches maximum vehicle width) and applying the required mitigation measures balances existing OHV uses with needed resource protection and public access needs.</p>							

OHV – off-highway vehicle, UTV – utility task vehicle, ATV – all-terrain vehicle, BLM – Bureau of Land Management, TMP – Travel Management Plan, RMP – Resource Management Plan

Table 2. Flag Point Route Evaluation Checklist

Evaluation Checklist for Interdisciplinary Route Analysis					
Purpose & Need Criteria			Resource Criteria		
Administrative Uses			Resource	Potentially Affected?	Comment
Use	Yes	Comment			
Compliance/Enforcement Monitoring	X	Archaeology, paleontology; accessible by foot	* Air Quality - Dust		
Fire Suppression			* Air Quality - Non-Attainment Area		
Predator Control			* Wildlife	X	Mule deer winter range
Public Safety			* Special Status Species #1 Habitat	X	Peregrine falcon at Flag Point proper along cliff edge; however, a road should not cause a substantial impact because it is about 8 miles from the end of the road.
Training Area/Facility			* Proximity to Special Status Species #1 Habitat		
Vegetation Treatment Area			* Special Status Species #2 Habitat		
Wildlife Water			* Proximity to Special Status Species #2 Habitat		
Other Administrative Uses			In a Wash		
Commercial Uses			Wash Crossing	X	
Use	Yes	Comment	Proximity to a Wash	X	
Ranching			Redundant Route	X	3 sections identified
Mining			Herd Management Area		
Mineral/Materials			* Vegetation		
Fluid Minerals			* Special Status Plant Species #1		
Renewable Energy			* Special Status Plant Species #2		
Right-of-Way			Invasive Nonnative Vegetation		
Utility			Other Vegetation		

Appendix W: Interdisciplinary Route Evaluation Forms and Analysis

Evaluation Checklist for Interdisciplinary Route Analysis					
Special Recreation Permits	X	Currently may hike to site by foot; no OHV	* Soils	X	Motorized use is contributing to soil instability and loss. Sandy soils with minimal pedogenic development in this area—low to moderate potential for erosion in disturbed sands.
Other Commercial Uses			Erosive Soils	X	Soils are sandy and well drained with low runoff potential.
<i>Public Uses</i>			Other Sensitive Soils	X	Crypto soils—potential for moderate to high early successional crust cover (Bowker Model).
<i>Use</i>	Yes	<i>Comment</i>	* Watershed		
Property Access			Water Quality		
Class B Road			Stream Crossing		
Other Public Uses			* Cultural Resource Site	X	High density
<i>Recreational Uses</i>			Proximity to Cultural Resource Site	X	High density
<i>Use</i>	Yes	<i>Comment</i>	High Probability Cultural Resource Area	X	Very high
OHV Use	X	Include trail in TMP	* Paleontological Resources	X	Dinosaur tracks
Trailhead Access			* Visual Resource Management Class	X	II
Loop/Connector Trail			Known Visual Scar	X	Trail visible/arial
Dispersed Camping	X	limited	* Area of Critical Environmental Concern		
Developed Camping			* Wilderness		
* Hunting	X		* Wilderness Study Area		
* Recreational Shooting	X		* Natural Area		
* Fishing			Wilderness Characteristics		
* Equestrian	X		Other Wilderness Characteristic Considerations		
* Mountain Biking	X		* Wild & Scenic River		
* Hiking	X		* National Historic Trail		
Permitted OHV Events	X	May occur if route opened	Special Recreation Management Area		
Wildlife Viewing	X		Recreation Management Zone	X	ERMA; proposed SRMA

Evaluation Checklist for Interdisciplinary Route Analysis					
Rock hounding	X		Prescribed Recreation Setting (ROS)	X	Undeveloped, primitive, self-directed accommodating motorized and non-motorized
Picnicking	X		* Conflicts with Other Recreational Users		
Pullouts	X	More needed if opened	* Noise		
Woodcutting			* Adjacent Communities		
Other Recreational Uses			Other Criteria		

* Signifies that there is an applicable law, regulation, Executive Order, or policy that REQUIRES this use, resource, or conflict to be considered.

Note: There is a presumption that boxes left unmarked were considered by the interdisciplinary team, and the team determined that a purpose and need is not present and/or user/resource conflicts do not exist.

OHV – off-highway vehicle, TMP – Travel Management Plan, ERMA – Extensive Recreation Management Area, SRMA – Special Recreation Management Area

Table 3. Flag Point RMP OHV Area Alternative Development Documentation Form

RMP OHV Area Alternative Development Documentation Form			
ID Team (GSENM)			
RMP Alternative and Theme		Date	
What sensitive resources/areas are being protected under this alternative by specific management proposals?			
Proposed?	Sensitive Resource/Area	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights-of-Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?
	Sensitive soil areas		
	Threatened or Endangered Species Habitat		
	Other Crucial Wildlife and Plant Habitats		
	Areas of Critical Environmental Concern		
Site avoidance along existing route, may not be possible	Cultural Resources	Assuming Alternative D, mitigation of sites (would be very time-consuming and expensive); road re-route (very time consuming, density of sites in this general area would be difficult to work around); selection of different route (user-created ATV route from Glass Eye Spring has been suggested, but has received no cultural resource survey to date)	Assuming Alternative D, suggest this as an equestrian and hiking route, but that apparently is not an option under Alternative D?
	Sensitive Watersheds		
	Riparian Habitat		
	National Historic Trail		
	Suitable Wild and Scenic River Segments	N/A	N/A
Monthly monitoring, onsite interpretation, emphasis on special enforcement of PRPA.	Paleontological Resources (Early Jurassic Age dinosaur fossil footprints)	None other proposed.	Closure of the route to the fossil and rock art sites would be consistent with protection of these sites under PRPA and ARPA.
	Lands with Wilderness Characteristics	N/A	N/A

RMP OHV Area Alternative Development Documentation Form

	Wilderness Study Areas	N/A	N/A
	Special Recreation Management Areas	A route designation would not affect the SRMA. Identified mitigation measures are important to reduce future resource impacts.	N/A
	Others?		

Are there other areas that should be considered for a Closed OHV Area proposal consistent with the goals and objectives of this RMP alternative? Consider the need to minimize noise, dust, and recreational user conflicts, promote public safety, and the compatibility of OHV use with adjacent communities.

Area	Issue	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights-of-Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or VRM II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?

Are Open OHV Area proposals consistent with the goals and objectives of this RMP alternative?

Area	Why or Why Not Consistent?	If consistent, identify any mitigation measures that should be built into the Open OHV Area proposal to minimize resource and user conflicts.

RMP – Resource Management Plan, OHV – off-highway vehicle, GSENM – Grand Staircase-Escalante National Monument, NSO – no surface occupancy, VRM – Visual Resource Management, ATV – all-terrain vehicle, N/A – not applicable, PRPA – Paleontological Resources Preservation Act, ARPA – Archaeological Resources Protection Act, SRMA – Special Recreation Management Area

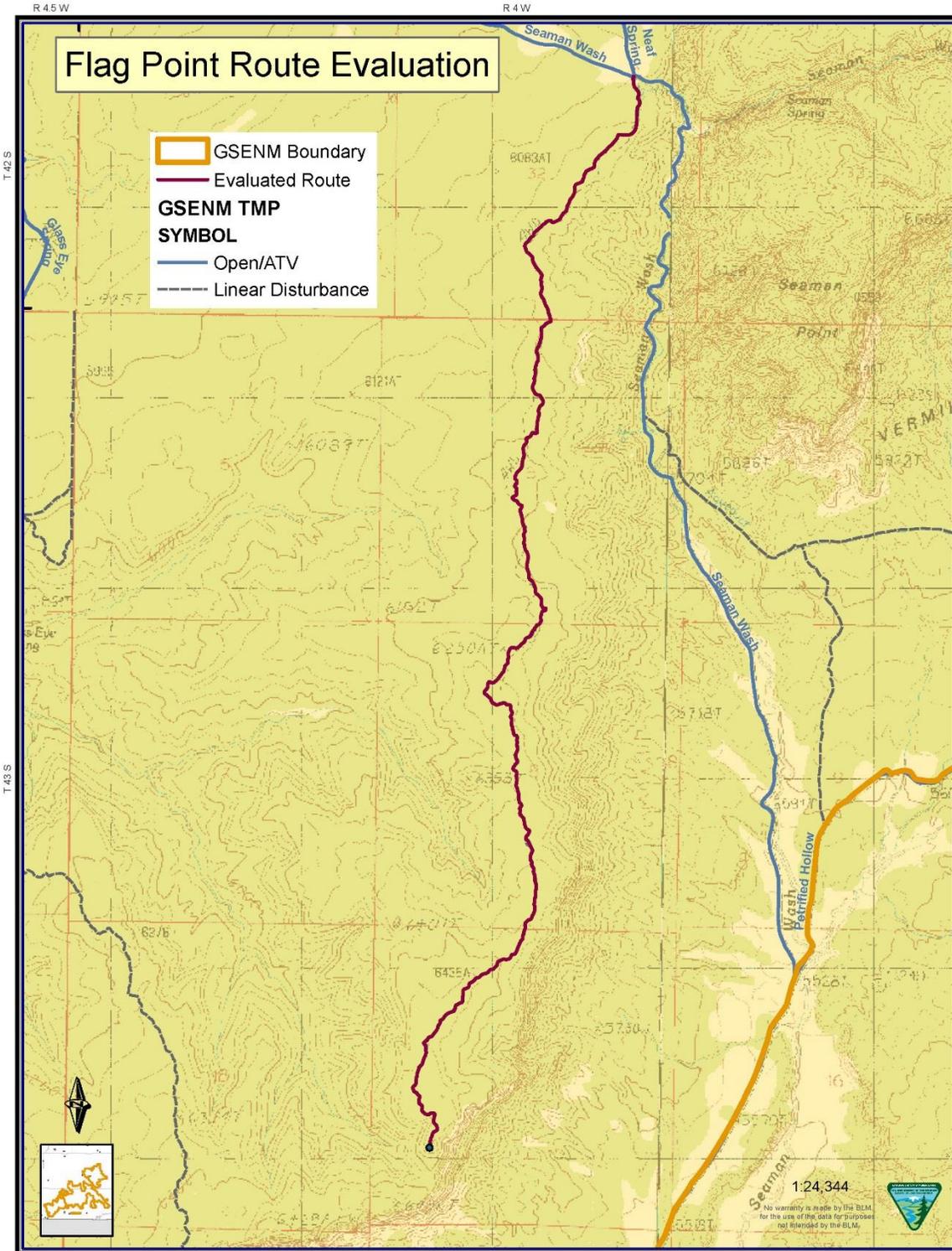


Figure 1. Flag Point Route Evaluation

Table 4. V-Road Route Evaluation Form

Evaluation Form for Interdisciplinary Route Analysis									
1	Route ID	V-Road			2	Length	7.36 miles		
3	Location	Garfield County, SE of Red Breaks, Harris Wash Rd.			4	Date	6/26/2018		
5	ID Team	Jabe Beal (ORP), Allysia Angus (LUP, Landscape Architect), Sean Stewart (RMS), Jason Bybee (RMS), Ken Bradshaw (Soil Scientist) Alan Titus (paleo), Allan Bate (RMS), Raymond Brinkerhoff (Botany), Matt Zweifel (Arch)							
6	Route Type	<input type="checkbox"/>	Road	<input type="checkbox"/>	Primitive Road	<input checked="" type="checkbox"/>	Trail	<input type="checkbox"/>	Way
7	<p>Purpose & Need of Motorized and Non-Motorized Travel on the Route: The original purpose for this road was for oil and gas exploration. There are two well pads along the old road. The well pipes are dated 1971. Today's purpose provides limited recreational access. One geologic feature of interest, the Eye of the Needle, is approximately 1 mile off of the route. Presently only OHVs and high-clearance 4X4 vehicles can access the end of the road due to deep sand and erosion damage along the old roadway.</p> <p>Additional Comments Regarding the Purpose & Need of Motorized and Non-Motorized Travel on the Route: The original road was developed with machinery and capped with local soils. Culverts and the original road bed are evident along the entire length of the road. Over many years the road has eroded, leaving culverts exposed and/or washed out. One section of the road in the sand area has been completely washed out at an approximate distance of 200 feet. Current public use is not well defined for a specific need. For administrative purposes, BLM may allow ranchers access to their cattle to place mineral supplements. Signs of cattle were documented along the road/trail. The old road/trail now provides recreational hiking access to the geologic feature the Eye of the Needle. Other recreation access needs or destinations are unlikely supported past the access point to the Eye of the Needle. There is a section of the road approximately 3.6 miles from Harris Wash that is eroded by floods that requires an OHV to re-route in soft sand. The re-route is tricky and is only suitable for OHVs capable of navigating soft sand. The last half-mile of the old road is a rough section only accessible by high-clearance 4X4 or OHVs. This section of road was blasted out by the road builders and reflects the time, energy, and resources that went into building these access roads. This section of the road was capped with local soils at one time; today those fill materials are eroded in many areas along the route. The well pads are not considered a recreational asset for access to the Escalante Canyons.</p>								
8	<p>Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: The road has not been maintained for many years, as is evident by the wash-outs of culverts and road bed material. Considering the current condition, the route would not be considered a road, but would be defined as a trail based on BLM Handbook H-8342-1. The road/trail is developed on unstable erodible soils, i.e., sand. Current access by the public may pose safety issues as the road/trail is washed out in several locations, requiring the public to drive user-created reroutes. The area is remote and not easily accessible. In the event a public member becomes stuck or has mechanical failure, it is unlikely another party would come along to provide assistance. The party would be required to walk 5 to 10 miles to access Hole-in-the-Rock Road. During summer months, heat exposure would be a serious safety concern. The old road/trail is located within the North Escalante Canyons Gulch WSA. The road corridor was cherry stemmed into the WSA upon designation (1984); however, the road was closed in GSENM's transportation system and has been managed for administrative use. During the road inventory, OHV use was documented off the route/trail within the WSA. The WSA boundary is not well signed, as this route has received little use due to its administrative use and difficult access. GSENM and all public lands in the region have seen increased visitation, with OHVs being one of the fastest-growing activities. With increased use on this route, it can be expected illegal OHV use in WSAs will continue and potentially increase. There are no Range Improvements accessed from this road but it is used administratively by the Upper Cattle allotment permittees to check the condition of grazing livestock and to access and place salt and mineral supplement during the Season of Use: November 1–June 15. The road is also used by BLM Range staff to periodically access a Long-Term Range Trend site and to conduct utilization studies in the area. The potential for livestock grazing/recreational conflicts is currently minimal. Grazing Permit Holders have expressed interest in fixing the road and have also asked</p>								

Evaluation Form for Interdisciplinary Route Analysis							
<p>about the possibility of water developments on the existing drill pads. Considering range management, this trail should be considered as an administrative route.</p> <p>Additional Comments Regarding Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: Signage is minimal or not present along the trail. The end of the trail/well pad is not signed. OHV tracks were documented leaving the north side of the well pad heading toward the Escalante River within the WSA. The BLM recently documented other OHV incursion from the V-road trying to access the Escalante River.</p> <p>Large deposits of Moki Marbles (i.e., iron concretions) are evident immediately adjacent to, and in the entire area along, the route/trail. Spencer Flat is 2.5 miles due west of the V-road and has the same deposit of Moki Marbles. Since monument designation, theft has depleted the marbles along Spencer Flat Road. Theft of these monument objects can be expected along the V-road. This route, managed as closed, provides for one of the largest roadless areas in GSENM, creating a 5-mile buffer from its center; managed as open, the roadless area would be reduced to a 2-mile buffer area (approximately).</p> <p>As described above, the route is washed out in several locations that has led to user-created re-routes located in the WSA. The old road/trail in its current condition offers the OHV user a challenging and unique experience. It is recommended to address open access along the original line of the road to eliminate the re-routes. This will not in itself make the route easier but keep motor vehicle use in the area of disturbance. It is recommended to perform only the needed maintenance and upgrades to make the route passable but not to rebuild the route/trail to its original condition.</p> <p>The GIS layer files do not reflect that actual road alignment on the ground. In some areas the deviation/error is off by several hundred feet. It is unknown how the GIS layer was created; however, the field survey was unable to make a correlation that the GIS road layer actually followed in the disturbance on the ground in several locations.</p>							
9 Route Designation Alternatives							
No Action	Defer to future TMP	Alternative B	Defer to future TMP	Alternative C	Defer to future TMP	Alternative D	Add route via an implementation level decision included in the RMP
<p>Comments: The route/trail does provide limited vehicle access to the “Cosmic Vortex.” The access point from the trail is not marked and it can be difficult to determine how to access the geologic feature. In summer months, this region is hot and dry and poses public safety concerns for becoming lost and succumbing to heat exposure. Since the mid 2000s, BLM has required the public to hike to the “Vortex.” This requires the public to pre-plan to determine the route of travel and location of the “Vortex.” In many instances the public has difficulty locating the site due to its location in a sandstone dome that can be challenging to locate.</p> <p>The road has not been maintained for many years and was documented as “unmaintained” in 1998 in a WSA inventory report. Road work is required to make the route passable and to address current public safety issues. The route in its current condition offers a challenging OHV experience requiring moderate to advanced skills to travel the route. For many OHV users, the challenging route is a desired experience/outcome. Pre-planning is highly recommended due to the safety concerns. The only recreational destination along this route is the “Vortex.” The remainder of the route does provide access to the WSA and Escalante River but is not documented as a desirable access point for backcountry visitors. If the route is opened on the transportation system, this would provide an access point the Escalante River within GSENM.</p> <p>Alternatives A, B, and C: The road would not be included as an open route on the transportation system. Signage and possibly physical barriers (e.g., gate and fencing) may be installed to limit access.</p> <p>Alternative D: The route/trail would be added to the transportation system, allowing motorized use on the trail. The route may be left in its current state (unmaintained), requiring high-clearance 4X4s/OHVs to access the end of the road. Alternately, the BLM could fix the impassable locations and leave the rest of the route as is to provide for a more challenging experience. The BLM may limit access to the route to 4x4s/OHVs and vehicles 50 inches or less; limit access to season of use; or allow for non-motorized and mechanized use only. Signage would be required to communicate that vehicles must stay along the identified route of travel to reduce incursions into the WSA.</p>							

Evaluation Form for Interdisciplinary Route Analysis	
10	<p>Recommended Mitigation Measures to Minimize User and Resource Conflicts for Each Alternative:</p> <p>Public safety would need to be addressed, i.e., reinstall and maintain culverts, install signage along the entirety and at the end of the route, and fix and/or identify safety hazards at washout areas/drop-offs. A parking area for the Eye of the Needle would reduce multiple parking areas/user-created impacts and a trail cairn system would be required to identify a trail to the feature to reduce route proliferation and impacts. Additional facilities, e.g., toilets, would be impractical to install along this route, as access for most vehicles is not recommended unless the road bed is restored with a hardened surface. Maintenance of the route would be difficult and costly.</p> <p>In the route's current condition, the BLM may limit access along the route to hiker/equestrian use only. This would not allow motorized access to the Eye of the Needle. Motorized access would require repairs and maintenance in order to provide access for the public and to minimize the public safety issues identified. If the route is opened in the transportation system, the BLM would need to develop route guides to support access, address public safety, and identify WSA boundaries. An open route designation would require additional management oversight, labor, and infrastructure to manage the area.</p>
11	<p>Summary Regarding the Interdisciplinary Team's Proposed Action Recommendation:</p> <p>In the route's current condition, the BLM may limit access along the route to hiker/equestrian use only. This would not allow motorized access to the Eye of the Needle. If the route is designated for administrative use, minimal repairs would be needed to all for continued access. Under Alternative D, an open designation is not required for the public to access the geologic formation the Eye of the Needle.</p>

OHV – off-highway vehicle, BLM – Bureau of Land Management, WSA – Wilderness Study Area, GSENM – Grand Staircase-Escalante National Monument, GIS – geographic information system, TMP – Travel Management Plan, RMP – Resource Management Plan

Table 5. V-Road Route Evaluation Checklist

Evaluation Checklist for Interdisciplinary Route Analysis					
Purpose & Need Criteria			Resource Criteria		
<i>Administrative Uses</i>			<i>Resource</i>	<i>Potentially Affected?</i>	<i>Comment</i>
<i>Use</i>	<i>Yes</i>	<i>Comment</i>			
Compliance/Enforcement Monitoring	X		* Air Quality - Dust	X	Potential for increased dust based on amount of OHV use.
Fire Suppression			* Air Quality - Non-Attainment Area		
Predator Control			* Wildlife		
Public Safety			* Special Status Species #1 Habitat		
Training Area/Facility			* Proximity to Special Status Species #1 Habitat		
Vegetation Treatment Area			* Special Status Species #2 Habitat		
Wildlife Water			* Proximity to Special Status Species #2 Habitat		
Other Administrative Uses			In a Wash	Yes	
<i>Commercial Uses</i>			Wash Crossing	Yes	

Appendix W: Interdisciplinary Route Evaluation Forms and Analysis

Evaluation Checklist for Interdisciplinary Route Analysis					
Use	Yes	Comment	Proximity to a Wash	Yes	
Ranching	X	Cattle are present but no range improvements exist, Road is used to access and place salt and mineral supplement, aiding livestock distribution. Also used to access BLM trend site	Redundant Route	Yes	In several locations
Mining			Herd Management Area		
Mineral/Materials			* Vegetation		
Fluid Minerals	X	Claims to well pads need to be determined.	* Special Status Plant Species #1		
Renewable Energy			* Special Status Plant Species #2		
Right-of-Way			Invasive Nonnative Vegetation		
Utility			Other Vegetation		
Special Recreation Permits		SRPs would be allowed under an open designation.	* Soils	X	Sandy soils that are well drained, but shallow so runoff and erosion potential is very high. Sand dunes present that are relatively stable with low runoff potential because they are deep (>60"); however, dunes are susceptible to shifting by wind erosion.
Other Commercial Uses			Erosive Soils	X	Sand—shallow sands present with very high runoff potential
Public Uses			Other Sensitive Soils	X	Crypto soils –potential for moderate to high early successional crust cover
Use	Yes	Comment	* Watershed		
Property Access			Water Quality		
Class B Road			Stream Crossing		
Other Public Uses	X	Recreation	* Cultural Resource Site	X	expected
Recreational Uses			Proximity to Cultural Resource Site	X	
Use	Yes	Comment	High Probability Cultural Resource Area	X	expected
OHV Use	X	Currently used	* Paleontological Resources	X	Moki Marble

Evaluation Checklist for Interdisciplinary Route Analysis					
Trailhead Access			* Visual Resource Management Class	X	Class 1
Loop/Connector Trail			Known Visual Scar	X	Route is visible
Dispersed Camping	X	Very limited an little use identified	* Area of Critical Environmental Concern		
Developed Camping			* Wilderness		
* Hunting			* Wilderness Study Area	X	Cherry Stem in WSA
* Recreational Shooting			* Natural Area		
* Fishing			Wilderness Characteristics		
* Equestrian			Other Wilderness Characteristic Considerations		
* Mountain Biking	X	May have use under open designation	* Wild & Scenic River		
* Hiking	X	Currently used	* National Historic Trail		
Permitted OHV Events			Special Recreation Management Area	X	Escalante Canyons
Wildlife Viewing			Recreation Management Zone		
Rock hounding	X	Moki marbles are monument objects. Collection would be in conflict with monument designation. Theft of marbles documented in area.	Prescribed Recreation Setting (ROS)	X	primitive
Picnicking	X		* Conflicts with Other Recreational Users		
Pullouts			* Noise		
Woodcutting			* Adjacent Communities		
Other Recreational Uses			Other Criteria		

* Signifies that there is an applicable law, regulation, Executive Order, or policy that REQUIRES this use, resource, or conflict to be considered.

Note: There is a presumption that boxes left unmarked were considered by the interdisciplinary team, and the team determined that a purpose and need is not present and/or user/resource conflicts do not exist.

OHV – off-highway vehicle, BLM – Bureau of Land Management, SRP – Special Recreation Permit, WSA – Wilderness Study Area, TMP – Travel Management Plan, ERMA – Extensive Recreation Management Area, SRMA – Special Recreation Management Area

Table 6. V-Road RMP OHV Area Alternative Development Documentation Form

RMP OHV Area Alternative Development Documentation Form			
ID Team			
RMP Alternative and Theme		Date	
What sensitive resources/areas are being protected under this alternative by specific management proposals?			
Proposed?	Sensitive Resource/Area	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights of Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?
Avoidance	Sensitive soil areas	Remain on designated routes, likely covered in transportation management plan.	Assuming Alternative D, this alternative does not allow for closure of this route.
	Threatened or Endangered Species Habitat		
	Other Crucial Wildlife and Plant Habitats		
	Areas of Critical Environmental Concern		
Avoidance of cultural sites	Cultural Resources	Assuming Alternative D, site mitigation; road re-route. Note: this road has not yet seen any cultural resource survey, so presence of archaeological resources is unknown. However, this route leads to an historic access route into the Escalante River with associated historic signatures, as well as Native American rock art. Consideration of access to and impacts on those sites should be taken into account.	Assuming Alternative D, this alternative does not allow for closure of this route.
	Sensitive Watersheds		
	Riparian Habitat		
	National Historic Trail	N/A	N/A
	Suitable Wild and Scenic River Segments	N/A	N/A
	Paleontological Resources		
	Lands with Wilderness Characteristics	N/A	N/A
	Wilderness Study Areas	N/A	N/A

RMP OHV Area Alternative Development Documentation Form

	Special Recreation Management Areas	Any route designation would not affect the SRMA as designated.	N/A
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	Others?		
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Are there other areas that should be considered for a Closed OHV Area proposal consistent with the goals and objectives of this RMP alternative? Consider the need to minimize noise, dust, and recreational user conflicts, promote public safety, and the compatibility of OHV use with adjacent communities.

Area	Issue	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights of Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or VRM II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?

Are Open OHV Area proposals consistent with the goals and objectives of this RMP alternative?

Area	Why or Why Not Consistent?	If consistent, identify any mitigation measures that should be built into the Open OHV Area proposal to minimize resource and user conflicts.

RMP – Resource Management Plan, OHV – off-highway vehicle, NSO – no surface occupancy, VRM – Visual Resource Management, SRMA – Special Recreation Management Area

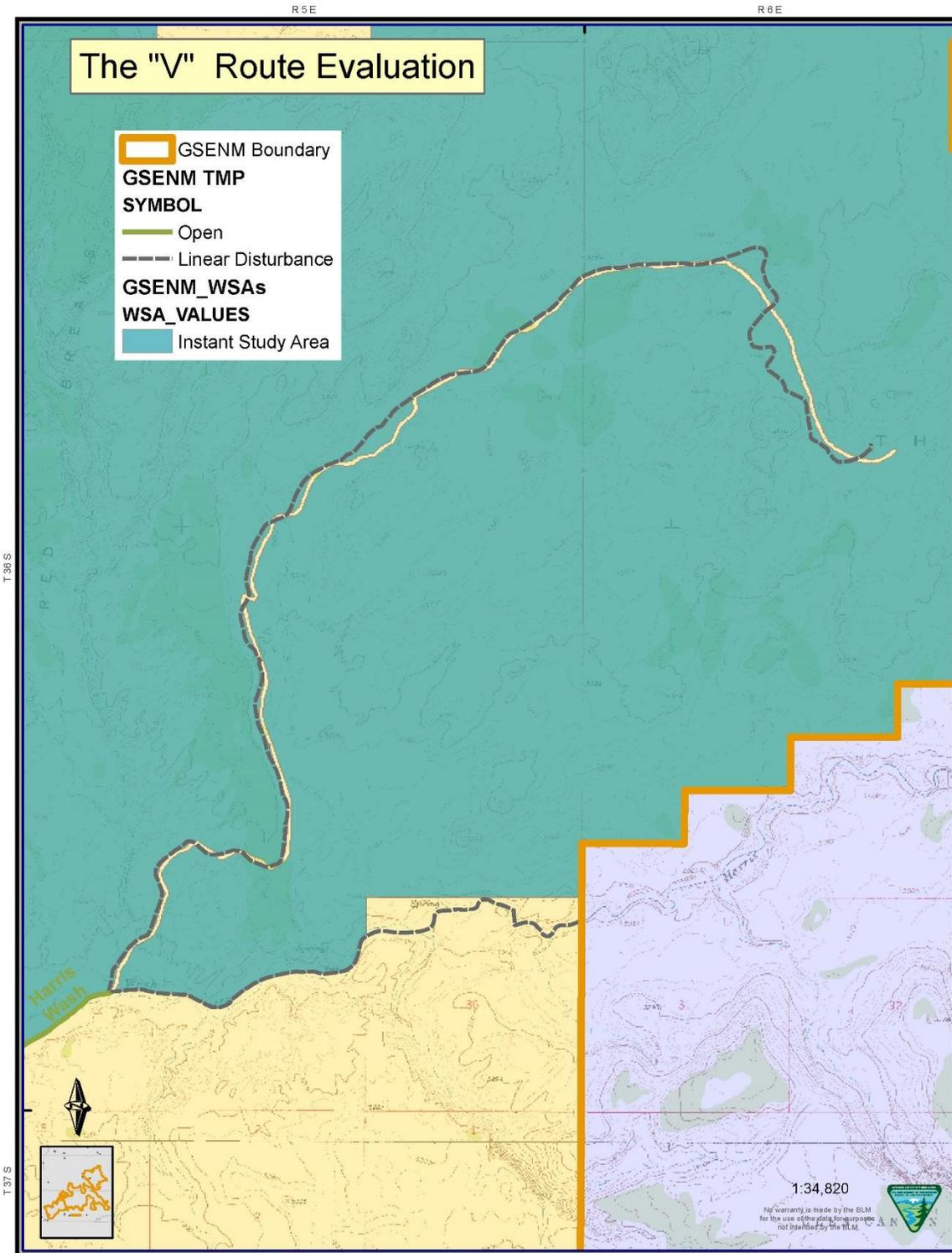


Figure 2. V-Road Route Evaluation



Figure 3. V-Road



Figure 4. V-Road Culvert in Place Requiring Maintenance



Figure 5. Sandy Section Along V-Road



Figure 6. V-Road Wash-Out Area – Old Road Bed



Figure 7. V-Road Wash-Out Road – Old Road Bed



Figure 8. V-Road End of Route

Table 7. Inch Worm Arch Road Route Evaluation Form

Evaluation Form for Interdisciplinary Route Analysis												
1	Route ID	Inch Worm Arch Road					2	Length	2.4 miles			
3	Location	Inch Worm Arch trail (OHV), Nephi Pasture reach, Kane County					4	Date	06/20/2018			
5	ID Team	Alan Titus, Allysia Angus, Allan Bate, Cameron McQuivey, Dana Backer, Ken Bradshaw, Jason Bybee, Jabe Beal, Mark Foley, Matt Zweifel, Raymond Brinkerhoff, Sean Stewart										
6	Route Type	<input type="checkbox"/>	Road	<input type="checkbox"/>	Primitive Road	<input type="checkbox"/>	Trail	<input type="checkbox"/>	Way	<input checked="" type="checkbox"/>	X	Transportation linear disturbance
7	Purpose & Need of Motorized and Non-Motorized Travel on the Route:											
	While this route is currently not part of the approved travel plan, the route receives use from OHVs (primarily UTVs, with some ATV and motorcycle use). Hikers, mountain bikers, and equestrian riders also use the route. The estimated percentage of use along the route by OHV and non-motorized use is unknown. The route in its current form travels along the user-created route through a pinyon-juniper desert landscape composed of sandy benches and dry washes. The route winds through trees and over archaeological sites.											
	The purpose and need of the current use of this route is to access a natural arch site at the end of the road. At the end of the OHV route, a 500-foot user-created foot trail provides access to the natural arch. The foot trail continues beyond the arch, accessing the canyon bottom.											
	Additional Comments Regarding the Purpose & Need of Motorized and Non-Motorized Travel on the Route: Inch Worm Arch is popular with local residents and visitors. The route receives use by the public. There is a user-created foot trail from the parking site to the arch viewing area. The trail is posted "No Vehicles," although ATV tracks were documented driving past the sign down toward the arch. It is expected the public will continue to want access (motorized and non-motorized) to visit this resource.											
8	Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: The linear disturbance provides the only motorized access to the arch site. Non-motorized use was documented going to, and in the immediate area of, the arch. The foot trails are user created to access the arch and surrounding area. The OHV route does pass through archaeological sites.											
	Additional Comments Regarding Potential Resource and/or User Conflicts from Motorized and Non-Motorized Travel on the Route: Kane County Travel Council has identified this site as a destination for the OHV community. It is expected the marketing and promotion of this site will continue. The existing motorized access route travels through two identified and catalogued archaeological sites. Several alternate routes that bypass/avoid the site have been identified and flagged by the GSENM archaeologist.											
9	Route Designation Alternatives:											
	Potential routes designations include, but are not limited to, open to all forms of travel, open with mitigation, open to specific vehicles types, limited to non-motorized forms of travel, limited seasonally, and closed.											
	No Action	Defer to future TMP	Alternative B	Defer to future TMP	Alternative C	Defer to future TMP	Alternative D	Add route via an implementation level decision included in the RMP				
	Comments: Under alternatives A, B, and C, the route would remain absent from the transportation plan and remain closed to motorized access. It can be expected that OHV use will continue unrestricted, unless closures are put in place. Tools used to close the trail may include fencing, boulders, post and rail, and signage. Based on the remote location of the trail, monitoring would be intermittent and the closures would be difficult to maintain. Additional resource impacts would likely occur by those trying to access the site.											

Evaluation Form for Interdisciplinary Route Analysis

10	<p>Recommended Mitigation Measures to Minimize User and Resource Conflicts for Each Alternative:</p> <p>Alternatives A, B, and C: The route would not be incorporated in the transportation plan.</p> <p>Alternative D: Inch Worm Arch route would be open to OHV use. Mitigation measures may include: vehicle size restrictions (50 inches or less), requirement of human waste disposal systems, development of pull-outs for passing lanes, educational/interpretive signage, development of official foot trails at both access points, erosion control where needed, and route realignment around cultural sites. In addition, other roads, i.e., #558 and 563, may be evaluated to open existing linear disturbances to provide a loop route that is popular with OHV users in the area. Perform archaeological clearances/evaluation to avoid sites or allow vehicle use through sites once surveyed.</p>
11	<p>Summary Regarding the Interdisciplinary Team's Proposed Action Recommendation:</p> <p>The route provides access to a popular location emphasizing a natural arch. There is a high potential for off-route incursions, as impacts were identified on the field survey. The field team recommendations are to: keep the route with appropriate re-routes around archaeological sites; install barriers to keep OHVs in the parking area and reduce impacts at and around the arch; install educational/interpretive panels; delineate parking area; prohibit camping in parking area; and develop the foot trail and viewing location to reduce resource damages.</p>

OHV – off-highway vehicle, UTV – utility task vehicle, ATV – all-terrain vehicle, GSENM – Grand Staircase-Escalante National Monument, TMP – Travel Management Plan, RMP – Resource Management Plan

Table 8. Inch Worm Arch Road Route Evaluation Checklist

Evaluation Checklist for Interdisciplinary Route Analysis					
Purpose & Need Criteria			Resource Criteria		
Administrative Uses			Resource	Potentially Affected?	Comment
Use	Yes	Comment			
Compliance/Enforcement Monitoring	X	Archaeology, paleontology, monument object and values	* Air Quality - Dust	X	OHV use
Fire Suppression			* Air Quality - Non-Attainment Area		
Predator Control			* Wildlife		
Public Safety	X	SAR access to site	* Special Status Species #1 Habitat		
Training Area/Facility			* Proximity to Special Status Species #1 Habitat		
Vegetation Treatment Area			* Special Status Species #2 Habitat		
Wildlife Water			* Proximity to Special Status Species #2 Habitat		
Other Administrative Uses			In a Wash		

Appendix W: Interdisciplinary Route Evaluation Forms and Analysis

Evaluation Checklist for Interdisciplinary Route Analysis					
Commercial Uses			Wash Crossing	X	
<i>Use</i>	Yes	<i>Comment</i>	Proximity to a Wash	X	
Ranching			Redundant Route	X	
Mining			Herd Management Area		
Mineral/Materials			* Vegetation		
Fluid Minerals			* Special Status Plant Species #1		
Renewable Energy			* Special Status Plant Species #2		
Right-of-Way			Invasive Nonnative Vegetation		
Utility			Other Vegetation		
Special Recreation Permits	X	Currently may hike to site on foot; no OHV	* Soils		Sandy soils with minimal pedogenic development in this area—low to moderate potential for erosion in disturbed sands depending on slope
Other Commercial Uses			Erosive Soils	X	Stabilized dunes—Soils are sandy and well drained with low runoff potential; 1 soil type in the area has high runoff potential on steeper slopes, but the route only intersects a small portion of this soil.
Public Uses			Other Sensitive Soils	X	Crypto soils—potential for moderate to high early and late successional crust cover (Bowker Model)
<i>Use</i>	Yes	<i>Comment</i>	* Watershed		
Property Access			Water Quality		
Class B Road			Stream Crossing		
Other Public Uses			* Cultural Resource Site	X	High density
Recreational Uses			Proximity to Cultural Resource Site	X	High density
<i>Use</i>	Yes	<i>Comment</i>	High Probability Cultural Resource Area	X	High density along ridge crest
OHV Use	X	Include Trail in TMP	* Paleontological Resources		
Trailhead Access	X		* Visual Resource Management Class	X	
Loop/Connector Trail			Known Visual Scar	X	Trail visible/ariel

Evaluation Checklist for Interdisciplinary Route Analysis					
Dispersed Camping	X	limited	* Area of Critical Environmental Concern		
Developed Camping			* Wilderness		
* Hunting	X		* Wilderness Study Area		
* Recreational Shooting	X		* Natural Area		
* Fishing			Wilderness Characteristics		
* Equestrian	X		Other Wilderness Characteristic Considerations		
* Mountain Biking	X		* Wild & Scenic River		
* Hiking	X		* National Historic Trail		
Permitted OHV Events	X	May occur if route opened	Special Recreation Management Area	X	ERMA; proposed SRMA
Wildlife Viewing	X		Recreation Management Zone	X	ERMA; proposed SRMA
Rock hounding	X		Prescribed Recreation Setting (ROS)	X	Undeveloped, primitive, self-directed accommodating motorized and non-motorized
Picnicking	X		* Conflicts with Other Recreational Users		
Pullouts	X	More needed if opened	* Noise		
Woodcutting			* Adjacent Communities	X	Private property close to roads off main access route.
Other Recreational Uses	X	Photography	Other Criteria		

* Signifies that there is an applicable law, regulation, Executive Order, or policy that **REQUIRES** this use, resource, or conflict to be considered.

Note: There is a presumption that boxes left unmarked were considered by the interdisciplinary team, and the team determined that a purpose and need is not present and/or user/resource conflicts do not exist.

OHV – off-highway vehicle, SAR – Search and Rescue, TMP – Travel Management Plan, ERMA – Extensive Recreation Management Area, SRMA – Special Recreation Management Area

Table 9. Inch Worm Arch Road RMP OHV Area Alternative Development Documentation Form

RMP OHV Area Alternative Development Documentation Form			
ID Team (GSENM)			
RMP Alternative and Theme		Date	
What sensitive resources/areas are being protected under this alternative by specific management proposals?			
Proposed?	Sensitive Resource/Area	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights-of-Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?
	Sensitive soil areas		
	Threatened or Endangered Species Habitat		
	Other Crucial Wildlife and Plant Habitats		
	Areas of Critical Environmental Concern		
	Cultural Resources	Assuming Alternative D, re-route of road only at specific sites (not very feasible); mitigation of sites (would be very expensive and time-consuming)	Assuming Alternative D, this alternative does not allow for closure of this road. Closure is not necessary as a re-route is entirely feasible.
	Sensitive Watersheds		
	Riparian Habitat		
	National Historic Trail		
	Suitable Wild and Scenic River Segments	N/A	N/A
	Paleontological Resources		
	Lands with Wilderness Characteristics	N/A	N/A
	Wilderness Study Areas	N/A	N/A
	Special Recreation Management Areas	Any route designation would not affect the SRMA	Any route designation would not affect the SRMA
	Others?		

RMP OHV Area Alternative Development Documentation Form

Are there other areas that should be considered for a Closed OHV Area proposal consistent with the goals and objectives of this RMP alternative? Consider the need to minimize noise, dust, and recreational user conflicts, promote public safety, and the compatibility of OHV use with adjacent communities.

Area	Issue	Other Protective Measures Proposed for this Area Under the RMP Alternative (e.g., closed or NSO for leasing, closed to saleable minerals, Rights of Way Avoidance or Exclusion Area, proposed mineral withdrawal, VRM I or VRM II, closed to woodcutting, closed to grazing)	Would a Closed OHV Area Proposal be Consistent with the Other Proposals for this Area Under the RMP Alternative? Why or why not?

Are Open OHV Area proposals consistent with the goals and objectives of this RMP alternative?

Area	Why or Why Not Consistent?	If consistent, identify any mitigation measures that should be built into the Open OHV Area proposal to minimize resource and user conflicts.

RMP – Resource Management Plan, OHV – off-highway vehicle, GSENM – Grand Staircase-Escalante National Monument, NSO – no surface occupancy, VRM – Visual Resource Management, N/A – not applicable, SRMA – Special Recreation Management Area

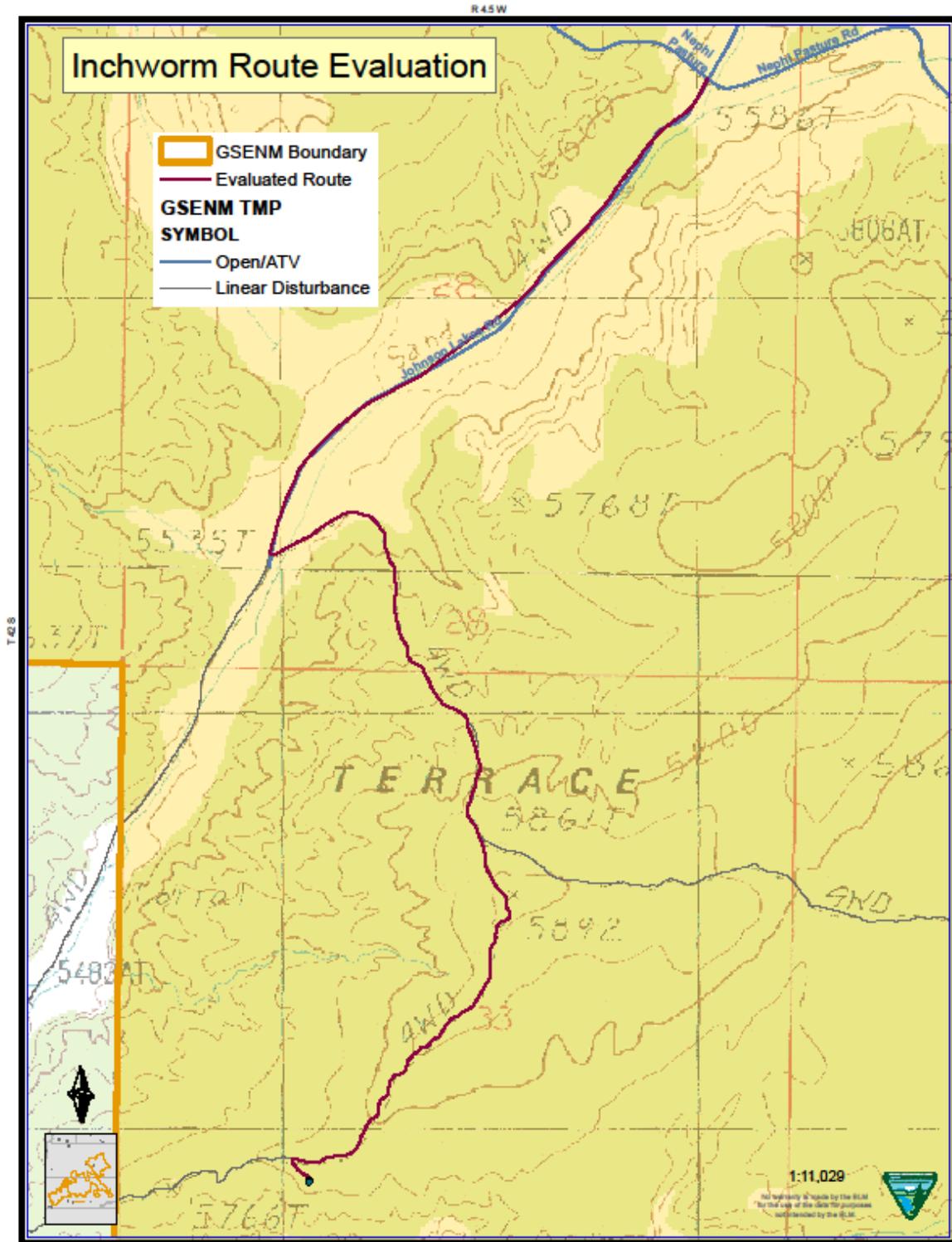


Figure 9. Inch Worm Arch Road Route Evaluation



Figure 10. Inch Worm Arch Road Route

Implementation-Level Route Analysis for V-Road, Inchworm Arch Road, and Flag Point Road

The addition of specific routes to the GSENM route map for the Planning Area is an implementation-level decision. Alternatives A, B, and C do not propose changes to the GSENM route map as part of this land use planning effort. Alternative D, however, amends the current GSENM route map through implementation-level decisions to include the V-Road, Inchworm Arch Road, and Flag Point Road as open and available for off-highway vehicle use (refer to Chapter 2, Section 2.3.15, *Travel and Transportation Management*). These additional routes are currently used by local residents and tourists to access certain archaeological and geological sites, and their inclusion on the GSENM route map would be beneficial to these users by allowing continued and legal access. Inclusion of these routes as open and available for off-highway vehicle use, however, could result in adverse environmental effects on cultural and paleontological resources, non-motorized recreation and travel, soil and water resources, wildlife, and other resources and uses. Because alternatives A, B, and C do not include these additional routes, neither the beneficial nor the adverse impacts anticipated under Alternative D would occur. Tables 10, 11, and 12 below include detailed analyses of the effects of inclusion of these additional routes in the GSENM route inventory.

Table 10. V-Road Affected Environment and Effects Analysis

	Affected Environment	Alternatives A, B, and C	Alternative D
Route Overview	<p>The site is located in GSENM within the Escalante Canyons Unit.</p> <p>The original purpose of this route was for oil and gas exploration. Two well pads are located along the road that date back to 1971. The route in its current form provides limited recreational access. One geologic feature of interest, the Eye-of-the-Needle, is located approximately 1 mile off of the route. Overall, the road has eroded over the years, leaving culverts exposed and/or washed out. One section of the road in the sand area has been completely washed out at an approximate distance of 200 feet. Presently, only OHVs and high-clearance 4X4 vehicles can access the end of the road due to deep sand and erosion damage along the old roadway. Scenic and geologic destinations in this area are known locally and promoted in the community, as well as by trail guides, and online.</p>	<p>Route would be closed to OHV use.</p> <p>Signage and possibly physical barriers may be used to limit access.</p>	<p>The route would be added to the transportation system and would remain open to OHV use.</p> <p>The route may be left in its current state (unmaintained), requiring high-clearance 4X4s/OHVs to access the end of the road. Alternately, the BLM may fix the impassable locations and leave the rest of the route in its current state to provide for a more challenging experience. The BLM may limit access to the route to 4x4s/OHVs and vehicles 50 inches or less; limit access to season of use; or allow for non-motorized and mechanized use only. Signage would be required to communicate that vehicles must stay along the identified route of travel to reduce incursions into the WSA.</p>
Livestock Grazing	<p>Resource: There are no range improvements accessed from this road but it is used administratively by the Upper Cattle allotment permittees to check the condition of grazing livestock and to access and place salt and mineral supplement during the season of use: November 1–June 15. The road is also used by BLM Range staff to periodically access a Long-Term Range Trend site and to conduct utilization studies in the area.</p> <p>Condition: The potential for livestock grazing/recreation conflicts is currently minimal. Grazing permit holders have expressed interest in fixing the road and have also asked about the possibility of water developments on the existing drill pads.</p>	<p>No additional impacts. The route would retain open administrative use in its current condition without improvement.</p>	<p>No additional impacts. The route would remain open to OHV use. If the BLM repairs impassable locations, beneficial impacts on livestock grazing permit holders could result from increased access to the Upper Cattle allotment.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
<p>Cultural and Paleontological Resources</p>	<p>Resource: The route traverses a high probability cultural resource area, including paleontological resources (Moki Marbles). Large deposits of Moki Marbles (i.e., iron concretions) are evident immediately adjacent to, and in the entire area along, the route/trail. Spencer Flat is 2.5 miles due west of the V-road and with similar deposits and exposures of Moki Marbles. Since monument designation, theft has depleted the marbles along Spencer Flat Road. Theft of these monument objects can be expected along the V-road. This route, managed as closed, provides for one of the largest roadless areas in GSENM, creating a 5-mile buffer from its center; managed as open, the roadless area would be reduced to a 2-mile buffer area (approximately).</p> <p>Condition: The BLM is currently undertaking cultural resource surveys along the route to assess sites and their condition.</p> <p>NHPA Section 106 status: Class I research indicates a high likelihood for cultural resource sites, probably temporary and/or seasonal camps and resource processing locations. However, this road was bladed and constructed to allow heavy equipment access to well pad locations, and it is assumed that any sites in the existing road will have already been significantly affected within that corridor. Cultural resource surveys will be initiated as soon as possible. It is quite likely that sites will be identified within the road corridor, but it is also likely that continued use within the existing disturbance will not further affect portions of sites that are found within the existing road prism. If necessary, it will likely be possible to re-route portions of this road to bypass NRHP-eligible sites.</p>	<p>Closure to OHV use would limit new potential degradation of site directly crossed by the existing route, and would limit the potential for additional theft and vandalism from increased public access. The potential for theft of Moki Marbles would be reduced through limitations on travel and access on the route.</p>	<p>Allowing public access would increase the potential for theft and vandalism of Moki Marbles and cultural sites, to which the route provides access. Special monitoring, education, and enforcement would likely be required to address effects from an increase in public access.</p> <p>If the density of sites directly crossed by the existing route indicates potential for impacts, the BLM would need to consider alternate routes (rerouting) to avoid ongoing damage or degradation. If avoidance is not possible, then the BLM would need to undertake a substantial archaeological excavation effort for the directly affected sites.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
Monument Objects	Presidential Proclamation 6920, as modified by 9682, identifies geologic and archaeological resources in the area.	Existing visitation levels would continue to increase primarily by foot track. Effects on cultural resources in the area are addressed above.	Visitation in the area by the route is expected to be higher with a corresponding increase in effects on geologic features such as Eye-of-the-Needle.
Soil Resources	<p><u>Resource:</u> The route crosses areas sandy and well drained, with very high runoff potential. Sand dunes present are relatively stable with low runoff potential because they are deep (>60 inches); however, dunes are susceptible to shifting by wind erosion. The area also has the potential for moderate to high early successional cryptobiotic soil crust.</p> <p><u>Condition:</u> Existing OHV use is the primary contributor to areas of soil instability and loss along the route. OHV use on the route has contributed to erosion and user-created re-routes have resulted in new areas of disturbance.</p>	Closure to OHV use would remove the primary contributor to soil loss along the routes, reducing impacts on soil resources.	Restrictions on vehicle size, designated pull-offs and signage, and erosion control measures would reduce potential for new impacts on soils. Potential for improving impassable segments of the route could reduce user-created re-routes and also reduce the potential for soil loss through erosion.
Visual Resources	<p><u>Resource:</u> The route corridor is currently managed as VRM Class I to preserve the existing, largely undeveloped character of the landscape from new visual contrast.</p> <p><u>Condition:</u> The route causes visual contrast by creating a man-made linear feature on the landscape.</p>	No additional impacts. The route would continue to create a linear feature causing visual contrast. Closing the route to OHV use could decrease the potential for route widening that would exacerbate that contrast.	The route would continue to create a linear feature causing visual contrast, the strength of which could increase over time if widening of the route by OHVs occurs.
Water	<p><u>Resource:</u> The route runs within a portion of a wash and crosses several other washes.</p> <p><u>Condition:</u> The route was developed on unstable, erodible soils (e.g., sand). Many culverts along the route are exposed or have been washed out. One section of the route has been completely washed out for a distance of approximately 200 feet. User-created re-routes (i.e., not engineered to address erosions/sedimentation issues) and their use by OHV is causing soil loss. The route in its current condition and the user-created reroutes also</p>	Closure of the route to OHV use could limit potential soil erosion and sedimentation along the route and user-created re-routes.	Restrictions on vehicle size and erosion control measures would reduce potential erosions and sedimentation. Potential repairs to washed-out portions of the route would reduce potential impacts from erosion and sedimentation.

	Affected Environment	Alternatives A, B, and C	Alternative D
	present a public safety risk, as the area is remote and not easily accessible.		
Recreational Uses and Access	<p>Resource: The route is used primarily for recreational access to the Eye-of-the-Needle. The access point to the Eye-of-the-Needle from the route is not marked and it can be difficult to determine how to access the geologic feature. In summer months, this region is hot and dry and poses public safety concerns for becoming lost and succumbing to heat exposure. Currently, the BLM requires the public to hike to the Eye-of-the-Needle. This requires the public to pre-plan to determine the route of travel and location of the Eye-of-the-Needle. In many instances, the public has difficulty locating the site due to its location in a sandstone dome that can be challenging to locate.</p> <p>Recreational access is primarily via OHV, but hiking, equestrian, and mountain biking also occur.</p> <p>Condition: The route has not been maintained for many years and was documented as “unmaintained” in 1998 in a WSA inventory report. Road work is required to make the route passable and to address current public safety issues. The route in its current condition offers a challenging OHV experience requiring moderate to advanced skills. For many OHV users, the challenging route is a desired experience/outcome. Pre-planning is highly recommended due to the safety concerns. The only recreational destination along this route is the Eye-of-the-Needle. The remainder of the route does provide access to the WSA and Escalante River but is not documented as a desirable access point for backcountry visitors. If the route is opened on the transportation system, this would provide an undeveloped access point to the Escalante River within GSENM.</p>	<p>In the route’s current condition, the BLM may limit access along the route to hiker/equestrian use only. Closure to OHV use would likely displace recreationists who use the route for an OHV desired experience/outcome, or for those seeking access to the Eye-of-the-Needle.</p>	<p>Allowing OHV use would increase recreational opportunities for those seeking access to the Eye-of-the-Needle. Improvements to the road may diminish the desired experience/outcome of OHV recreationists; however, improvements could address public safety concerns. Additionally; public safety concerns, including installation and maintenance of culverts, signage along the entirety and at the end of the route, and identification of safety hazards at washout areas/drop-offs, would be beneficial. A parking area for the Eye-of-the-Needle would reduce multiple parking areas/user-created impacts and a trail cairn system would be required to identify a trail to the feature to reduce route proliferation and impacts. Additional facilities, e.g., toilets, would be impractical to install along this route, as access for most vehicles is not recommended unless the road bed is restored with a hardened surface. Maintenance of the route would be difficult and costly.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
Wilderness Study Areas	<p>Resource: The route is located within the North Escalante Canyons Gulch WSA.</p> <p>Condition: The route was closed in GSENM’s transportation system and has been managed for administrative use. During the road inventory, OHV use was documented off the route/trail within the WSA. The WSA boundary is not well signed, as this route has received little use due to its administrative use and difficult access. GSENM and all public lands in the region have seen increased visitation, with OHVs being one of the fastest-growing activities.</p>	Closure of the route to OHV use could limit potential for illegal OHV use within the WSA.	Allowing OHV use would result in potential for illegal OHV use within the WSA; however, improvements to damaged portions of the route could eliminate user-created re-routes that currently extend into the WSA.
Socioeconomic	Limited SRP use in the region is primarily focused on hunting and sightseeing.	No additional economic benefit.	Access to destinations in the area may result in a limited increase in SRP use and a very limited potential economic benefit to the community.

GSENM – Grand Staircase-Escalante National Monument, OHV – off-highway vehicle, BLM – Bureau of Land Management, WSA – Wilderness Study Area, NHPA – National Historic Preservation Act, NRHP – National Register of Historic Places, VRM – Visual Resource Management, SRP – Special Recreation Permit

Table 11. Inch Worm Arch Road Affected Environment and Effects Analysis

	Affected Environment	Alternatives A, B, and C	Alternative D
Route Overview	The destination and route are located in the GSENM within the Grand Staircase Unit. The route in its current form travels along the user-created route through a pinyon-juniper desert landscape composed of sandy benches and dry washes. The route winds through trees and over archaeological sites. The purpose of the current use of this route is to access a natural arch site at the end of the road. At the end of the OHV route, a 500-foot user-created foot trail provides access to the natural arch. The foot trail continues beyond the arch, accessing the canyon bottom. The destination is well known locally and promoted in the community, as well as by trail guides, and online.	Route remains closed to OHV use. Signage or other barriers, coupled with enforcement efforts, will be used to limit access.	Route is opened to OHV use and added to the Transportation Management Plan. As needed for resource protection and safe public access, allow development of the following: human waste disposal systems; OHV parking areas, pull-outs, or passing lanes; signage; development of official foot trails at both access points; erosion control where needed; and route realignment around sensitive archaeological and paleontological sites.

	Affected Environment	Alternatives A, B, and C	Alternative D
			<p>Other roads, i.e., #558 and 563, may be evaluated in the future to open existing linear disturbances to provide a loop route that is popular with OHV users in the area.</p>
<p>Cultural Resources</p>	<p><u>Resource:</u> The route traverses an area of significant cultural resource site density, within an area of the larger of the Planning Areas with previously documented high cultural resource site density. The BLM has conducted a Section 106 survey along the existing route, which identified four sites crossed by the route, as well as several other additional sites that are outside the route corridor.</p> <p><u>Condition:</u> Several sites have been exposed by OHV use along the route, leading to degradation of the sites.</p> <p><u>NHPA Section 106 status:</u> Cultural resource surveys have been completed, sites identified and recorded, and a potential bypass route flagged for further consideration. A report will be completed and forwarded to the SHPO with a finding of No Historic Properties Affected, assuming that the proposed bypass route will be adopted. If this bypass route is not adopted and current route use continues, the report will be filed with a finding of Adverse Effect, and mitigation of the sites in question will be necessary; this would likely be an expensive and time-consuming process.</p>	<p>Closure to OHV use would limit new potential degradation of sites directly crossed by the existing route. Non-motorized public access would occur, but such access would be unlikely to directly cause additional (new) degradation for sites crossed, although degradation from natural erosion and other factors outside of the BLM's control would continue to occur.</p>	<p>Allowing increased public access and OHV use would increase the potential for degradation of sites crossed by the route. The BLM would need to consider alternate routes (rerouting) to avoid ongoing damage or degradation, or would need to undertake a substantial archaeological excavation effort for the directly affected sites. The BLM has initially identified several alternate routes that bypass/avoid the sites.</p> <p>The BLM has limited control over off-route incursions, and allowing OHV access could therefore allow effects to occur on cultural resources adjacent to the route.</p>
<p>Monument Objects</p>	<p>Presidential Proclamation 6920, as modified by 9682, identifies geologic resources including arches such as Inch Worm as objects. Archaeological resources in the area also identified as objects.</p>	<p>Existing visitation levels would continue to Inch Worm Arch and increase based upon non-BLM derived promotion of the area. This visitation has the potential to affect the arch through vandalism, arch swinging, or similar human-caused effects. Effect on cultural resources are addressed above.</p>	<p>Visitation is expected to be slightly higher with a corresponding increase in effects on Inch Worm Arch. Cultural sites would be better protected through proposed realignment of the route around sites.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
<p>Visual Resources</p>	<p>Resource: The route approaches the Inch Worm Arch, a unique geologic feature.</p> <p>Condition: The route causes visual contrast by creating a man-made linear feature on the landscape.</p>	<p>No additional impacts. The route would continue to create a linear feature causing visual contrast. Closing the route to OHV use could decrease the potential for route widening that would exacerbate that contrast.</p>	<p>The route would continue to create a linear feature causing visual contrast, the strength of which could increase over time if widening of the route by OHVs occurs.</p>
<p>Soil and Water Resources</p>	<p>Resource: The route generally crosses areas of stabilized dunes, with sandy and well drained soils with low runoff potential. Sandy soils with minimal pedogenic development occur in this area, with a low to moderate potential for erosion in disturbed sands. A small portion of the route crosses areas of steeper slopes and soils with high runoff potential. The area also has the potential for moderate to high early successional cryptobiotic soil crust.</p> <p>Condition: There is a high potential for off-route incursions by recreationists, and past incursions were noted during the BLM's field survey. Activity off-route can result in soil loss, especially in areas with high runoff potential. The routes cross and run adjacent to washes, which could be affected by recreationists directly (e.g., driving through washes) or via erosion in the watershed.</p>	<p>Closure to OHV use could reduce potential soil loss along the routes, reducing impacts on soil resources.</p>	<p>Restrictions on vehicle size, designated pull-offs and signage, and erosion control measures would reduce potential for new impacts on soils. However, the BLM does not anticipate improving the route, and therefore impacts from soil loss would continue to occur. The BLM has limited control over off-route incursions, and allowing OHV access would therefore allow effects on soils from such incursion to continue.</p>
<p>Recreational Uses and Access</p>	<p>Resource: Inch Worm Arch is popular with local residents and visitors, and the route receives use by the public. There is a user-created foot trail from the parking site to the arch viewing area. Recreational access occurs via OHV, hiking, equestrian, and mountain biking. Other activities along the route include hunting and fishing, recreational shooting, photography, wildlife viewing, and limited dispersed camping. The route is the only motorized access to Inch Worm Arch. The Kane County Travel Council has identified this site as a destination for the OHV community.</p> <p>Condition: The area is managed as an ERMA, primarily catering to undeveloped, primitive, self-</p>	<p>Closure to OHV use would likely displace recreationists who access Inch Worm Arch. Inch Worm Arch is popular with local residents and visitors, and it is expected that the public would continue to seek access to visit this resource; closure to OHV use would limit such access. The route receives use by the public. There is a user-created foot trail from the parking site to the arch viewing area. The trail is posted "No Vehicles,"</p>	<p>Allowing OHV use would provide recreational opportunities for those seeking access to Inch Worm Arch, as well as those seeking opportunities for hunting, shooting, and other uses. Conversely, allowing OHV access along the route could increase conflicts between hikers, mountain bikes, and OHVs; increases in OHV use would increase the potential for dust, which could adversely affect recreationists at Inch Worm Arch and along the route.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
	directed recreation use accommodating both motorized and non-motorized uses. Non-motorized use was documented going to, and in the immediate area of, the arch. The foot trails are user created. The user-created foot trail from the parking site is posted “No Vehicles,” although OHV tracks have been documented driving past the sign toward the arch.	although ATV tracks were documented driving past the sign down toward the arch. It is expected the public will continue to want access (motorized and non-motorized) to visit this resource.	
Lands with Wilderness Characteristics	This area surrounding the Inch Worm Arch route was inventoried in 2018 and no areas of lands with wilderness character occur in the vicinity.	No effect.	No effect.
Lands and Realty	<u>Resource:</u> The route crosses close to private property. <u>Condition:</u> There is a high potential for off-route incursions by recreationists, and past incursions were noted during the BLM’s field survey. Such incursions could lead to trespass issues on adjacent private lands.	Closure to OHV use would decrease incursions (trespass) on adjacent private lands.	Allowing OHV use could increase incursions (trespass) on adjacent private lands. Signage and the development of pullouts and other route components would help reduce the potential for such effects by directing OHV users to remain on route and providing safe locations on BLM-administered surface land to pull off-route.
Socioeconomic	Limited SRP use in the region is primarily focused on hunting and sightseeing.	No additional economic benefit.	Access to the destination may result in a limited increase in SRP use and a very limited potential economic benefit to community.

GSENM – Grand Staircase-Escalante National Monument, OHV – off-highway vehicle, BLM – Bureau of Land Management, NHPA – National Historic Preservation Act, SHPO – State Historic Preservation Officer, ERMA – Extensive Recreation Management Area, SRP – Special Recreation Permit

Table 12. Flag Point Trail Affected Environment and Effects Analysis

	Affected Environment	Alternatives A, B, and C	Alternative D
Route Overview	The destination and route are located in the GSENM within the Grand Staircase Unit. The route in its current form travels along the user-created route through a pinyon-juniper desert landscape composed of sandy benches and dry washes, making it difficult for larger vehicle access. The	Route remains closed to OHV use. Signage or other barriers, coupled with enforcement efforts, will be used to limit access.	Route is opened to OHV use, and added to the Transportation Management Plan. As needed for resource protection and safe public access, allow development of the following: human

	Affected Environment	Alternatives A, B, and C	Alternative D
	<p>route winds through trees and over archaeological sites. At the end of the OHV route, a 500-foot user-created foot trail provides access to the paleontological site (dinosaur tracks) and archaeological site (pictograph and petroglyphs). The destination is well known locally and promoted in the community, as well as by trail guides, and online.</p>		<p>waste disposal systems, OHV parking areas, pull-outs for passing lanes, signage, development of official foot trails at both access points, erosion control where needed, and route realignment around sensitive archaeological and paleontological sites.</p>
<p>Cultural and Paleontological Resources</p>	<p>Resource: The route traverses an area of very high cultural resource site density, within a portion of the Planning Areas with some of the highest cultural resource site density found in GSENM. The terminal point of the route provides access to a series of pictographs and petroglyphs depicting dinosaur tracks. The location of known fossil dinosaur tracks nearby is globally unique, with fewer than five such sites known in the world. The route also provides access to a grouping of Early Jurassic Age dinosaur fossil footprints. These resource types are not unique when compared to other paleontological and archaeological sites in the area. However, the pictographs of anthropomorphic figures apparently dancing around a dinosaur track, and anthropomorphic figures with large, three-toed feet, found on the cliff face immediately below the tracks and unquestionably associated with the tracks should be considered unique. Vandalism at these rock art sites is an ongoing problem. The Kane Country Travel Council promotes these resources as destination for the OHV community.</p> <p>Condition: The BLM is currently undertaking Class III cultural resource surveys along the entire route to assess sites and their condition. Preliminary field surveys have identified Anasazi farmstead sites, Archaic lithic scatters, and Late Prehistoric sites.</p> <p>NHPA Section 106 status: initial Section 106 cultural resource surveys have been completed along the existing route. More than 40</p>	<p>Closure to OHV use would limit new potential degradation of the site directly crossed by the existing route, and would limit the potential for additional theft and vandalism of the dinosaur track site, pictographs, and petroglyphs from increased public access. However, a user-created foot trail from Seaman Wash Road (BLM 563) along the valley floor to access these sites currently exists and would remain regardless of whether Flag Point Trail is designated; non-motorized public access to the dinosaur track site, pictographs, and petroglyphs would therefore likely continue and the potential for theft and vandalism would remain.</p>	<p>Allowing public access would increase the potential for theft and vandalism of the dinosaur track site, pictographs, and petroglyphs, and other archaeological sites to which the route provides access. Special monitoring, education, and enforcement would be likely be required to address effects from an increase in public access.</p> <p>The density of sites directly crossed by the existing route indicates the BLM would need to consider alternate routes (rerouting) to avoid ongoing damage or degradation, or would need to undertake a substantial archaeological excavation effort for the directly affected sites.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
	<p>archaeological sites have been identified, the large majority of which are crossed by the existing route. This stands in stark contrast to the results of cultural resource surveys performed in this area and along this ridge in 1989, showing that use of that route over the past two or three decades has exposed many additional sites. Re-routing of this route would be very difficult, as cultural resource surveys to date indicate a very heavy site density along any potential re-route. Sites located by the recently completed route-specific survey are dominated by Formative residential and farmstead sites, including sites from the Basketmaker III period through the Anasazi Puebloan periods. These include masonry structures, room blocks, pithouses, artifact scatters, and extensive middens. Sites also include those from the Archaic through the Late Prehistoric periods. All sites within the existing route have been adversely affected by use of this route. Mitigation (excavation) of these sites would be a very time-consuming and expensive process. It is suggested that an optional route be identified for access to the Flag Point area. Furthermore, it is suggested that no motorized access to this location should be allowed, as such access will only increase the ongoing vandalism at this very important set of archaeological and paleontological sites.</p>		
Soil Resources	<p><u>Resource:</u> The route crosses areas of sandy and well-drained soil with low runoff potential. Sandy soils with minimal pedogenic development occur in this area, with a low to moderate potential for erosion in disturbed sands. The area also has the potential for moderate to high early successional cryptobiotic soil crust.</p> <p><u>Condition:</u> Existing OHV use is the primary contributor to areas of soil instability and loss along the route. OHV use on the route has created trail</p>	<p>Closure to OHV use would remove the primary contributor to soil loss along the routes, reducing impacts on soil resources.</p>	<p>Restrictions on vehicle size, designated pull-offs and signage, and erosion control measures would reduce potential for new impacts on soils. However, the BLM does not anticipate improving the route, and therefore impacts from soil loss would continue to occur.</p>

	Affected Environment	Alternatives A, B, and C	Alternative D
	tread erosion, exposed tree roots, and erosion adjacent to tree trunks.		
Special Status Species	<u>Resource:</u> There is an existing peregrine falcon nest along the cliff edge at Flag Point. <u>Condition:</u> The route is 8 miles from the peregrine falcon nest, and is not known to be affecting the nest.	No additional impacts. The route would continue to be at a distance from the peregrine falcon nest such that effects are not anticipated to occur.	No additional impacts. The route would continue to be at a distance from the peregrine falcon nest such that effects are not anticipated to occur.
Monument Objects	Presidential Proclamation 6920, as modified by 9682, identifies paleontological resources and specifically classifies the Flag Point dinosaur tracks as a monument object. Archaeological resources in the area are also identified as objects.	Existing visitation levels would continue to the Flag Point site and increase based upon non-BLM-derived promotion of the area. This visitation has the potential to affect the tracks through vandalism or similar human-caused effects. Effect on cultural resources are addressed above.	Visitation is expected to be slightly higher with a corresponding increase in effects on Flag Point dinosaur tracks. Cultural sites would be better protected through proposed realignment of the route around sites or by selection of an alternative route.
Visual Resources	<u>Resource:</u> The route corridor is currently managed as VRM Class II to preserve the existing, largely undeveloped character of the landscape from new visual contrast. <u>Condition:</u> The route causes visual contrast by creating a man-made linear feature on the landscape.	No additional impacts. The route would continue to create a linear feature causing visual contrast. Closing the route to OHV use could decrease the potential for route widening that would exacerbate that contrast.	The route would continue to create a linear feature causing visual contrast, the strength of which could increase over time if widening of the route by OHVs occurs.
Water	<u>Resource:</u> The route crosses and runs adjacent to Seaman Wash. <u>Condition:</u> The route is user created (i.e., not engineered to address erosions/sedimentation issues) and its use by OHV is causing soil loss.	No additional impacts. Closure of the route to OHV use could limit potential soil erosion and sedimentation.	Restrictions on vehicle size and erosion control measures would reduce potential erosion and sedimentation. However, the BLM does not anticipate improving the route, and therefore impacts from erosion would continue to occur.
Wildlife	<u>Resource:</u> The route crosses through mule deer winter range. <u>Condition:</u> Habitat conditions for mule deer have been declining for mule deer across the Planning Area. Mule deer are vulnerable to stress caused by	Closure to OHV use could reduce the potential for displacement of mule deer in winter range.	Allowing OHV use would likely increase use of the route, and would likely lead to additional opportunities for displacement of mule deer in this portion of its winter range.

	Affected Environment	Alternatives A, B, and C	Alternative D
	human activity in winter range areas, and are displaced by human activity. Refer to Chapter 2, Section 2.2.5, <i>Fish and Wildlife</i> (pages 39–47), and Appendix 4, <i>Fish and Wildlife</i> (pages 263–268), in the AMS (BLM 2018b) for information on big game populations in the Planning Area.		
Recreational Uses and Access	Resource: The route is used primarily for recreational access to popular cultural and paleontological resources. Recreational access is primarily via OHV. Hiking, equestrian, and mountain biking may occur to a lesser extent. Other activities along the route are limited and constrained. Condition: The area is managed as an ERMA, primarily catering to undeveloped, primitive, self-directed recreation use accommodating both motorized and non-motorized uses. The existing user-created route is narrow, has limited pull-outs for passing, and includes blind spots that may be creating public safety issues.	Closure to OHV use would likely displace recreationists who access sites along the route. The paleontological and archaeological sites are popular with local residents as well as tourists, and it is expected that the public and commercial permit holders would continue to seek access to visit these resources; closure to OHV use would limit such access.	Allowing OHV use would increase recreational opportunities for those seeking access to the paleontological and archaeological sites along the route, as well as those seeking opportunities for hunting, shooting, and other uses. Conversely, allowing OHV access along the route could increase conflicts between hikers, mountain bikes, and OHVs due to the narrow size of the route and lack of pull-outs. Should the BLM develop pull-outs, such conflicts could be reduced.
Lands with Wilderness Characteristics	The area surrounding the Flag Point route was inventoried in 2018 and no areas of lands with wilderness character occur in the vicinity.	No effect.	No effect.
Socioeconomic	Limited SRP use in the region is primarily focused on hunting and sightseeing.	No additional economic benefit.	Access to the destination may result in a limited increase in SRP use and a very limited potential economic benefit to the local community.

GSENM – Grand Staircase-Escalante National Monument, OHV – off-highway vehicle, BLM – Bureau of Land Management, NHPA – National Historic Preservation Act, VRM – Visual Resource Management, AMS – Analysis of the Management Situation, ERMA – Extensive Recreation Management Area, SRP – Special Recreation Permit

References

Bureau of Land Management (BLM). 2018b. Grand Staircase-Escalante National Monument and Kanab-Escalante Planning Area Analysis of the Management Situation. BLM Utah. June 2018.

