

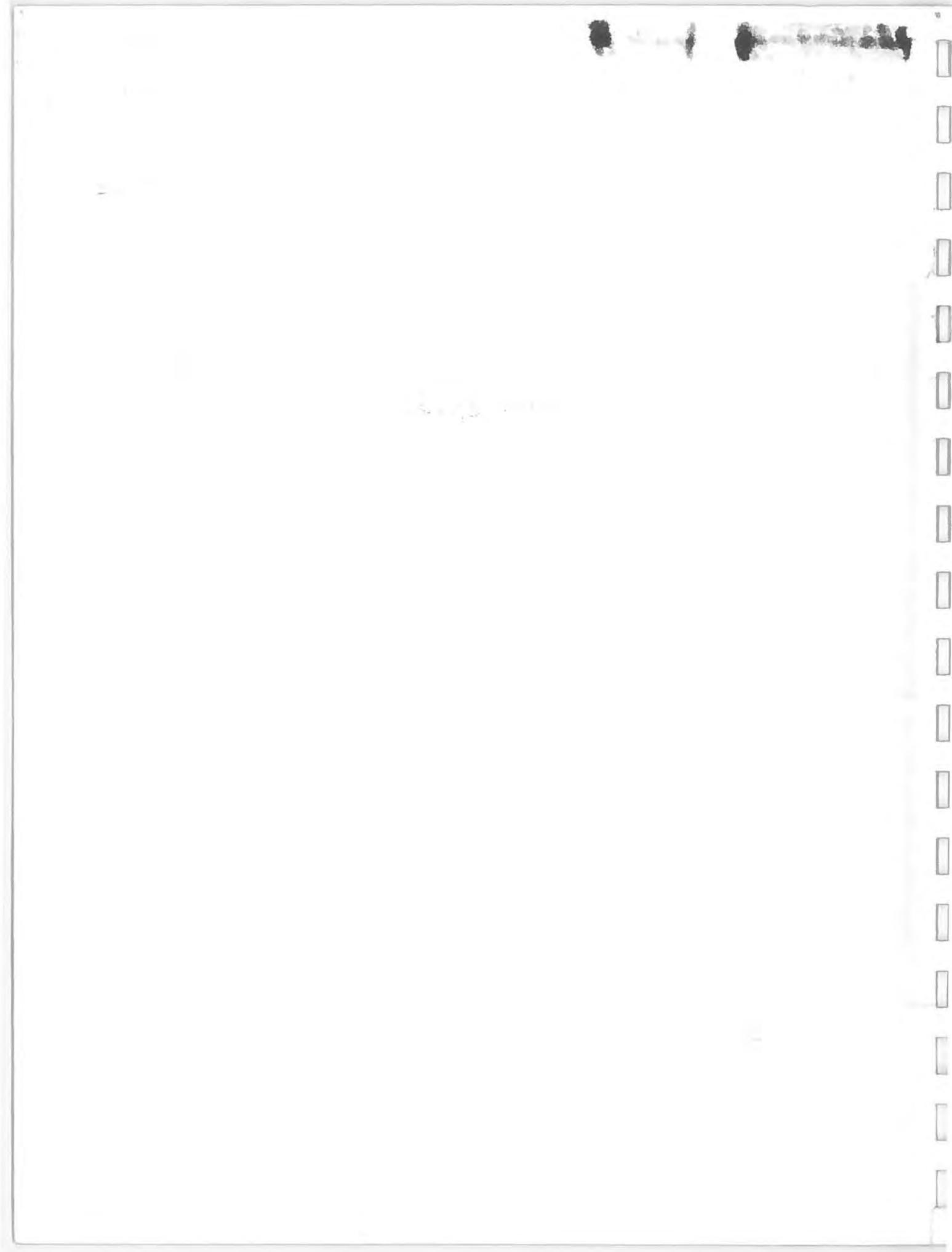
E
[REDACTED]
C-1

[REDACTED]
**wild and scenic river study
final environmental statement**
september 1979


**COLORADO AND
LOWER DOLORES RIVERS**

COLORADO / UTAH





c-1

United States Department of the Interior

WILD AND SCENIC RIVER STUDY
and
FINAL ENVIRONMENTAL STATEMENT

FES 83-37

COLORADO AND LOWER DOLORES RIVERS

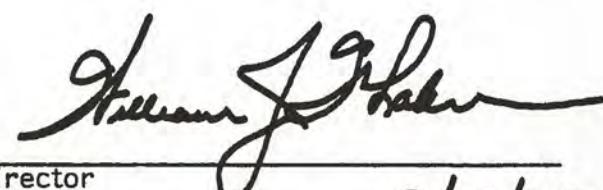
Prepared by
National Park Service
Denver Service Center

in cooperation with

The Colorado Department of Natural Resources

and

The Utah Department of Natural Resources



Director
National Park Service

9/13/79

C O N T E N T S

WILD AND SCENIC RIVER STUDY

Summary of Findings and Recommendations	1
Findings	1
Recommendations	1
Estimated Costs	6
Chapter I - Introduction	7
Background	7
The Study	10
Chapter II - Regional Description	14
Physiography and Geomorphology	14
Minerals	22
Soils	26
Climate	31
Vegetation and Wildlife	35
Cultural Resources	36
Archaeology	36
History	39
Water Resources	41
Population	45
Economy	46
Landownership and Use	46
Transportation	48
Recreation	49
Chapter III - The River Corridor	53
Preface	53
Scenery, Geology, and Geomorphology	53
Colorado River	53
Dolores River	75
Mineral Resources	86
Soils	88
Vegetation	94
Fish and Wildlife	102
Water Resources	107
Cultural Resources	121
Archaeology	121
History	122
Land Use and Ownership	123
Recreation	127
Chapter IV - Eligibility and Classification	133
Eligibility	133
Classification	144
Chapter V - Findings and Recommendations	157
Findings	157
Recommendations	157
Management Recommendations	163
Land Acquisition	169
Developments	171
Costs	173

FINAL ENVIRONMENTAL IMPACT STATEMENT

Chapter VI - Description of the Proposal	182
Background	182
Management Goals	185
Corridor Area	186
Easement Acquisition	187
Planned and Proposed Developments	188
Costs	191
Relationship with Other Programs	192
Chapter VII - Description of the Environment	195
Chapter VIII - Environmental Impacts of the Proposed Action	196
Colorado River	196
Impact on Mineral Resources	196
Impact on Land Use	197
Impact on Water Resource Development Projects	198
Impacts on Recreation	200
Impacts on Economic and Regional Development	201
Impact on Social Well-being	202
Other Impacts	202
Dolores River	204
Impact on Mineral Resources	205
Impact on Land Use	206
Impact on Water Resource Development Projects	207
Impact on Recreation	207
Impact on Economic and Regional Development	208
Impact on Social Well-being	208
Other Impacts	208
Chapter IX - Mitigating Measures and Unavoidable Adverse Impacts of the Proposed Action	210
Mitigating Measures	210
Unavoidable Adverse Impacts	211
Chapter X - Relationship Between Short-term Use of the Environment and Long-term Productivity; and Irreversible or Irretrievable Commitments of Resources Involved in the Proposed Action	214
Chapter XI - Analysis of Alternatives and their Impacts	215
Planning Procedure	215
Alternative Plans	216
Colorado River	218
Dolores River	238
Summary and Comparison	255
Chapter XII - Consultation and Coordination in the Development of the Proposal and Environmental Statement	260
Public Comments on the Draft Environmental Impact Statement and Responses	263
Appendix A - Rock Formations of the Colorado and Dolores River Study Area	344

Appendix B - Water Flow Data	348
Appendix C - Fishes of the Colorado and Dolores Rivers	352.
Appendix D - Wildlife of the Colorado and Dolores River Study Areas	354
Appendix E - Outline and Application of Principles and Standards Procedures to Alternative Actions	362
Appendix F - Contributors	
Bibliography	376

L I S T O F F I G U R E S

STUDY REPORT

	<u>Page</u>
Regional Setting and Study Segments	3
Grand & Mesa Counties Physiographic Features	19
Piracy of the Gunnison and Colorado Rivers	21
Grand & Mesa Counties Mineral Resources	23
Grand & Mesa Counties Soils	29
Major Recreation Areas	51
Generalized Section of Rock Formations	
Along the Colorado River Study Area	54
Generalized Section of Rock Formation	
Along the Dolores River Study Area	76
General Soil Association	89
Generalized Position of Soils in the Corridor Landscape	92
Endangered and Threatened Fish of the Colorado River Study Area	103
Mean Monthly Flow-Colorado River Near Cisco, 1950-1977	108
Percent of Flows That Equal or Exceed a Given Rate of Flow, Colorado River Near Colorado/Utah State Line, 1951-1975	110
Mean Monthly Flow-Dolores River, 9 Miles Above Mouth, 1950-1975	112
Percent of Flows That Equal or Exceed a Given Rate of Flow, Dolores Near Cisco Utah, 1952-1975	113
Corridor Landownership	125
Eligibility and Classification	155
Recommendations	159

ENVIRONMENTAL STATEMENT

Proposal	183
Planned and Proposed Developments	189
Plan 2 - Colorado River	229
Plan 3 - Colorado River	233
Plan 2 - Dolores River	245
Plan 3 - Dolores River	251

L I S T O F T A B L E S

STUDY REPORT

<u>Number</u>		<u>Page</u>
Key -	Soils Map, Mesa County Colorado & Grand County Utah	28
II-1	Land Ownership in Mesa County, Colorado and Grand County, Utah	47
III-1	Water Rights-Colorado and Dolores Rivers	115
III-2	Summary of Water Quality, Colorado and Dolores Rivers	118
IV-1	Summary of Factors Determining Eligibility	135
IV-2	Classification Level Criteria	146
IV-3	Classification Levels	148

ENVIRONMENTAL STATEMENT

VII-1	Corridor Landownership Acreage and River Frontage	187
VIII-1	Impact of the Proposed Action on Expected Visitation	203
XI-1	Impacts of Alternatives for the Colorado River	217
XI-2	Effects of Options for the Colorado River in 1990	236
XI-3	Impacts of Alternatives for the Dolores River	239
XI-4	Effects of Options for the Dolores River in 1990	256

APPENDIX

B-1	Colorado River Near Colorado-Utah State Line, Water Flow Data-Yearly Summary	348
B-2	Water Flow Data, Yearly Summary, Dolores River near Cisco, 9 miles above mouth	349
B-3	Water Flow Data, Yearly Summary, Colorado River near Cisco, Utah, 1 mile below Dolores River	350
C-1	Fishes of the Colorado and Dolores River	352
D-1	Wildlife of the Colorado and Dolores River Study Area	354
E-1a	Differences in Effects Between the Recommended Option and the other Options in 1990 - Colorado River	369
E-1b	Differences in Effects Between the Recommended Option and the other Options in 1990 - Colorado River	370

E-2	Government Cost Assumptions, Colorado Wild and Scenic River Study	371
E-3	Cost Assumptions - Colorado and Dolores Wild and Scenic River Study	374

SUMMARY OF FINDINGS AND RECOMMENDATIONS

FINDINGS

1. The Colorado River from the Loma launch site, 20.7 miles (33.3 km) upstream from the Colorado-Utah border, downstream to its confluence with the Dolores River in Utah is eligible for inclusion in the National Wild and Scenic River System. This 55.7-mile (88.8-km) portion of the river contains outstandingly remarkable scenic, geologic, cultural, recreational, and fish and wildlife values.
2. The Dolores River from Gateway, Colorado, downstream 31 miles (49.9 km) to its confluence with the Colorado River in Utah is eligible for inclusion in the National Wild and Scenic River System and possesses outstandingly remarkable scenic, geologic, recreational, and wildlife values.
3. The Principles and Standards analysis revealed that designating these rivers would protect their outstanding values while making substantial contributions to the regional economy.

RECOMMENDATIONS

1. The Colorado River study segments, totaling 55.7 miles (88 km) and including about 25,000 acres (10,100 ha) of associated lands in a corridor averaging approximately 0.35 miles (0.6 km) in width on each shore, should be designated a component of the National Wild and Scenic River System, with the following classification levels:
 - (a) Segments A-1 and A-2, Loma Launch to Westwater Canyon (river mile 1,079.2 to river mile 1,051.5), 27.7 miles (43.8 km)-----Scenic

- (b) Segment B, Westwater Canyon to Rose Ranch (river mile 1,051.5 to river mile 1,038.5), 13 miles (20.9 km)----Wild
 - (c) Segment C, Rose Ranch to Cisco Wash (river mile 1,038.5 to river mile 1,027.5), 11 miles (17.7 km)-----Scenic
 - (d) Segment D, Cisco Wash to Dolores River (river mile 1,027.5 to river mile 1,023.5), 4 miles (6.4 km)-----Recreational
2. The Dolores River from the vicinity of Gateway to the confluence with the Colorado River, totaling 31 miles (49.9 km) and including about 11,900 acres (4,820 ha) of associated lands in a corridor averaging approximately 0.3 miles (0.5 km) in width on each shore, should be designated a component of the National Wild and Scenic River System, with the following classification levels:
- (a) Segment A, Gateway, Colorado, to Fisher Creek (river mile 31 to river mile 17), 14 miles (22.5 km)-----Scenic
 - (b) Segment B, Fisher Creek to Bridge Canyon (river mile 17 to river mile 11), 6 miles (9.7 km)-----Wild
 - (c) Segment C, Bridge Canyon to Colorado River (river mile 11 to river mile 0), 11 miles (17.7 km)-----Scenic
3. The State of Utah is making an inventory and analysis of all its rivers, and until this is completed, will not take a position on designation of either of these rivers.¹ The State of Colorado fully supports designation of the segments within its borders.²

1. Letter of July 18, 1979, from Governor Matheson (signed by Kent Briggs) to Ben Zerbey. See public comment section of Chapter 12.

2. Letter of August 3, 1979, from Governor Lamm to Cecil Andrus. See public comment section of Chapter 12.

4. The Bureau of Land Management, which at present administers the rivers, should continue to do so after designation. The management plans for the rivers should be prepared by the BLM in cooperation with the states of Colorado and Utah, with the general goals of preserving existing land uses, protecting the outstanding values which have made the rivers eligible for the system, and encouraging the amounts and types of recreation that will not degrade these values. These plans will determine the actual boundaries of the corridor. The BLM should identify, during the planning period, environmentally acceptable access sites to the Dolores Triangle, in the event future access improvement to that area is required. During the management planning period, the BLM should also investigate the possibility of providing access on public lands near Gateway, since convenient sites exist and this could minimize interference with private property.
5. Approximately 5,350 acres (2,160 ha) of private land along the Colorado River and 1,640 acres (690 ha) along the Dolores should be preserved in their present natural or pastoral state. This should be accomplished, if possible, by the present landowners. If determined practicable, a notice requirement should be instituted for landowners to inform the Bureau of Land Management of plans for any major changes in land use, so that the agency can determine whether the planned change would degrade the rivers' values. If it were found that the change in land use would degrade the rivers' values, a one-year negotiation period should ensue. During this period an attempt would be made to agree on land use changes acceptable to the landowner that would not degrade the outstanding values of the area. If no agreement on an acceptable land use change could be reached, the Bureau of Land Management would purchase a scenic easement on the lands involved. This process is described in more detail in chapter V.

ESTIMATED COSTS

If the 55.7-mile (89-km) segment of the Colorado and the 31-mile (49.9 km) segment of the Dolores are included in the national system, the following costs are estimated:

Scenic Easements (Maximum easement purchase on all private lands in the corridor if BLM exercises its right to condemn easements in order to forestall developments threatening the rivers' values) - - - - -	\$2,796,000
Land Acquisition in Fee- - - - -	0
Recreational Developments- - - - -	64,000
Additional Annual Operations and Maintenance- -	3,500

CHAPTER I

INTRODUCTION

BACKGROUND

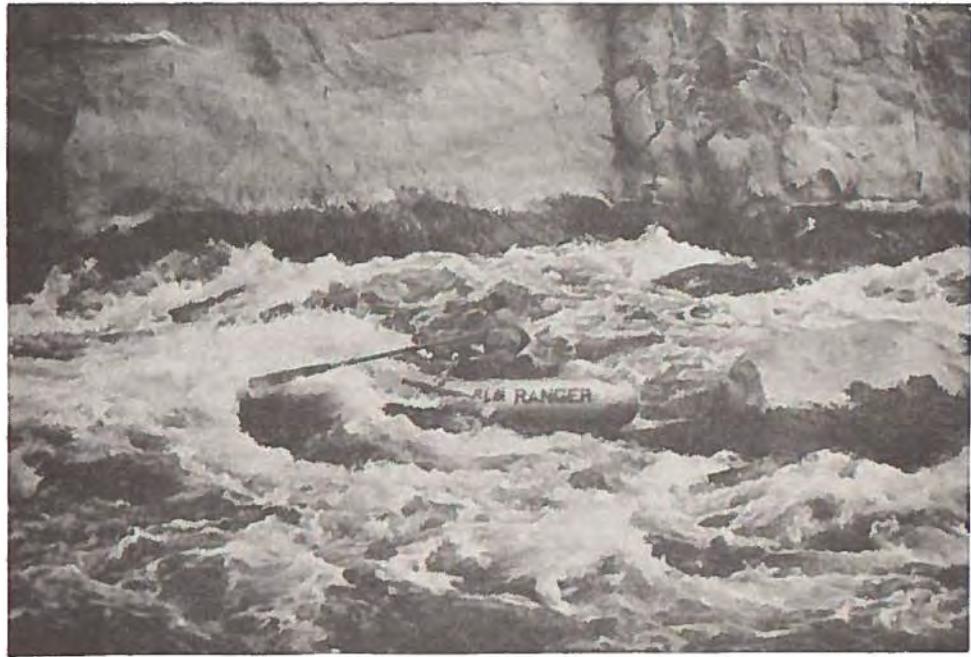
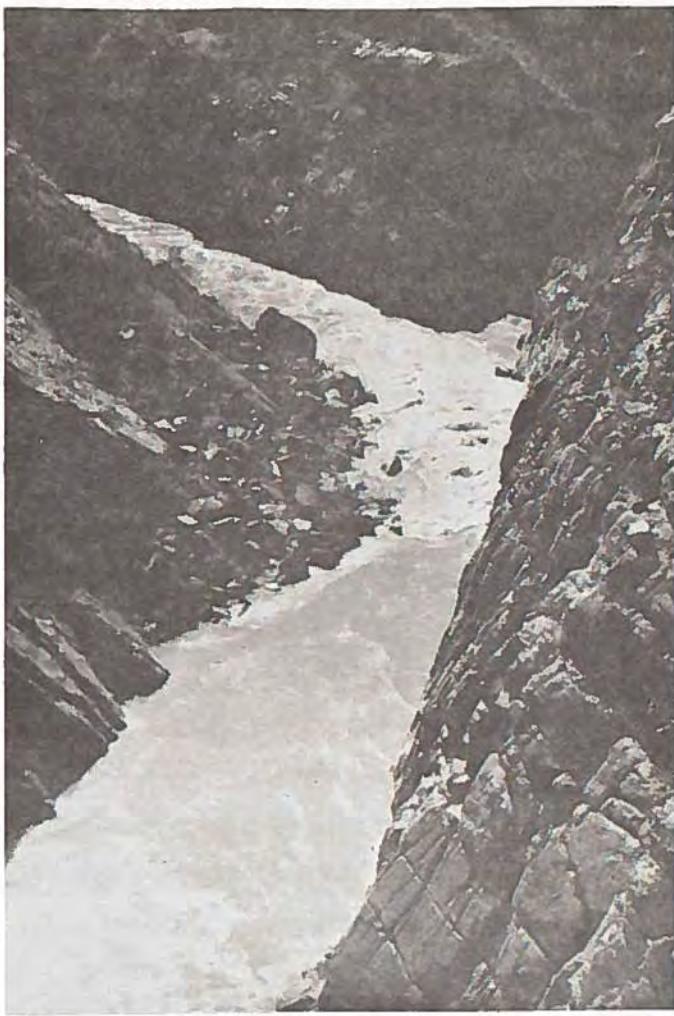
The Wild and Scenic Rivers Act, P. L. 90-542, became law on October 2, 1968. It preserves "certain selected rivers" that "possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values . . . in their free-flowing condition . . . for the benefit and enjoyment of present and future generations."

The Act named eight rivers as initial components of the National Wild and Scenic Rivers System. Twenty-seven others were listed as potential additions, and a procedure was framed for assessing their eligibility. The Act defines three possible classifications for eligible rivers: wild, scenic, and recreational; these are predicated on the degree of development in the corridor. It deals with such matters as land acquisition, right and use of occupancy, water resource developments, mining and administration as they affect components of the system.

Since October 1968 there have been six amendments to the Wild and Scenic Rivers Act. As of January 1979 there were 28 rivers or river segments in the National Wild and Scenic Rivers System, 20 of which have been added since passage of the Act. Amendments have also designated 45 additional rivers for study, of which 29 were included by the amendment of January 3, 1975 (P.L. 93-621).

One of the 29 new "study rivers" was "(34) Colorado, Colorado and Utah: The segment from its confluence with the Dolores River, Utah, upstream to a point 19.5 miles (31.2 km) from the Utah-Colorado border in Colorado."

Skull Rapid – Westwater Canyon NPS



The terminus 19.5 miles (31.2 km) above the border was apparently not related either to recreational use, private land, or physiography, so the study team extended the boundary of the area upstream approximateiy 1.2 miles (2 km) to a more logical area, the Loma boat ramp--the staging area for most river trips on this part of the Colorado. Thus the area of the Colorado River which was studied was 55.7 miles (89.1 km) long.

This same amendment required the study of the Dolores River in Colorado, during 1975. The Departments of the Interior and Agriculture and the State of Colorado jointly recommended in that study that a 105-mile (168 km) segment of the Dolores from the McPhee Damsite to 1 mile (1.6 km) above Bedrock, Colorado, be included in the National Wild and Scenic River System. In addition, the State of Colorado recommended an additional 35 miles (56 km) of the West Dolores. The report noted that "the 8-mile portion of the river between Gateway and the Utah State Line should be included in the national system at such time as the river in Utah is included."¹

On November 12, 1976, Governor Rampton of Utah requested the Secretary of the Interior to study that portion of the Dolores River in Utah. Governor Lamm of Colorado supported this extension of the study. The Assistant Secretary of the Interior agreed to this request on December 17, 1976. Consequently, an evaluation of the 31-mile (49.6 km) segment of the Dolores River that runs from Gateway, Colorado, down to the confluence with the Colorado River in Utah is included in this report.

1. Dolores River Wild and Scenic River Study Report, Colorado Department of Natural Resources, U.S. Departments of Agriculture and the Interior. (March, 1976). See also Final Environmental Statement, Dolores River, FES 76-56 (November, 1976).

THE STUDY

In June 1976, a joint federal-state team was formed to carry out the Colorado River study. Three agencies shared leadership responsibilities; the Bureau of Outdoor Recreation,² the Colorado Department of Natural Resources (represented by the Colorado Water Conservation Board), and the Utah Department of Natural Resources (represented by the Utah Outdoor Recreation Agency). In addition, the Bureau of Land Management, which is the primary land managing agency along the segments of the Colorado and Dolores Rivers under study, was also included on the study team. Many other federal and state agencies actively participated in the study, including the U.S. Fish and Wildlife Service, Bureau of Reclamation, National Park Service, Soil Conservation Service, Energy Research and Development Administration, as well as the fish and wildlife agencies and historical societies of both states. Other federal and state agencies were consulted as needed during the study.

The study proceeded as follows:

Gathering Data

The study team used existing data sources to full advantage. A substantial amount of information concerning the Colorado and Dolores Rivers was included in various reports available to the study team. In addition, data were also provided by various federal and state agencies, consultants, interested groups, and individuals.

2. The Bureau of Outdoor Recreation, reorganized as the Heritage Conservation and Recreation Service, transferred the study to the National Park Service on July 5, 1978.

To gain first-hand knowledge of the rivers, the study participants inspected them on foot, by raft, by motor vehicle, and from the air. Basic information gathered on the Colorado and Dolores Rivers is presented in chapters II and III.

Determining Suitability for the System

When information on the two rivers had been amassed, the rivers were evaluated to determine their suitability for the national system. The Wild and Scenic Rivers Act specifies the basic criteria for determining whether a river is eligible for the system. These criteria have been supplemented by the Secretaries of the Interior and Agriculture in a joint document entitled "Guidelines for Evaluating Wild, Scenic and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System under Section 2, Public Law 90-542 (February, 1970)."

A four-step process for determining suitability was used:

- 1) the river segments were evaluated to see if they were eligible for the system;
- 2) the eligible segments were divided into units on the bases of length, similar physical characteristics, and similar levels of shoreline development;
- 3) the most restrictive classification (wild, scenic, or recreational) for which each unit qualifies was determined; and
- 4) all inputs from the public, including information obtained at the public meetings, in letters, and in workshop responses, were carefully evaluated. This information was utilized by the study team to review its suitability determinations and to check for errors and oversights.

The results of this process are presented in chapter IV.

Alternatives

An additional study requirement was imposed by the adoption of "Principles and Standards for Planning Water and Related Land Resources," which was published in the Federal Register, Vol. 38, No. 184, Part III (September 10, 1973). Basically, this process requires formulation of alternative plans based on a national economic development objective and an environmental quality objective. A recommended plan must have net economic benefits, except when the deficiency in net benefits results from benefits foregone or additional costs incurred to serve the environmental quality objective. In other words, a plan with no net economic benefit can be recommended if it has overriding long-term environmental benefits. This process also requires assessment of the effects that the various plans have on regional development and social well being. An outline of this procedure is included in appendix E; the results are presented in chapter XI.

Public Response

Public comment on the study was gathered at two series of public meetings, held in Utah at Moab and Salt Lake City; in Colorado at Grand Junction and Denver. Public involvement packets were submitted to the team after these meetings. Those living close to the rivers, particularly those attending the meeting in Moab, expressed concern about the effect designating the rivers would have on private land in the river corridor, and on uranium mining. They felt there was already enough federal control of the rivers, and in general were opposed to designation.

Those living further from the rivers were mostly familiar with their recreational and natural values. These people--generally non-commercial river runners, outfitters, conservationists, and environmentalists--supported the designation of both rivers to the national system at the classification levels for which they qualify. These opinions, expressed verbally in three of the meetings, also appeared in the public opinion packets returned to the team, which overwhelmingly favored protection of the outstanding values of the two rivers.

A fifth meeting was held in Gateway, Colorado on July 10, 1979, to explain scenic easements, the past conduct, and future of the study. Opposition to designation of the Dolores, concern that scenic easements would infringe on private rights, and indignation at inadequate notice of previous meetings were universally expressed by about 65 people. Those present were also opposed to moving the upper terminus of the recommended designation downstream to parcels of public land unless the upper terminus were placed at or near the Colorado-Utah border.

Conclusions and Recommendations

The final step was to evaluate the data, public response, and selection criteria. The findings and recommendations summarized at the beginning of the report and presented in detail in chapter V are the results of this evaluation.

CHAPTER II REGIONAL DESCRIPTION

PHYSIOGRAPHY AND GEOMORPHOLOGY

The regional setting described in this report is Mesa County, Colorado and Grand County, Utah. These two counties abut one another at the Colorado-Utah border, and by the standards of most of the rest of the United States, are very large--Mesa County contains 3,334 square miles (864,000 ha) and Grand County 3,697 square miles (958,000 ha), for a total area of 7,031 square miles (1,822,000 ha). Rhode Island contains 1,214 square miles (314,500 ha) so the two-county region through which the Colorado and Dolores flow is about 6 times as large as that state. The area lies about 200 miles (320 km) southeast of Salt Lake, and 250 miles west of Denver.

Not only are the two counties very large, but they are relatively empty, and offer impressions not available in most of the rest of the US. In most of the canyon country, starlight is bright enough to follow a trail by and moonlight sometimes is bright enough both to read by and to elicit faint colors from the surroundings. In the still desert night it is possible to hear a train at a distance of 20 miles (32 km). Traveling major US highways in the canyon country can be a minor adventure; late at night it may be 70-100 miles (120-160 km) between open gas stations. In the day, in mid-summer, heat can be fierce, and kills some every year who do not have the gallon (4 liters) of water per day that it takes to survive, even in the shade. By air or by car the area can easily be crossed on the traveler's own terms, if the cooling system functions and the car does not break down on the four-wheel drive roads in the back country. By river, or especially by foot, the area is crossed only by adopting the techniques of its denizens; the hiker

learns to hoard water like a cactus, shade up like a jackrabbit, or travel at night like a kit fox. Some of the side canyons still contain unknown ruins and burials, untouched by the desert air for 800 years. Rare plants, even unknown plants may still exist high on the sheer walls of unexplored side canyons. Soils are thin and vegetation, except in the highest areas, is sparse; the bare rock with its thousands of colored shapes and contortions, elegant and harsh, subtle and brilliant, is the dominant element.

The two counties lie mostly in the Canyonlands section of the Plateau Province of the western U.S., a 130,000 square mile (33.7 million ha) area where vast areas of exposed rock lie flat or nearly so. But it should not be thought that because the rocks are flat, relief is. The Roan Plateau and Book Cliffs, which bound the counties to the north, overtop the Colorado River nearly 3,400 feet (1040 m) in eastern Mesa County. A ridge and mountain range form the southern physiographic boundary of the two counties. The ridge is the Uncompahgre Plateau in Colorado; which, at about 9,500 feet (2,910 m), lifts nearly 5,000 feet (1,500 m) above the Dolores. The range is the La Sal Mountains in Utah, a laccolith which, with an elevation of over 13,000 feet (3,960 m), is almost 9,000 feet (2,750 m) above the Colorado River.

On the east, the two-county region is bounded by Grand and Battlement Mesas; a caprock of Tertiary lavas has armored the shale oil bearing sediments of the Green River Formation and allowed them to retain an elevation of 10,000-11,000 feet (3,000-3,350 m). To the west the deepening canyons of the Green River (Desolation, Gray, and Labyrinth) bound the region.

Barring the local disturbances of the La Sals and the Uncompahgre Plateau, the rocks of the area slope gradually to the north. Thus each resistant layer caps a plateau which runs many miles to the

north, to the point at which it submerges beneath another capped plateau which towers thousands of feet above it. These giant steps, which run from northern Arizona to northern Utah, are deeply dissected by the four major rivers shown in the Physiographic Features Map. Where, as on Grand and Battlement Mesas in Colorado, these plateaus attain great elevation, they are forested by aspen, subalpine fir, and Engelmann spruce. Where their elevation is not so great, they have ponderosa pine, pinyon, and juniper, as is the case with the Tavaputs Plateau (also called the Roan Plateau in Colorado) through which Desolation and Gray Canyons are cut by the Green River.

The Uncompahgre Plateau and the Sierra La Sal, which disturb these even layers, are two of the most interesting structural features of the region. The Plateau, which trends from the southeast to the northwest about 50 miles (80 km), is a combination of a horst and anticline. The borders of the Plateau are faults, but where the overlying strata are still present, these are covered by monoclinal flexures. The Plateau was first upraised about 300 million years ago. When the ancestral plateau's uplift ceased and it had been eroded, the upper Mesozoic layers were deposited over it, by a succession of rivers, winds, seas, and beaches, burying it thousands of feet. Renewed uplift about the time of the Laramide Orogeny (ca. 70 million years ago) domed those upper layers and attracted the assault of wind and water. The erosional agencies then stripped away many of the layers, revealing the sloping redrocks in which are cut the monoliths and striking canyons of Colorado National Monument and the study segment. Associated with this uplifted block are paralleling synclines to the southwest, so the area near the Plateau is corrugated on an enormous scale.

The Sierra La Sal (La Sal Mountains) have an igneous origin. Infiltrating magma threaded through the Paleozoic sediments lying near what is now Moab. Finding a zone of weakness, the molten

rock spread, raising the upper layers into a massive blister. The millions of years since have removed the sedimentary cap and revealed the igneous core; around the margins of these mountains the redrocks slope steeply up toward the heart of the range. Associated with the development of this range is the formation of Spanish Valley, a rift valley in which Moab, Utah, is located.

The region is crossed by four great exogenous streams, the Colorado, Gunnison, Green, and Dolores. These streams are mostly sunken inaccessibly below the surface of the surrounding lands: their canyons can be 2,000 feet (610 m) deep. They and their mostly ephemeral tributaries have deeply dissected the plateaus, breaking them up into canyons, gullies, mesas, outliers, and buttes. The major rivers formed their courses in softer, now vanished, rocks far higher in the geologic column, which now are being re-compacted into new rock in the Gulf of California. These rivers maintained the smoothly meandering courses created in the softer rock when they encountered the harder underlying bedrock in which their canyons are now cut. The patterns of the deep tributary canyons that join these entrenched meanders sometimes resemble the venation of leaves or the branching of trees. Some parts of the area, seen from the air or the overlooks at the southern tips of the successive plateaus, could be said to resemble a topographic map printed on red paper with red inks: the varying resistance of the different layers to the attack of cloudbursts and their resulting flash floods, combined with the even bedding planes, leave contour-like ledges that are obscured in wetter parts of the country.

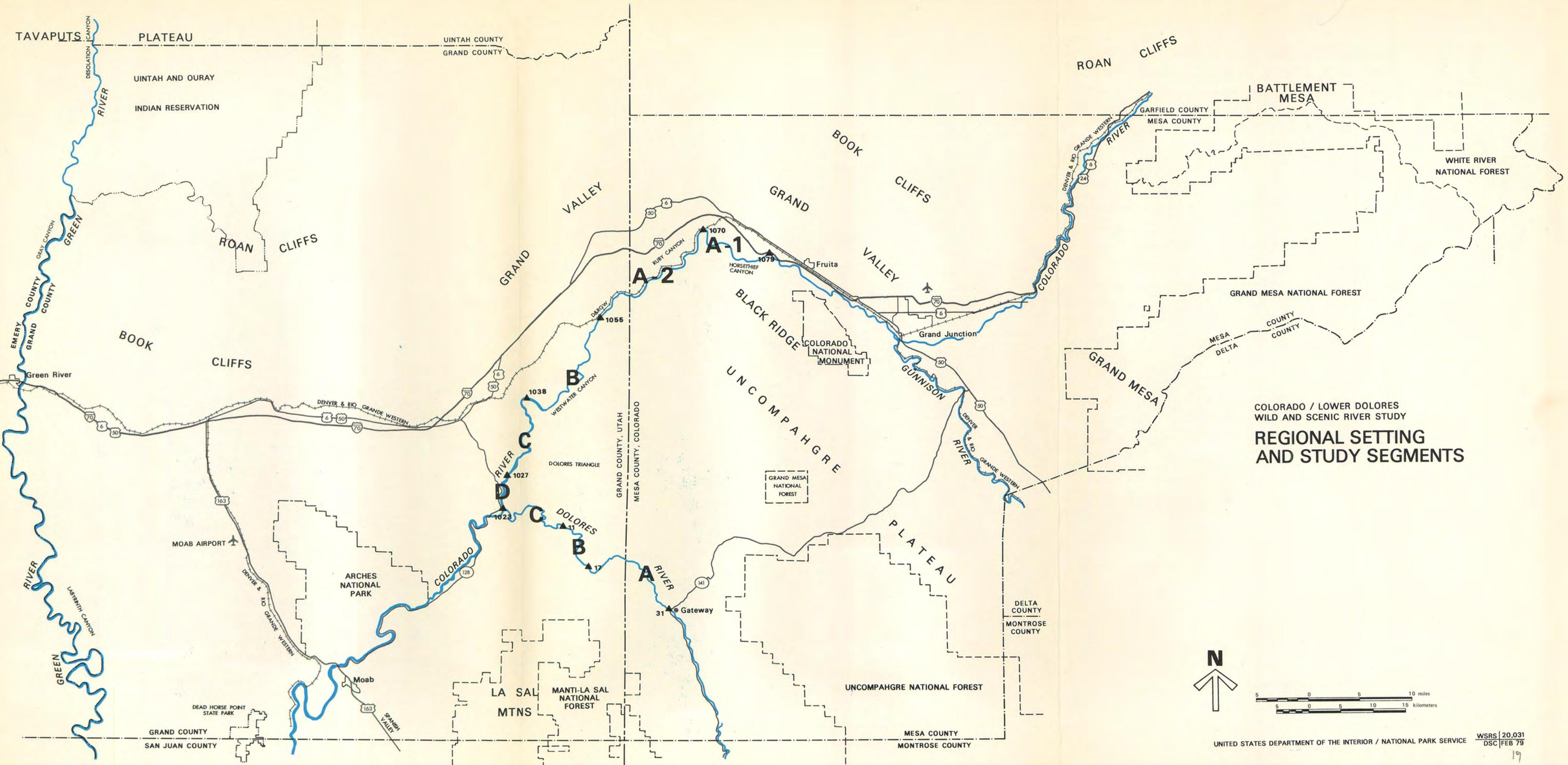
One particularly striking geomorphic event took place quite recently, in geologic terms. This was the capture of the ancestral Colorado and Gunnison Rivers. Although geologists differ on the details, it is apparent that one or both of these rivers once flowed across the top of the Uncompahgre Plateau, through a vast gorge

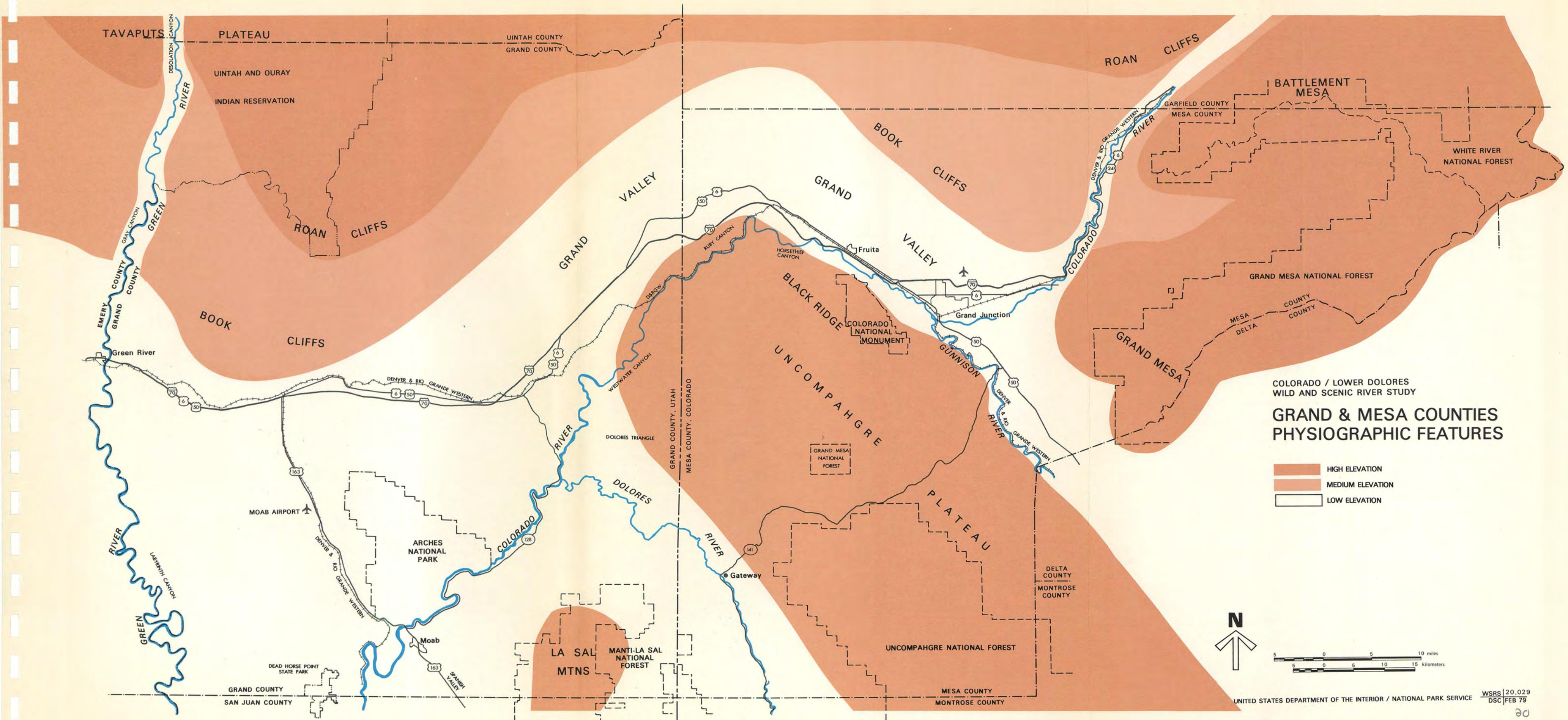
now called Unaweep Canyon. The hard rocks on the top of the Plateau confined the river(s) to a course which flowed south to the vicinity of Gateway, Colorado (the start of the study segment of the Dolores) from which point the river flowed west to the vicinity of Dewey Bridge.

Softer rock, probably the Mancos Shale, which lies far higher in the geologic column, allowed a tributary to work around the western end of the Uncompahgre Plateau, capturing the rivers near the vicinity of Grand Junction and diverting them into their present course through the study area, abandoning Unaweep Canyon to the small, misfit streams of East and West Creeks. This capture, displayed in the drawing of the Piracy of the Colorado and Gunnison Rivers, may have taken place as recently as two million years ago.¹ Once it was completed, the rivers attacked their new bed, lowering it until the rocks of the study segment were exposed.

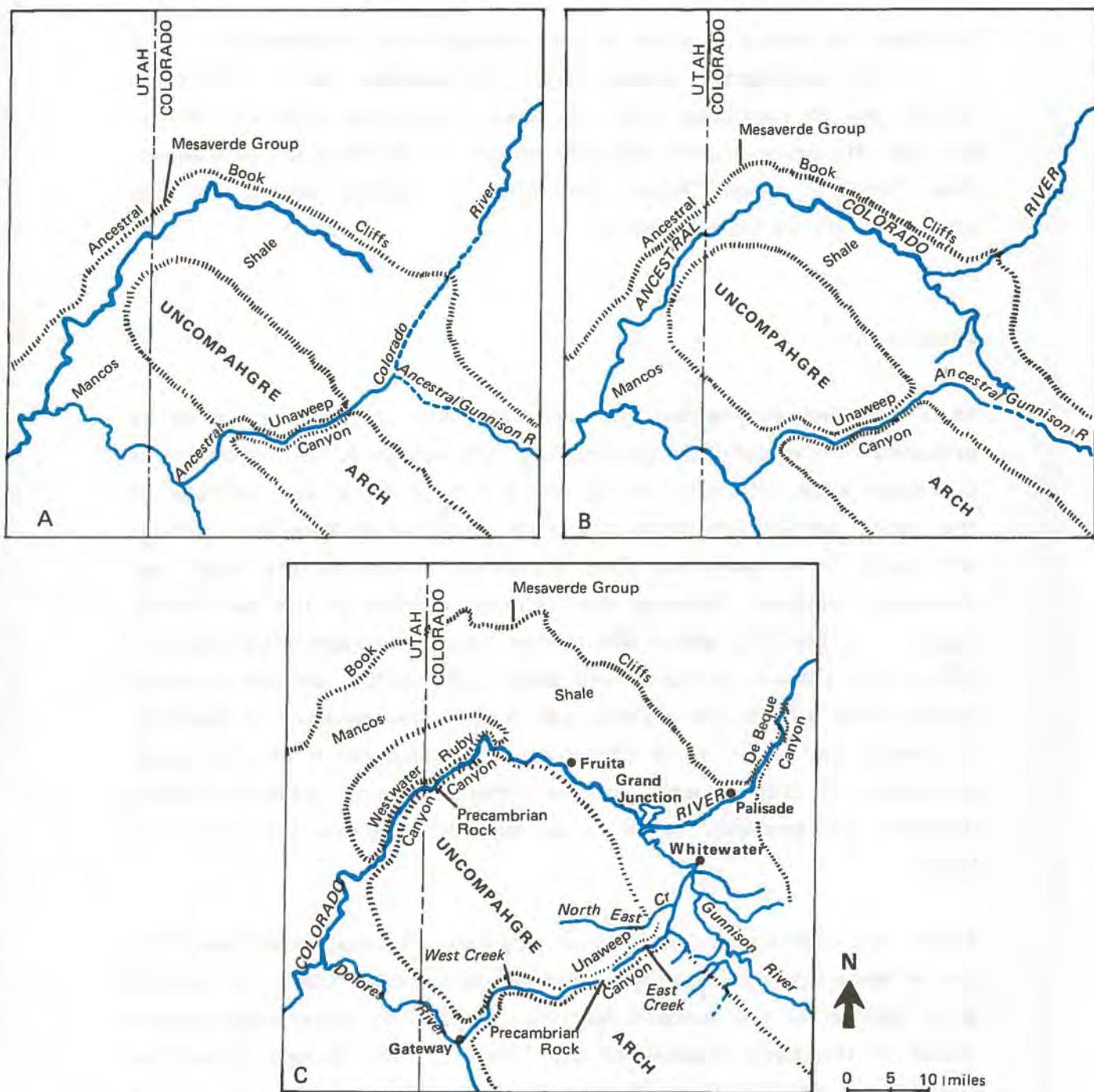
The sequence of the rocks in the two-county region displays not merely striking color, but striking fullness. Rocks ranging in age from the 1.8 billion years of the Uncompahgre Complex, exposed in the heart of Westwater Canyon, to the Tertiary lava flows of about 30 million years ago, whose armor has kept the Grand Mesa from dwindling, are displayed. Rocks from all eras are represented, in a

1. S. W. Lohman, in Geology and Artesian Water Supply of the Grand Junction Area, Colorado (USGS Professional Paper 451, 1965) assigns the capture to Pliocene time, 12-2 million years ago; Charles B. Hunt, in "The Geologic History of the Colorado River" (in The Colorado River and John Wesley Powell, USGS Professional Paper 669, 1969) argues for early Pleistocene time, about 2-3 million years ago. Either date is strikingly recent compared both to the great age of the rocks in the area, and the depth to which the river has cut them in the time since the capture took place.





PIRACY OF THE GUNNISON AND COLORADO RIVERS



Maps of a part of western Colorado and eastern Utah showing probable drainage pattern and topographic features at three successive stages of development. Solid drainage lines taken from Moab and Grand Junction, Utah-Colorado, topographic maps of the Army Map Service; dashed drainage lines are hypothetical. A, just prior to piracy of ancestral Colorado River; B, after piracy of ancestral Colorado River and just prior to piracy of ancestral Gunnison River; C, present drainage pattern, after renewed uplift of the Uncompahgre arch and piracy of East Creek.

SOURCE: After S.W. Lohman, Geology and Artesian Water Supply of the Grand Junction Area, Colorado, USGS Professional Paper 451 (1965).

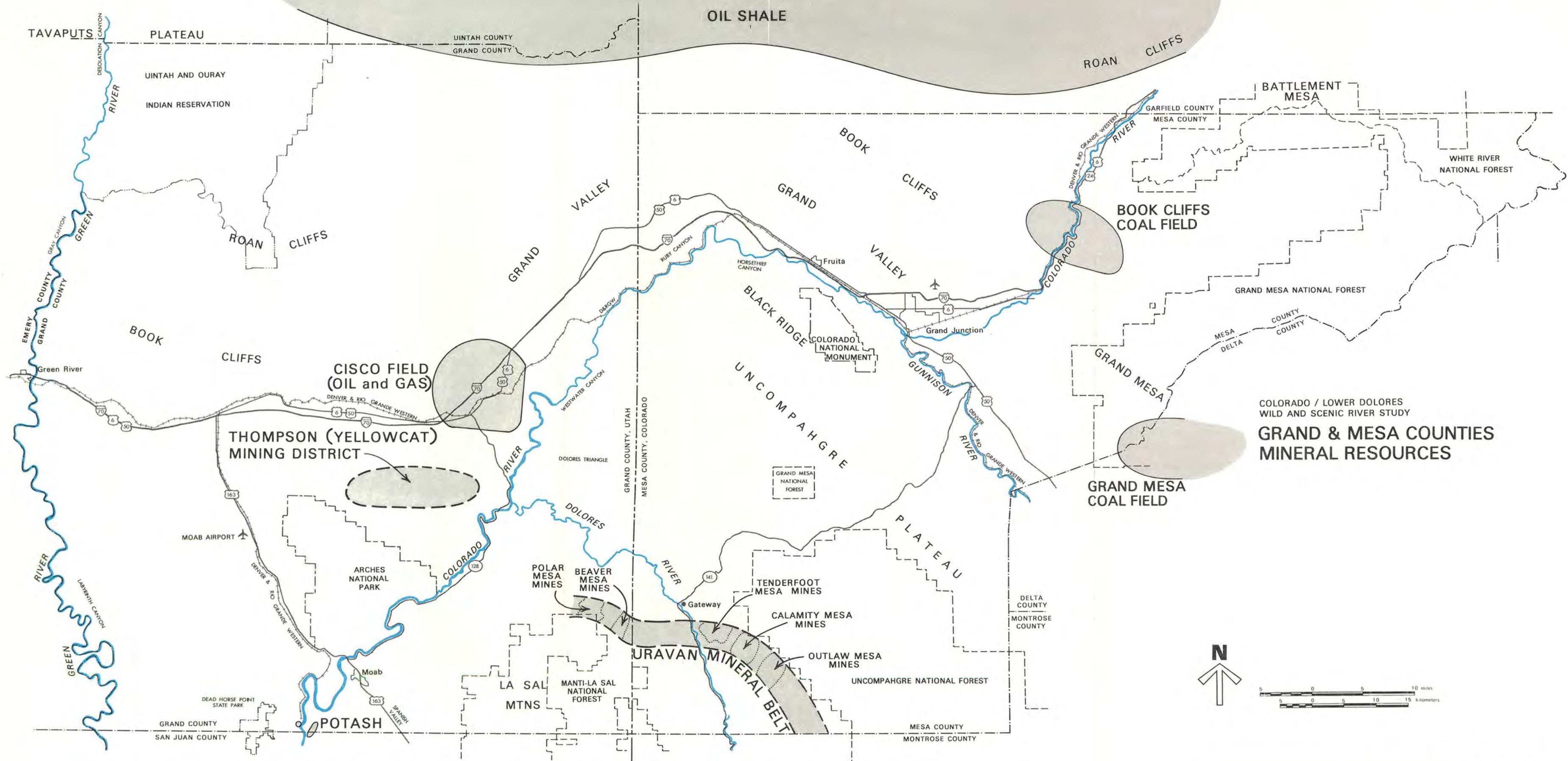
thickness of about 3 miles which overlays the Precambrian. The alternating sandstone, shales, and conglomerates of the Mesozoic system are of particular note for their scenic and scientific value, and for the uranium and dinosaur fossils of the Morrison Formation. The Tertiary Green River Formation, described below, is also known for its vertebrate fossils.

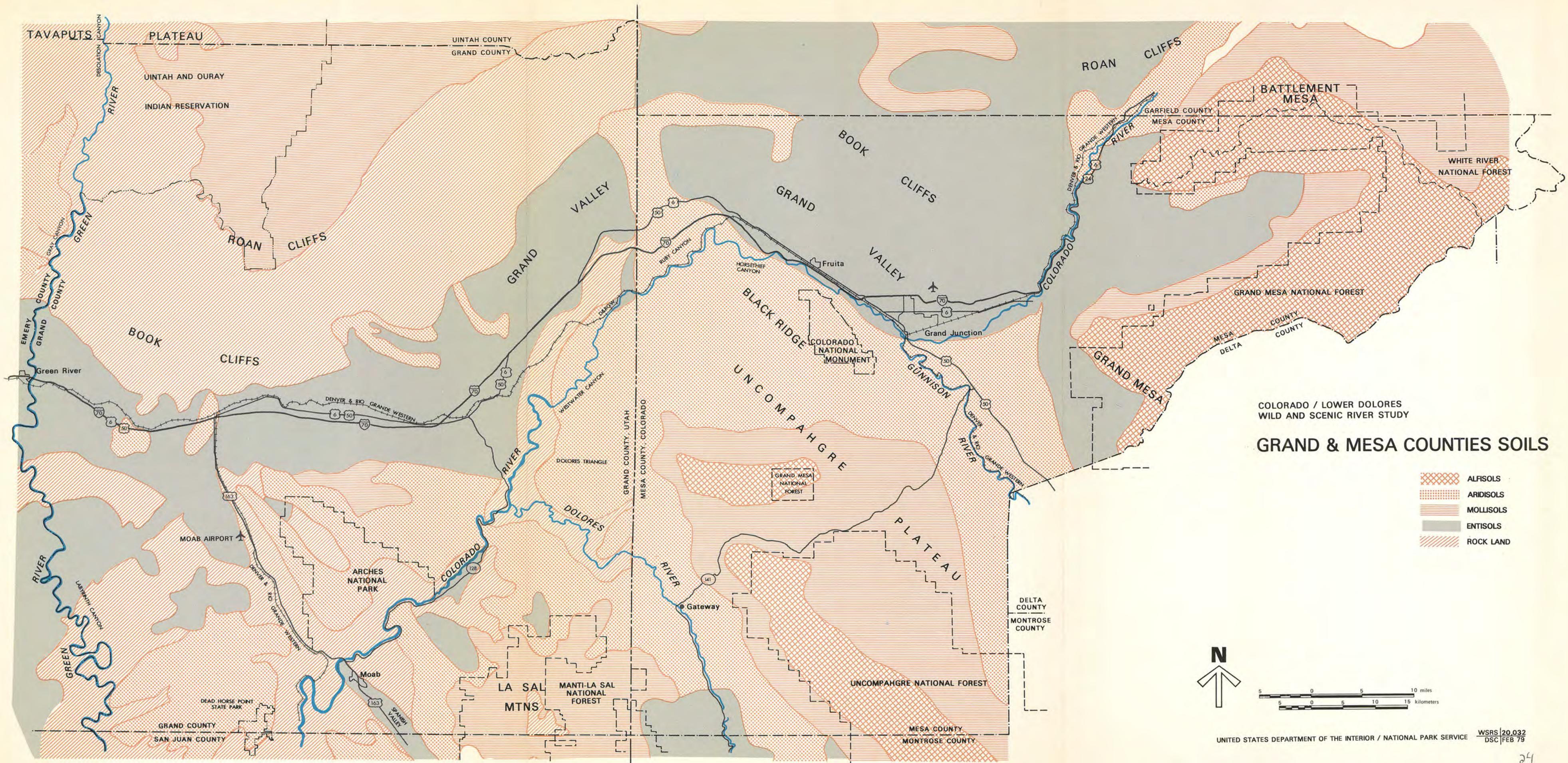
MINERALS

While detailed information on minerals and energy resources is provided in the corridor description, the Green River Formation is of region-wide interest. It is the source of shale oil: sections of the rock, particularly from the rich strip called Mahogany Ledge, will burn in a campfire. This formation makes up the Roan and Tavaputs Plateaus, forming the northern margin of the two-county region. It contains about 600 billion barrels of high-yield deposits (25 to 100 gallons per ton) and some 1,200 billion barrels in lower grade shale (15 to 20 gallons per ton). Development of the lake sediments and their oil is slated to take place north of the region described in this report, in the Piceance basin, although Grand Junction will probably serve as an important service center for the boom.

There are significant deposits of uranium and associated vanadium ore in Mesa County, Colorado, and Grand County, Utah, in the Salt Wash Member of the Jurassic Morrison Formation; lesser deposits are found in the basal member of the Chinle. The Mineral Resources Map shows the location of mineral and energy resources in the region.

By 1975, 396 properties in the two counties had produced 16,235,000 pounds (7,380,000 kg) of uranium oxide--2.82 percent of





the total national uranium production. Energy Research and Development Administration records for 2,696,630 tons (2,451,500 metric tons) mined in the same period indicated an average grade of 0.93 percent V_2O_5 and a production of ore of 51,662,730 pounds (23,483,060 kg) of vanadium oxide, which is produced as a co-product with the uranium. The Gateway district has been the most productive, accounting for 80 percent of the uranium and 82 percent of the vanadium that has been produced.

Known ore reserves carried by ERDA for the two counties, as of January 1, 1976, are 1,504,300 tons (1,367,000 metric tons) with 3,333,800 pounds (1,515,000 kg) of uranium oxide. Vanadium ore has been calculated at 1,411,500 tons (1,283,000 metric tons) which contain 13,608,145 pounds (6,185,500 kg) V_2O_5 . These reserves are in the \$30/pound forward production cost category.

ERDA estimates as of January 1, 1979, of potential uranium resources in the \$50/pound forward production category that occur within the two-county area are:

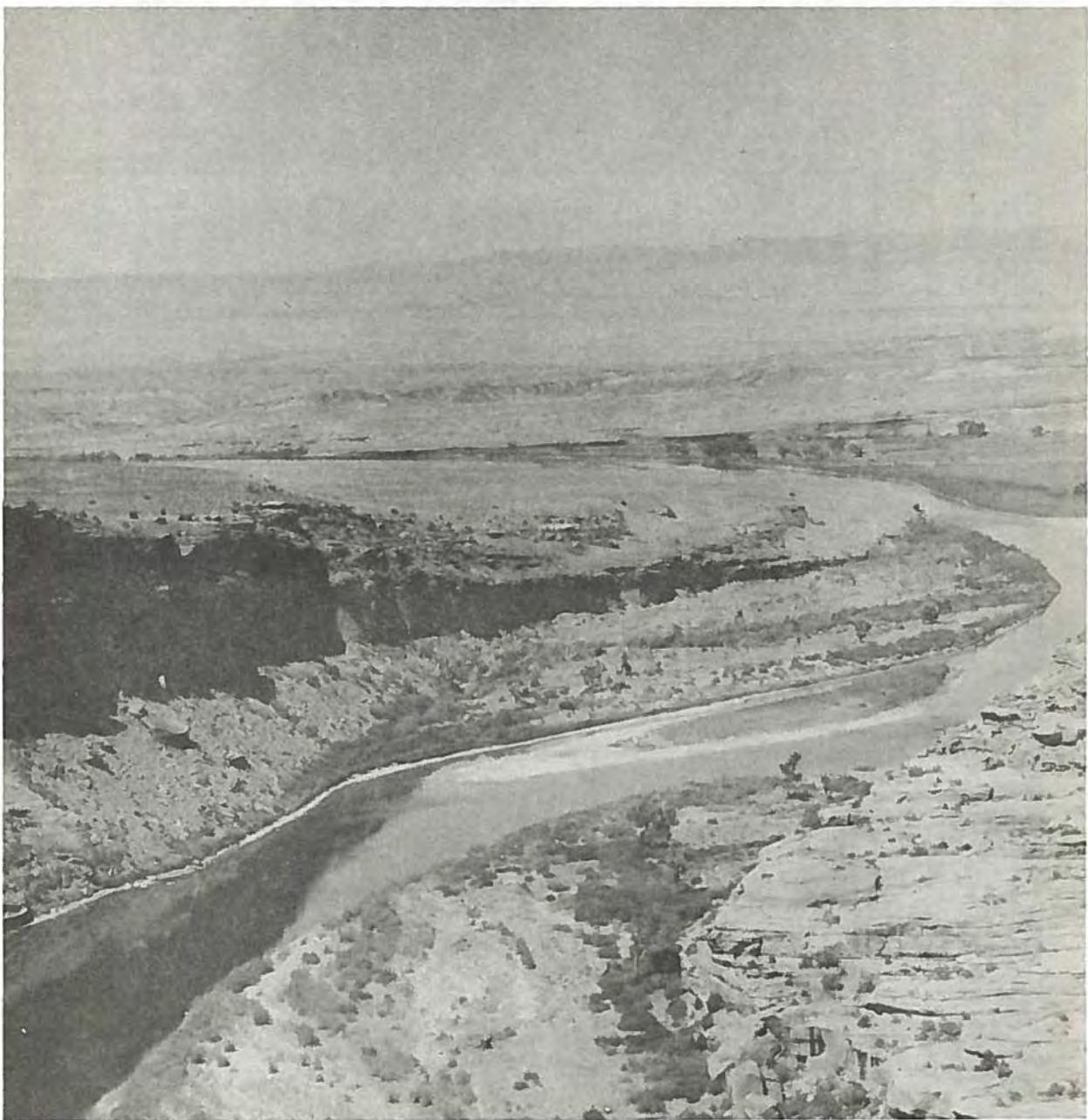
<u>Class</u>	<u>Pounds (kg) U_3O_8</u>	<u>Area</u>
Probable	29,700,000 (13,500,000)	Gateway, Inter River, Thompson, Green River
Possible	20,800,000 (9,454,500)	Gateway, Moab, Inter River, Thompson
<u>Class</u>	<u>Pounds (kg) V_2O_5</u>	<u>Area</u>
Probable	53,000,000 (24,100,000)	Gateway, Thompson, and Green River
Possible	58,000,000 (26,360,000)	Gateway, Moab, and Thompson

The Grand Mesa is estimated to have 1,569 million tons (1,426 million metric tons) of coal in the Paonia shale member of the Mesa Verde Sandstone. Most of the mining is in Delta County, rather than in the region. Coal is also mined, outside the region, in Carbon and Emery Counties of Utah.

SOILS

Soil associations from four of the ten soil orders in the world are found in Grand and Mesa Counties, as shown in the Soils Map. Both counties share the Aridisols, Mollisols, and Entisols, but Mesa County also has an Alfisol association--a Typic Cryoboralf found high on the sides and top of Grand Mesa. Grand County has large areas of Rockland and Rockland-badland land types which are not as common in Mesa County. This distinctive "soil" association is 50-75 percent bare rock, with shallow, poorly developed soils making up the remaining percentage. These rockland associations are of two types--those developed at high altitudes in the Sierra La Sal, with crags, talus slopes, and small pockets of tundra vegetation nurtured by shallow, cold soils. The other type, which helps to give the area its distinctive character, is the rockland association of the redrock country, where large areas of land are rock with small patches of soil. These soils, which support pinyon, juniper, and cactus, are extremely erodible; they melt off the land in a heavy rain, particularly when the crustose lichens which partly armor them have been disturbed.

The soils on the Mancos Shale, which was deposited in a shallow Cretaceous sea, though moderately fertile when irrigated, are saline and subject to quick erosion; their characteristic pale yellow and gray badlands are easily recognized. Contact with bedrock is made at 5-20 feet. This rock type and the soils developed on it are the area's largest diffuse contributor of salinity to the Colorado River system.



Northwest view near the beginning of Segment C, Colorado River, shows saline soils developed on the distant Mancos Shale. Book cliffs and Tavaputs Plateau in the distance.BLM

KEY - SOILS MAP MESA COUNTY COLORADO & GRAND COUNTY UTAH

MAP UNIT	SOIL TYPE	REFERENCE & REFERENCE UNIT NUMBER *	COMPOSITION	ELEVATION	MEAN ANNUAL TEMPERATURE (F*)	MEAN ANNUAL PRECIPITATION IN INCHES	DOMINANT PARENT MATERIAL	SLOPE (PERCENT)	MAJOR LAND USE
			GREAT GROUP OR SUBGROUP						
1	ALFISOLS	Colo. 1	Typic Cryoboralfs, skeletal-Rock Outcrop	7,500-11,000	35-45	20-40	CRYSTALLINE & SEDIMENTARY ROCK	5-65	RANGE, TIMBER, WILDLIFE, RECREATION, WATERSHED
2	ARIDISOLS	Colo. 6,10,12,18,20 Utah 41,55	Typic Haplargids, Ustolic Haplargids, Ustolic Natrargids, Typic Calciorthids, Lithic Ustolic Calciorthids	4,000-6,000	47-59	8-15	SHALE, SANDSTONE, ALLUVIUM	0-30	RANGE, WILDLIFE, SOME IRRIGATED CROPS
3	MOLLISOLS	Colo. 52,56,57,58 Utah 1,5,6,17	Typic Argiborolls, Aridic Argiborolls, Typic Cryoborolls, Argic Cryoborolls, PETROCALCIC CALCIBOROLLS	6,000-11,000	38-45	15-30	SHALE, SANDSTONE, METAMORPHIC ROCK	2-50	RANGE, WILDLIFE, TIMBER & WATER PRODUCTION, RECREATION
4	ENTISOLS	Colo. 28,30,33,42 Utah 51,52,63	TYPIC TORRIFLUVENTS, USTIC TORRIFLUVENTS, TYPIC TORRIORTHENTS, LITHIC USTIC TORRIORTHENTS, AQUIC XEROFLUVENTS, BADLANDS	4,000-7,500	47-59	6-15	SHALE, SANDSTONE, ALLUVIUM	0-45	RANGE, WILDLIFE, RECREATION, SOME IRRIGATED FARMING
5	ROCK LAND	Utah 68,69,70	BADLANDS, CANYON ROCKLAND, ROCKLAND OF THE HIGH MOUNTAINS	3,600-8,000 11,000-13,000	not available	6-12; over 30	SHALE, SANDSTONE, IGNEOUS ROCK	0-100	RECREATION, RANGE, WILDLIFE, RECREATION & WATER PRODUCTION

* The reference is either SOILS OF COLORADO State University Experiment Station and U.S. Soil Conservation Service; or SOILS OF UTAH (Wilson and others and U.S. Soil Conservation Service). The Reference Unit Number is the number applied on the respective state maps to given soil associations; these have been combined to make the map units on the attached map.

The two counties have a total of 5 aridisol soil associations. These dry mineral soils, found in areas of 4,500 to 7,500 feet, support greasewood and big sagebrush at lower elevations, pinyon and juniper at higher. Irrigation near Grand Junction produces alfalfa, orchards, and vegetables from this unit; where unirrigated, these soil associations provide winter range for wildlife.

The two counties have five entisols. These torriorthents, torrifluvents, and one association of Aquic Xerofluvents - Aquic Ustifluvents receive little precipitation (10-15 inches per year) and where not irrigated are used for winter range by wildlife, rangeland by cattle, and recreation. Substantial parts of some of these associations are bedrock, and where the soils are deep, alkalinity can be a problem.

Grand and Mesa Counties contain 5 borolls; the presence of clay at lower elevations names the argiborolls; cool summer soil temperatures are found in the high-altitude cryoborolls. These soils are forested with aspen, spruce, fir, and lodgepole pine in the high country, and with Douglas-fir, oakbrush, sage, and grasses in the lower areas. Range wildlife, timber, and water production are the main uses of these soil associations.

CLIMATE

Most of the two county area lies in a rain shadow caused by mountain ranges to the east, west, and north; precipitation is thus relatively low--about 8 inches (20 cm) a year in Moab and the desert north of that city, and about 8 inches (20 cm) a year in Grand Junction. Only where high elevations are available to drain the clouds does precipitation approach the levels of most of the eastern U.S. Thus the 9,000 feet (2,750 m) of elevation between the canyon of the Colorado River south of Moab, and the peaks of



Winter snow on the La Sal Mountains, summer in the desert canyon of the Dolores 8000 feet (2400 m) below — an illustration of climatic extremes caused by the regional relief. BLM

the La Sals, offers an even gradation between a moist Arctic climate and an arid desert--to travel from Grand Mesa to the Colorado River is a climatic journey from northern Canada to north-central Mexico.

Any night of the year may record freezing temperatures in the La Sals, while the frost-free season at Grand Junction is about 185 days.

At the top of the range precipitation is about 40 inches (1 m) a year; down at Moab it is, as stated above, about 8 inches (20 cm). Snowfall in Moab is about 6 inches (15 cm) or about 1/10 the total annual precipitation; about 10 feet (3 m) falls in the mountains. In the high altitudes of the two counties summers are mild, with mean high temperatures in the 70° F (21° C) range. Winters are chill, the mean January low being 0° F (-32° C), although the insolation at these altitudes makes such temperatures normally quite tolerable.

Temperatures in the lowland deserts nearby are skewed up about 20 degrees above the figures for the high mountains or plateaus of the two counties. The mean January low in the redrock country is about 16° F (-9° C); the mean high in July is about 95° F (35° C), with nights averaging about 65° F (18° C). In side canyons off the river, the temperature goes over 100° F (38° C) many times each year. Sunrise in midsummer comes as a palpable blast of heat, as if the door of an oven had been opened. By mid-day, the heat sets the air to pulsing, producing mirages and making the distant cliff fronts appear to waver. But such temperatures are not unpleasant, if the traveler has water and need not do any hard work, because humidity is very low--generally 22 percent in midsummer.

Prevailing winds come from the southwest at about 5-10 miles (8-16 km) per hour, but as with rainfall, they are so strongly influenced

by local variations in topography that the region-wide winds are almost irrelevant to the winds in the traveler's own area. The canyons act as funnels, so the strong winds created by afternoon heating of the cliff faces or by the passage of fronts can gust up to 60 miles (90 km) an hour along the rivers.

Most of the rain in the desert area falls in late summer. Much of the time it does not reach the ground; afternoon cumulus clouds build into massive lead-gray towers which trail long brushes of rain down toward the mesas, but usually don't reach them. Even when the rain comes, a weather condition peculiar to the desert may rob the land of some of its benefits. By the time an afternoon storm falls, the rock has been heated, sometimes to a surface temperature over 200° F (93° C). The air also remains hot. The rain which falls quickly evaporates and rises. The next day the moist air is reheated and continues to rise, until it is carried back up to altitudes where it again begins to condense and recirculate. This evaporation is joined by the water transpired by the phreatophytes of the area--a mature Fremont cottonwood apparently transpires about 500 gallons (1,900 l) a day.

When the drops attain sufficient size to fall, they do, and thus the "same" rain falls several days in a row, until the passage of a front pushes that particular moist mass of air out of the area, leaving little for the area's vegetation.

When a large rain does fall the desert areas can receive half a year's precipitation in a day. There being little vegetation to retard the runoff and very large areas of bare rock to accelerate it, the water pours off the land, surges in muddy walls down the arroyos, and drapes the walls of the main canyons with multi-colored waterfalls, so little of this water is also available.

VEGETATION AND WILDLIFE

Nine thousand feet (2,750 m) of relief, and the resulting variations in climate, have produced consequent variations in vegetation; not only in temperature and precipitation, but in plant communities does the area offer the impression of a journey from Canada to Mexico. The successive climates caused by altitude thus evoke wide bands of vegetation which lie on the region like contours; conditions at the top and bottom of each such band are marginal for the species involved. At the highest elevations--the La Sals extend 2,000 feet (610 m) above timberline--there are stunted tiny plants like moss campions, alpine forget-me-nots, and alpine avens. These endure about 10 months of the year in a relatively dormant state, and suddenly flower during the other two, painting the grassy alpine fields with color.

Below the "tundra" of this highest altitude area are forests whose trees are progressively more spaced as altitude decreases. The highest such forest is the association of Engelmann spruce and subalpine fir which lies between about 8,000 and 11,000 feet (2,400-3,350 m). This dense and dark-colored forest serves as a water reservoir by storing winter snows. These forests shelter varying hares, deer and elk, bear, chickarees, foxes and coyotes, and such birds as kinglets, gray jays, and Clark's nutcrackers.

Overlapping the lower elevations of this forest are aspen, lodgepole pine, and douglas-fir. Still lower are ponderosa pine, Gambel's oak, and lower still, spacious pinyon-juniper forests. Like the upper forest, these lower associations support deer, elk, cougar, turkeys, and coyotes. They have an understory of wheatgrasses, needlegrasses, bromes, elk sedge, American vetch, aspen peavine, yarrow, and fleabane. The pinon/juniper association has an understory of wheatgrass, asters, cactus, phlox, squirreltail and Indian ricegrass.

The lowest associations are found in the deserts near the rivers. The overstory--it is only about 3-7 feet tall--consists of shadscale, greasewood, and sagebrush. The grasses of the desert are annual brome, squirreltail, Indian ricegrass, galeta, and needle-and-thread; forbs include Indianwheat, globemallow, buckwheats, paintbrush, and asters. Like the tundra areas, this area can display beautiful wildflowers, if moisture has been sufficient. The most frequently seen wildlife in this area are probably jackrabbit, 13-lined groundsquirrels, chipmunks, coyote, deer, and prairie dogs. Cactus wrens and burrowing owls, kestrels and turkey vultures are often seen.

The presence of water alters these characteristic associations. From the highest to lowest parts of the area the riparian vegetation differs from the vegetative communities through which it passes. In the highest area there are willows as stunted as the mat-like plants of the alpine zone. In the middle areas are found Rocky Mountain ash, alders, and willows. Lower still are stream-side borders of narrow-leaf cottonwoods, which in turn cede to the plains or Fremont cottonwood, a huge and noble tree, which has an understory of willow and tamarisk. Specific communities found along the rivers in the study area are discussed in the description of the river corridor.

CULTURAL RESOURCES

Archeology

During prehistory there were two main cultural traditions in the region. These were the Desert Archaic Cultural Tradition (ca. 8,000 B.C.--500 A.D., and later) and the Horticultural Cultural Tradition (ca. 500 A.D.--1,200 A.D., commonly known as the Fremont Culture). The Desert Archaic Culture Tradition continued



Pictographs near the study area may be artifacts of the Fremont culture. NPS

as an important way of adaptation during this later Fremont and Anasazi Cultures period, and (in some guises) survived its demise.

The Desert Archaic Cultural Tradition is represented in the two-county region by archeological sites dating back to about 10,000 B.C. on the Uncompahgre Plateau in Colorado. Other such sites, which display relatively little cultural change, date up into the Historic period. At about the time of the birth of Christ, some of the small bands of Desert Archaic peoples began to adopt introduced horticultural adaptations, which gradually replaced their reliance on hunting and gathering and a lifestyle based on restricted wandering.

Simultaneous with this shift was their development into a tribal level of social integration. The Fremont Culture eventually extended from the Yampa River near the Colorado-Wyoming border down into what is now Canyonlands National Park. The Fremont branch of the Horticultural Tradition was particularly prominent in the canyons near and south of the study area. The small pithouses and masonry cists characteristic of these latter horticultural people are easily found in the region, as is their rock art, which was produced in prodigious quantities.

The Fremont culture disappeared for uncertain reasons about A.D. 1150 and no distinctive sites have been found dating after A.D. 1200. It is suspected that the Fremont peoples, no longer able to cultivate food on the drought-diminished surrounding land, rejoined the Desert Archaic's foraging subsistence style, and were known to the first Euroamericans as the Southern Paiutes and Utes.

History

Guided by Ute Indians, Fathers Dominguez and Escalante were the first white men to visit the area. On September 5, 1776, the fathers and their party descended the slopes of Battlement Mesa to the Colorado River. The fathers did not discover their objective in leaving New Mexico, a northern route to the missions of California, but they did leave their mark on the land. Escalante and Dominguez Canyons are not far from the study area; the Escalante River, tributary of the Colorado River in Glen Canyon, was apparently the last named major river in the continental United States. Until the 1840's, when a succession of explorers, miners, and farmers entered Colorado, the region remained little known.

After the initial gold strikes in the Denver region in 1859, miners worked their way up the rivers of the eastern slope, over the mountains and into the drainages of the western slope. Many of them eventually settled as farmers on the western slope. Actually, mining and entry of the area had been forbidden by the first of a series of treaties with the Utes. This first treaty in 1863 gained the San Luis Valley along the Rio Grande for the whites and shifted the Utes to the west.

The next treaty, in 1868, granted the Utes the western third of Colorado; the border was the 107th meridian near Gunnison. But the flow of miners toward the rich strikes of the San Juan Mountains, in violation of the 1868 treaty, brought about yet another treaty.

The Brunot treaty of 1873 again constricted the Utes' lands. Conflicts still arose between the Indians and white settlers, so in 1880 the Southern Utes were sent to the reservation they now occupy in southern Colorado.

After more trouble with the whites, the Uncompahgre Utes, who were first slated to be settled in the vicinity of Grand Junction, were sent to Utah to their current reservation.

The lands of what was soon to become Mesa County were officially opened for settlement in 1882. A series of names for the town eventually yielded to Grand Junction. By 1882, a narrow gage line had reached the area; by 1887, a standard gage. Discovering the 185-day growing season of the area, the new settlers planted the first of the orchards which now fill the valley and began to dig the ditches that would water them.

The first settlement of Moab, Utah, a Mormon mission, collapsed in the mid 1850's due to Indian trouble. However, by 1870's ranchers and returning Mormons had reentered the valley. They established the town of Moab and completed a post office by 1879.

By the early decades of the 1900's, an act of considerable historic note had taken place in the area. John Otto, who had grown fascinated by the warped layers and red sandstone monoliths of the area south and west of Grand Junction, urged citizens to petition the Federal Government to grant the area the status of a national monument. In 1907, the Grand Junction Chamber of Commerce did so; in 1911, the area became Colorado National Monument. Recognition to the red rock wonders near Moab followed with the designation of Arches National Park (originally Arches National Monument), and later by Canyonlands National Park in 1964.

Mesa County's pace was relatively slow through the ensuing decades. This was to change, however, in the 1950's when a uranium boom occurred. Grand Junction and Moab became the centers for much of the activity.

WATER RESOURCES

The Colorado River is the largest in the two states and in the region. It is estimated that the actual annual virgin flow of the river at the Colorado-Utah border in recent years is about 5.8 million acre feet (7,096 million m³), and the flows which can therefore be expected should lie in the range of 3.7 to 4.7 million (4,527-5,750 million m³), for about 614,000 acre feet (751 million m³) are exported from the basin and about 1,000,000 acre feet (1,233 million m³) are used consumptively.²

The flow of the river and its tributaries is apportioned by a compact between the states of the Upper and Lower Basin. The states of the Upper Basin have further apportioned their allotment among themselves. Of the 7.5 million acre feet (9,175.5 million m³) allotted to the Upper Basin, the Department of the Interior has estimated that there are approximately 5.8 million acre feet (7,100 million m³) actually available. The discrepancy arose because the original compact based its division of the flow on what is now known, from stream gaging records and tree-ring investigations, to have been one of the wettest periods in 600 years.

Colorado, as one of the Upper Basin states, is estimated to have about 750,000 acre feet (917.5 million m³) per year available for development. This water can be developed from any tributary in the basin that lies within the state. Utah's situation is similar. Once these states have applied the water allotted them to beneficial use,

2. Critical Water Problems Facing the Eleven Western States. (The Westwide Study), U.S. Department of the Interior, Washington, DC. (April, 1975).

the remaining water in the rivers must be allowed to flow down to the Lower Basin. Thus, it is not easily possible to predict where and when the water remaining to Colorado and Utah under the compact will be developed. It will be possible to develop it on several, but not all, of the tributaries, or on the main stem. Once the entitlement has been put to use on certain tributaries, any developments constructed on others will be "called out of priority", i.e., they will not be able to store or divert water until the requirements of the Lower Basin have been met. They may be thus able to take water only in very wet years, or perhaps not even then, if the allotment is exhausted.

This restriction will apply only to consumptive use. Diversions from the Western Slope of Colorado to the Eastern, or from the Green River Basin of Utah to the Salt Lake Valley, are defined as a total consumptive use, since the water they take leaves the basin. Agricultural diversions generally consume about 50 percent of the water they divert. Hydropower consumes only what evaporates from the lake above the turbines, and can operate when a senior call requires the stored water. Hydropower projects can thus be constructed when other developments will have become uneconomical for lack of a water supply that is not owed to the Lower Basin.

Since there are, in Colorado, valid rights to develop far more water than is actually available under the compact (some have estimated that on many streams in the state there are rights to as much as four times as much water as exists), the determination of where the water will be used will depend on which conditional rights³ are

3. A conditional right is perfected, or made absolute, when the project for which it is granted is completed. Its priority date, which determines its right to water vis-a-vis all other rights in that basin, is then pushed back to the date of first filing, which may have been 20 years before.

actually perfected, by constructing the project and putting the water to use.

Such conditional rights exist for several authorized projects on the upstream portions of both rivers. On the Colorado River these are the Grand Valley, Dallas Creek, Fruitland Mesa, and West Divide projects. Of these, the one which is expected to have the largest direct effect on the study area is the Grand Valley Project. By lining canals and laterals with concrete, installing on-farm improvements, and implementing irrigation management techniques, the project is expected to reduce by approximately one-third the 600,000 tons (545,000 metric tons) of salt added to the river annually in this vicinity. The other projects are not expected to have significant effects on the flows in the study area.

On the Dolores River and tributaries, upstream from the study area, are planned the Dolores Project, San Miguel Project, and Paradox Valley Salinity Control Unit. The Dolores River has historically been depleted about 105,000 to 130,000 acre feet (128-159 million m³) by the Montezuma Valley Irrigation Company (MVIC), which operates near the town of Dolores. McPhee Dam, a feature of the Dolores Project, will increase these exports into the basin of the San Juan River by 101,200 acre feet (123 million m³). An additional 25,400 acre feet (30 million m³) of project water will be released in the summer and fall for fishery purposes.

During the first 14 years of record, the Dolores at Gateway averaged an annual flow of 749,000 acre feet (917.5 million m³); during the next 25, at a station 9 miles above the mouth, about 522,400 acre feet (638.6 million m³). Inflow and depletions between the two are insignificant, so the stations are comparable. The difference between their readings is mostly attributable to increased diversions and lower precipitation. The extant MVIC diversions reduce the flow in the study area by about 14-19 percent. In

addition to the exports to the San Juan basin made by the MVIC, there is in-basin consumptive use of about 56,700 acre feet (69 million m³) or about 8 percent of the flow. The Dolores project depletions will further reduce it by 14-15 percent. If the project water which is released for fish and wildlife is subtracted, since this flow occurs at a time and in such volume as to be unuseable for boating, the flows of the river can be considered to be reduced a further 3.5 percent.

The other project, on the San Miguel, a major tributary of the Dolores which joins it about 35 miles (56 km) above the study area, will utilize 50,000-80,000 acre feet (61-98 million m³) per year for irrigation, municipal, and industrial purposes. When constructed, this project will deplete the flow in the study area by approximately 7 to 11 percent.

The lower figure in these percent ranges assumes that MVIC diversions will continue at their average historic rate of about 105,000 acre feet; the higher, that they will continue at the figure of 130,000 acre feet (159 million m³) established in recent years.

The Paradox Valley Salinity Control Unit will remove up to 180,000 tons (163,000 metric tons) of salt from the Dolores river just upstream from its confluence with the San Miguel. In the Paradox Valley area the Dolores flows over a salt anticline, picking up about 200,000 tons (182,000 metric tons) of salt from briny groundwater. Pumping this brine enough to lower the interface between the brine and relatively fresh surface groundwater would permit only the relatively fresh water to enter the river. The recovered salts and sulphur would be pumped to Radium Evaporation Pond, about 20 miles (32 km) from the river. This project would considerably improve water quality in the study area and the Colorado below the confluence, while depleting the flow of the river in the study area about 0.5 percent.

POPULATION

Populations vary greatly between Mesa and Grand Counties. According to the U.S. Bureau of the Census, the 1970 population of Grand County was 6,688 while that of Mesa County was 54,374. Almost half of Mesa County's population resides in Grand Junction (population 23,774). Slightly more than half of the county's population is classified rural farm. For purposes of comparison, the population density of Mesa County is almost 10 times that of Grand County, and about 1/50 that of Rhode Island. Seventy-two percent of Grand County's population is located in Moab with a 1970 population of 4,793. The remaining population is primarily rural farm.

Future energy resource development (coal and oil shale) is expected to have dramatic effects on the population of northwestern Colorado. According to the BLM's Final Environmental Statement, Northwest Colorado Coal, Colorado State Planning Region 11 (Mesa, Garfield, Rio Blanco, and Moffat Counties) will increase in population from 89,374 in 1974 to 123,781 in 1980 and 168,231 by 1990. This represents a 38 percent increase by 1980 and an 88 percent increase by 1990. The Grand Junction area, one of the major population centers for the region, is expected to grow in a similar pattern.¹

1. These estimates have begun to be actualized; it is estimated the 1978 population of Moab was 4,500 and of Grand County 10,000. The estimated 1977 population of Grand Junction was 25,398, and of Mesa County was 66,548, according to a special census.

ECONOMY

The economy of the two-county region is diversified. In Mesa County the primary economic center is Grand Junction, which is the major service center and largest metropolitan area on the Western Slope of Colorado. Services, retail trade, and government comprise over 50 percent of the total employment in the county. Manufacturing and transportation, communication, and public utilities each employ approximately 10 percent. Agriculture, mining, construction, wholesale trade, and finance constitute the remaining employment picture in Mesa County.

In Grand County, Moab is the center for economic activity. Primary economic activities in Moab are oriented toward mining and the tourist trade.

LAND OWNERSHIP AND USE

Of the 2,134,000 acres (864,000 ha) of land in Mesa County, Colorado, approximately 74 percent is in public ownership. The majority (73 percent) of this public land is under federal ownership with the remainder being either state, county, or municipal land. In Grand County, Utah, approximately 90 percent of the total 2,366,080 acres (948,000 ha) is in public ownership. Again, the majority (74 percent) is under federal ownership with the remaining 15 percent being either state, county, or municipal land. Table II-2 shows the land ownership breakdown in acres and in percent of the total land area.

TABLE II-1
Land Ownership
in
Mesa County, Colorado, and Grand County, Utah

<u>Ownership</u>	<u>Acres</u> (Hectares)	<u>Percent</u>
Mesa County		
Private Lands	556,000 (225,000)	26
State, County and Municipal Lands	19,000 (7,690)	1
Federal Lands	1,559,000 (631,175)	73
Total	2,134,000 (863,865)	100
Grand County		
Private Lands	236,608 (95,793)	10
State, County, and Municipal Lands	378,572 (153,270)	16
Federal Lands	1,750,900 (708,870)	74
Total	2,366,080 (957,933)	100

As might be expected in counties containing such vast amounts of public land, the major portions are in a natural state; i.e., open rangeland and woodland. The remaining private land is dominated by agriculture. This productive agricultural land is one of the major resources of the counties. Major crops raised in Mesa County include fruits, sugar beets, hay, some grains, and a variety of commercial vegetables. The primary agricultural product in Grand County is orchard fruits. Livestock also adds to the agricultural

wealth of both counties and, through the grazing permit system, utilizes large segments of federal land.

The mining and processing of minerals is also an important land use in both counties. Uranium, vanadium, coal, natural gas, and oil shale are found in the counties and the production of these energy sources is expected to increase. Potash is also an important mineral found in Grand County.

TRANSPORTATION

Physiography has influenced the transportation pattern of the two counties. In Colorado, the broad river valleys are natural corridors for roads and railroads. In Utah the main roads are on the plateaus. Thus, in Mesa County, Grand Junction is reached by I-70, paralleling the Colorado River and by U.S. 50, following the Gunnison River. Moab lies about 30 miles (48 km) south of I-70 and is reached by Utah 128 along the Colorado River, and U.S. 163. Grand Junction is served by five truck lines; Moab by four. Continental Trailways provides bus service to both, while Grand Junction has two local bus lines.

Both cities have rail service available for freight from the Denver and Rio Grande Western Railroad, although Moab is served by a spur line. Passenger service is available three days a week from Grand Junction to Denver and Salt Lake. Like the interstate, the route of the railroad is along the river in Colorado and across the desert plateau between the Green and Colorado Rivers in Utah.

Both cities are served by airports. Moab has a county facility with a 6,900-foot (2,100 m) paved runway. Grand Junction's Walker Field handles class B aircraft (727, 737, DC 10, etc.) and has scheduled passenger service.

RECREATION

The region contains recreation areas of national significance. Colorado National Monument is located at the upstream end of the study area, while immediately downstream in Utah is Arches National Park. Within an approximate 200-mile radius of the study rivers are other areas such as Rocky Mountain, Canyonlands, Capitol Reef, Mesa Verde, and Bryce Canyon National Parks; Great Sand Dunes, Black Canyon of the Gunnison, and Dinosaur National Monuments and Curecanti and Glen Canyon National Recreation Areas, as shown on the Recreation Areas Map.

Notable also among these attractions is Dead Horse Point State Park near Moab, which offers an unparalleled view of the entrenched meanders of the Colorado River near Canyonlands. Plans call for an integration of the visitor interpretation services at this state park with those offered at nearby Canyonlands and Arches National Parks.

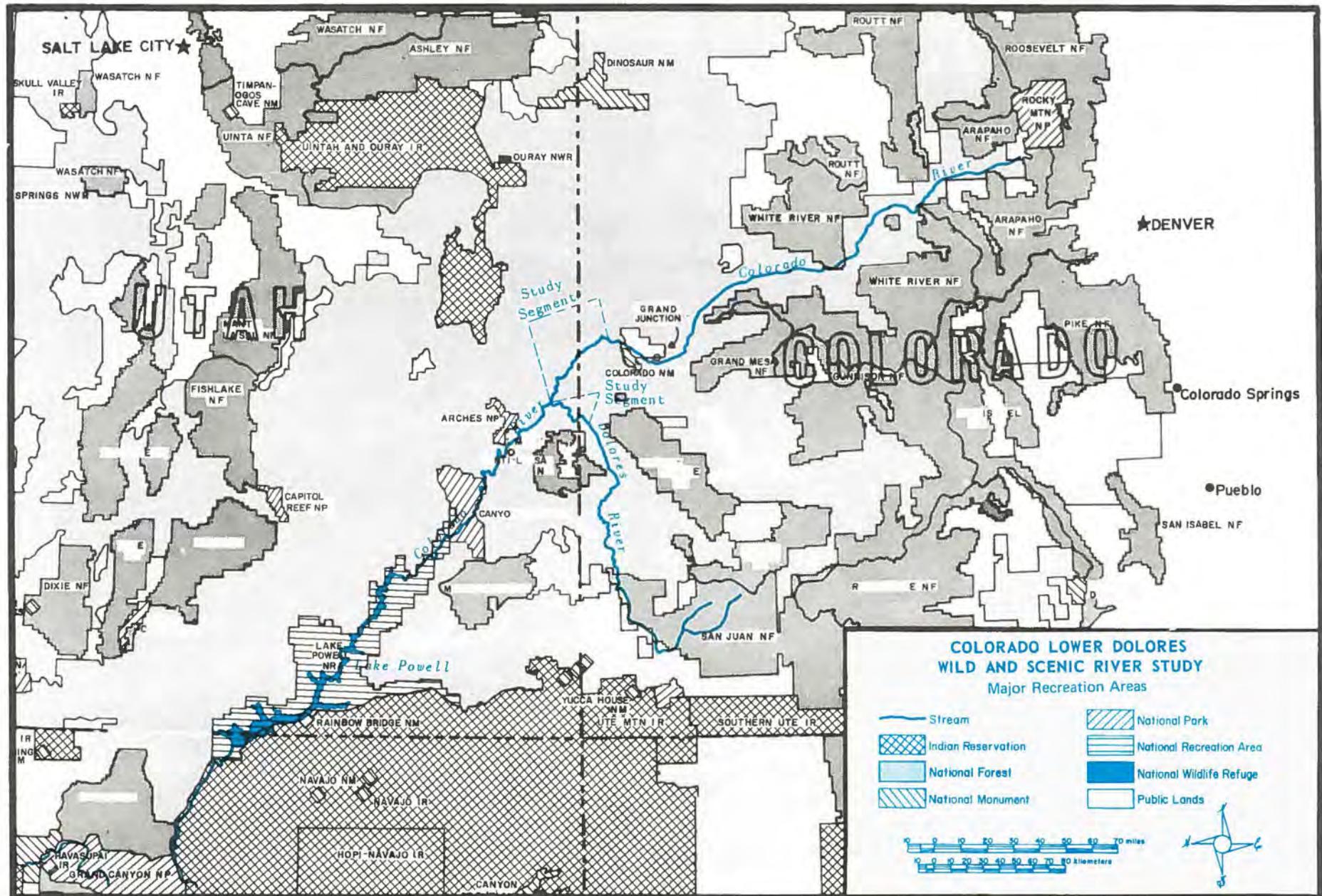
The region also has three national forests--Grand Mesa, which is renowned for the hundreds of lakes on the top of the plateau; Uncompahgre, on the Plateau of the same name, and Manti-La Sal, which covers portions of the La Sal Mountains. Hunting in these areas is quite good. In 1975, for instance, 49 bear, 4 antelope, 2,697 deer, and 987 elk were taken in Mesa County. The public lands administered in both counties by the BLM provide outstanding opportunities for desert hiking, scenic driving, four-wheel driving, and geologic study. The new and growing sport of river-running takes place not only in the study area, but on other portions of the 4 major rivers of the area, attracting boaters from all over the nation.

the first time in the history of the country. The new government was formed by the members of the former cabinet, except for the Minister of Finance, who was replaced by Dr. J. C. R. M. van der Linde.

On 1 January 1946, the new government took office. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet. He was succeeded by Mr. H. J. G. van der Linde. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet.

On 1 January 1946, the new government took office. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet.

The new government took office on 1 January 1946. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet. The new Minister of Finance, Dr. J. C. R. M. van der Linde, had to leave his post because he had been appointed as a member of the new cabinet.





CHAPTER III

THE RIVER CORRIDOR

PREFACE

The river corridor described in this chapter is the area seen from the river; it thus varies from a constricted few hundred feet on either shore, where the canyon is narrowest, to about 15 miles (23 km) where the walls fall away. Since the Wild and Scenic Rivers Act contains provisions dealing with mining that apply to an area of 320 acres per mile (a quarter mile or 400 meter strip on either shore) or approximately 80 ha per kilometer, detailed information on the economic resources along the river is given for the area within a quarter mile (400 m) of the rivers.

SCENERY, GEOLOGY, AND GEOMORPHOLOGY

Colorado River

Segment A-1 - Horsethief Canyon (River Mile 1079.2 to River Mile 1070.5). In the arid climate of the study area, little vegetation obscures one's view of the rock, so geology is a major determinant of the scenery in the river corridor. The Colorado's flow, generally northwest for about 10 miles (16 km), then southwest for about 40 miles (64 km), takes it along the margin of the Uncompahgre Plateau, a region-wide anticline plunging northwest across the river's course. Since its course was determined when it flowed through now-vanished soft strata that lay thousands of feet above the rocks now exposed in the study area, the Colorado's course bears little relation to the structure of the rock. The river meanders directly into the uplift, cutting it with canyons, or parallels it, passing between the tilted strata along its

GENERALIZED SECTION OF ROCK FORMATIONS ALONG THE COLORADO RIVER STUDY AREA

SYSTEM	SERIES	FORMATION	MEMBER	THICKNESS (FEET)	CHARACTER	
Cretaceous	Upper Cretaceous	Mancos Shale		Top not exposed	Gray marine shale; few thin beds of sandstone near base; few thin beds of limestone. Underlies Grand Valley and forms Book Cliffs	
		Dakota Sandstone		150±	Crosses white basal conglomerate, lignitic shale, buff sandstone, and thin beds of lignite. Sandstone forms ledges and cliffs	
	Lower Cretaceous	Burro Canyon Formation		50-120	Buff sandstone, generally iron stained, and green-hued siltstone and mudstone; sandstone locally conglomeratic. Forms cliffs where largely sandstone	
Jurassic	Upper Jurassic	Morrison Formation	Brushy Basin Member	260-340	Mainly red, green, brown, purple, and gray-white siltstone and mudstone; contains some bentonitic beds and a few thin beds or lenses of white to brown sandstone and limestone	
			Salt Wash Member	190-312	Similar to Brushy Basin Member, but contains thick lenticular sandstone beds and, in lower part, thin beds of dove-gray limestone	
	Summerville Formation			40-60	Red, green, gray, purple, and brown mudstone and siltstone, and persistent thin beds of hard sandstone, some ripple marked	
Triassic(?)	Upper Triassic(?)	Moab Member			White to gray evenly bedded fine-grained sandstone, some ripple marked. Forms steps, of probable Curtis age	
			Slick Rock Member	60-200	Salmon-colored to pink fine-grained generally crossbedded sandstone, containing scattered grains of medium- to coarse-grained sand. Forms cliffs	
	Kayenta Formation			0-127	Medium- to coarse-grained highly lenticular hard sandstone, some lenses of red or purple siltstone and mudstone; also some lenses of conglomerate and conglomeratic sandstone. Forms benches	
Triassic	Upper Triassic	Wingate Sandstone		215-370	Thick beds of salmon-colored to buff fine-grained generally crossbedded sandstone. Forms cliffs; many cliff faces coated with desert varnish	
		Chinle Formation		80-120	Red siltstone containing a few thin lenses of green-hued limestone or limestone conglomerate. Forms slopes	
Precambrian complex				Base not exposed	GREAT UNCONFORMITY	
					Schist, gneiss, granite, and pegmatite dikes	

AFTER S. W. LOHMAN, GEOLOGY AND ARTESIAN WATER SUPPLY OF THE GRAND JUNCTION AREA, COLORADO PLATE 2,
UNITED STATES GEOLOGICAL SURVEY PROFESSIONAL PAPER 451, WASHINGTON, D. C. (1965).

edge and thus leaving hogback ridges. Sometimes it strikes directly across faults bounding the uplift and thus passes from wide valleys into canyons in a few yards.

Just above the beginning of the study area, the Colorado River temporarily abandons the roughly northwest course it has maintained since Grand Junction and the confluence with the Gunnison river. Leaving I-70 it flows briefly west through a hogback capped with the Dakota and Burro Canyon Formations, and through the softer shales and sandstone lenses of the Morrison Formation.

The Morrison Formation is the focus for most of the vanadium and uranium resources of the area. It consists of dark sandstone lenses that form ledges, and slope-forming pastel shale layers covered by blocks riven from the sandstone. Beach, lagoon and stream deposits comprise the formation. The stream deposits contain the uranium. Of considerable paleontologic interest is that the sandstone ledges contain dinosaur fossils in places. Fossil bones have been recovered near, though not within, the study corridor at the upper end of the Colorado segment, and in the lower end of the study area.

Below the Morrison Formation (the Summerville Formation, a thin bed of shales, directly underlines the Morrison in this area, but is not differentiated from it in this report) lie the Jurassic and Triassic sediments of the Entrada Sandstone, the Kayenta Formation and the Wingate Sandstone. These dip against the river's course, so it quickly cuts a canyon into them.

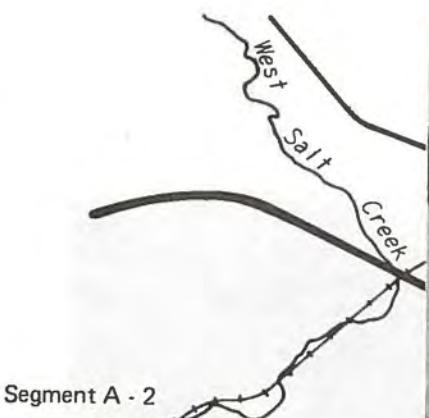
The Colorado's entry into these brown ledges, pink cliffs, and red bluffs marks the beginning of Horsethief Canyon. At the start of the canyon, the same rocks that encase the Colorado at river level are visible to the south, high on the Black Ridge, revealing the

thousands of feet of uplift that have raised the Uncompahgre Plateau. In the first two miles (3.2 km) of the segment, agricultural activities, a small gravel operation and a few farm buildings are visible on the right bank, through a screen of tamarisks, cottonwoods, and willows. At low stage a slightly translucent flow of about 150 feet (45 m) in width, the Colorado rises as much as 8 feet (2.5 m) in this vicinity and spreads to perhaps 600-700 feet (190-230 m) during spring floods. At these times the river is thick with silt. At peak stages, vibrating willow and tamarisk near the shore seemingly grow from the river itself; at low stage islands and gravel bars are exposed.

The 10-mile (16-km) length of Horsethief Canyon exposes a variety of landforms. During its flow to the south and west, the river passes vertical pitted cliffs about 200 feet (65 m) high, banded with red, tan, and brown. In parts of Horsethief Canyon the river flows between two layers of rock which dip transverse to its course, so that one wall of the canyon will be the smooth vertical contours of Entrada Sandstone, while the other will be the blocky ledges of Kayenta, which lie below the Entrada in the geologic column. In the vicinity of Crow Bottom, just above the end of Horsethief Canyon, the river swings north into the higher rocks and the cliffs recede, opening views of jumbled hills and slopes developed on the Morrison Formation.

The only man-made intrusions visible in Horsethief Canyon are the agricultural activities and gravel operation mentioned above, a fence near the end, and a no-trespassing sign.

Segment A-2 - Ruby Canyon (River Mile 1070.5 to River Mile 1051.2). The end of Horsethief Canyon and the start of Ruby are marked by both human and geologic phenomena. At the point where the river swings furthest north, and into the highest strata it encounters in this area (the Morrison formation), it is joined by



1. The entry point for many river users is located near Loma, Colorado. To the southeast this is backdropped by low rolling hills set against the steep cliffs of the Black Ridge near Colorado National Monument. HCRS

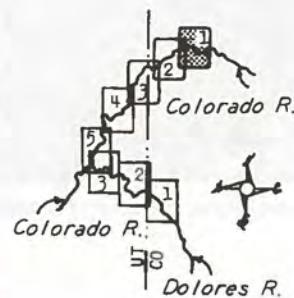
Segment A - 2

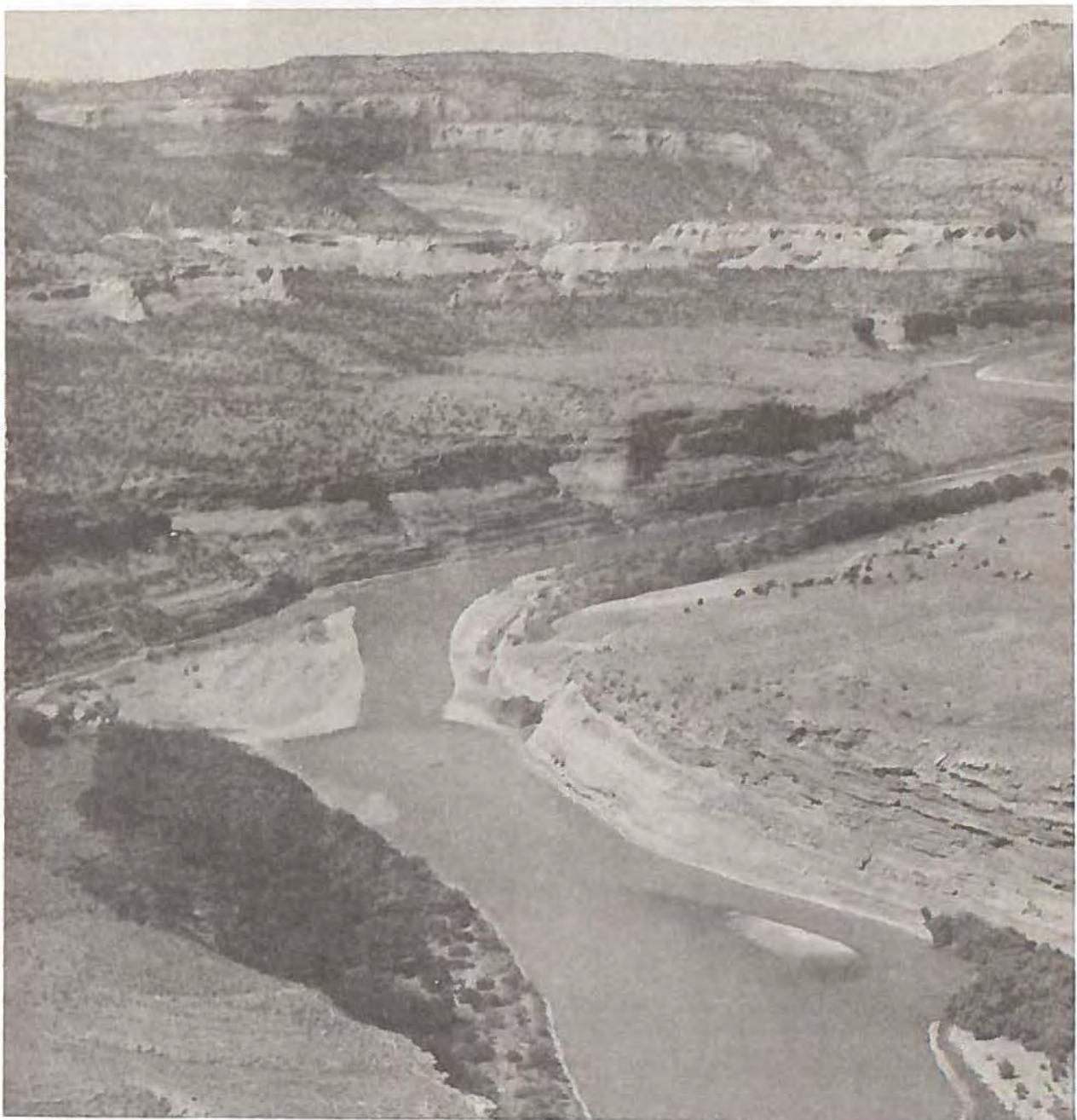


3. Vertical pitted cliffs 200 feet high, with bands of red, brown, and tan, predominate in Horsethief Canyon. HCRS

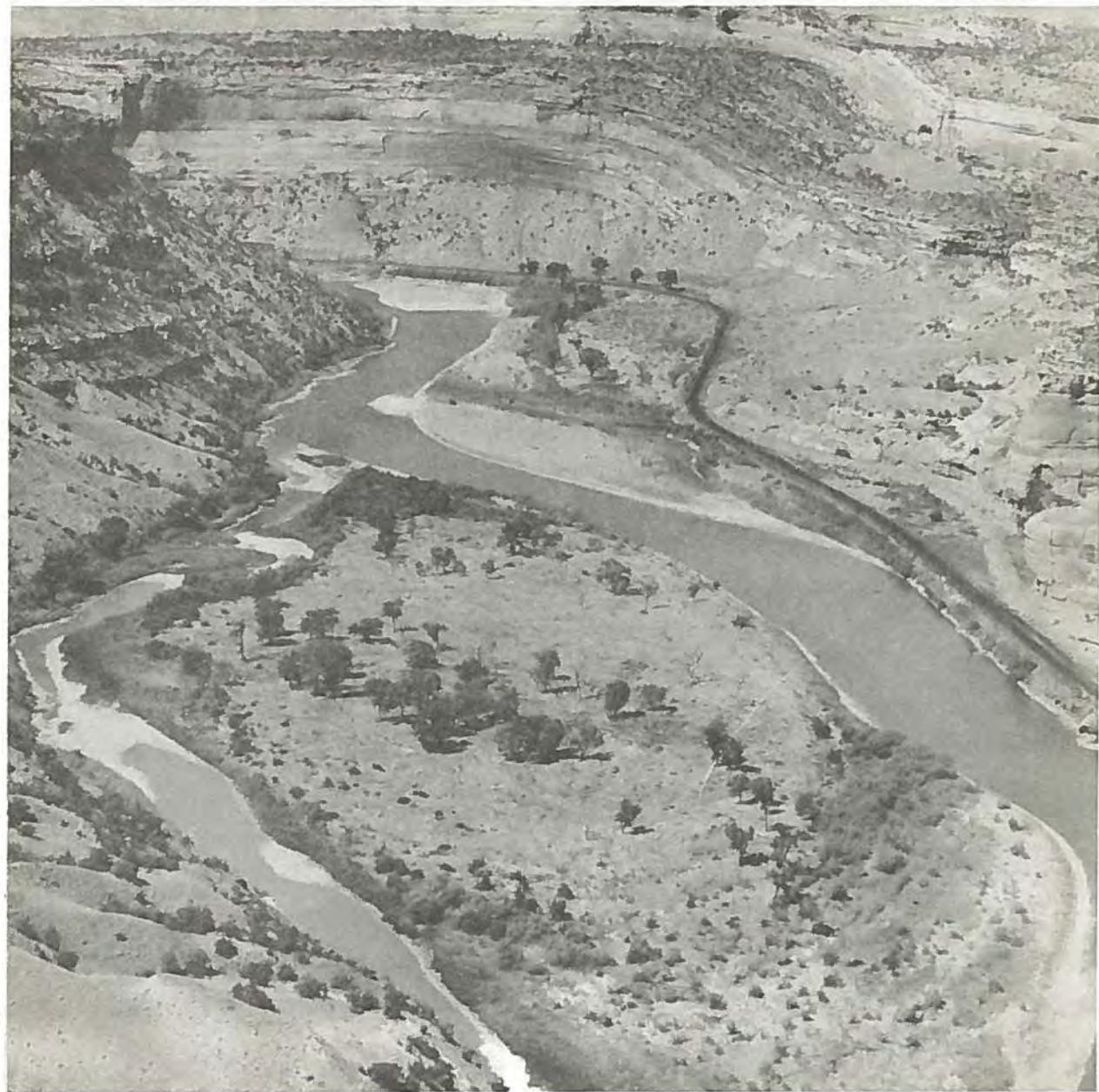


2. Horsethief Canyon marks the beginning of the study segment. Vegetation in this area is primarily cottonwoods, tamarisk, and willows which occupy the flood plain. BLM





A view to the southwest from Horsethief Canyon shows the fold at the edge of the Uncompaghre Uplift. BLM



One of the three folds in Segment A warps the strata in Ruby Canyon. BLM

Salt Creek, which mostly carries saline irrigation return flows. The tracks of the Denver and Rio Grande Western, which closely parallel the river from this point to Westwater Ranger Station and the beginning of segment B (about 16 miles or 25 km), enter the canyon via Salt Creek Canyon. The river swings south, toward Black Ridge and the uplift, and almost immediately cuts through the fault at its northern margin. In quick sequence it passes from the Morrison through the Summerville, Entrada, Kayenta, and Wingate Sandstone and begins to flow in the soft brick-red shales of the Chinle. The vertical cliffs of Wingate Sandstone which now tower above it, because of the intense red color that characterizes these cross-bedded aeolian deposits, have inspired the name Ruby Canyon.

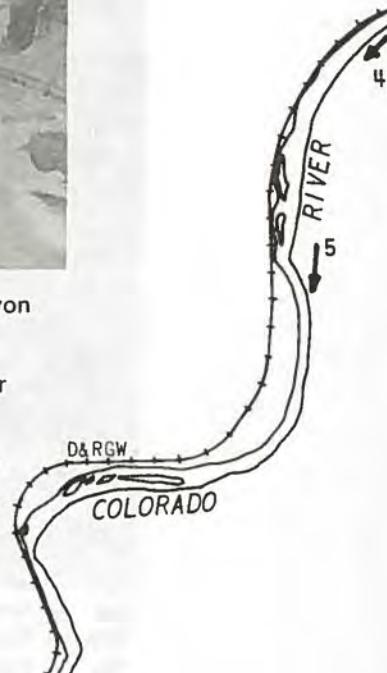
Throughout Ruby Canyon the facilities associated with the railroad are intermittently visible, though nowhere obtrusive. A screen of tamarisk and willows, overtopped by massive cottonwoods on some of the bottoms, conceals the tracks, poles, and occasional corrals. The railroad itself is noticeable in most places only when there is a train on the tracks. These intrusions are dwarfed and overshadowed by the monoliths, spires, towers and curiously sculpted formations of the Wingate. The 500-foot (160 m) red walls, their color varying from dark, flat red at mid-day to shades of brilliant orange and pink at sunrise or sunset, are often plated with desert varnish, a blue, purple, and black reflective skin of iron and manganese oxide deposited on the rock by groundwater. Through cracks and flakes in this dark coating the colors of the rock appear with special brilliance.

The Black Rocks area is scenically and geologically one of the most interesting in Ruby Canyon. A large bench (Moore Bottom) has developed on the early Triassic Chinle Formation. At this point the river has cut into the Uncompahgre Uplift to the rocks which make up its core: the black Precambrian gneiss and schist of the



4. The Denver and Rio Grande Western railroad joins the river just above Ruby Canyon. The railroad and associated facilities are occasionally visible from the river in Ruby Canyon. BLM

5. Vegetation within Ruby Canyon consists of a sparse cover of brush, shrubs, and grasses with riparian vegetation along the river banks. Occasional agricultural structures, such as corrals and irrigation pumps, appear periodically. Those intrusions, however, are overshadowed by dramatic painted cliffs, polished black metamorphic rocks, spires, and other erosional features. BLM



RUBY CANYON

Segment A-2



6. An outcrop of black metamorphic rocks in Ruby Canyon has been sculptured and polished by the river. HCRS



Two views of the Black Rocks Area, Ruby Canyon.



Jec — Jurassic Entrada Sandstone
T(?)k — Triassic (?) Kayenta Formation
Tw — Wingate Sandstone
Th — Chinle Formation
p-Cu — Precambrian Uncompahgre Complex



At river level, the Uncompahgre Complex is strangely fissured and polished by the river.

Uncompahgre Complex. The contact between the Chinle and the Uncompahgre Complex is unconformable; about 1.5 billion years are missing. The black rock, which protrudes about 20 feet (5 m) above the water, has been polished and fluted by the river. The smoothly rounded columns sculpted in this black rock by the river, and the almost silvery reflections from them, contrast with the vertical joints and lofty sheer red cliffs that line the pocket which contains this popular camp.

Below this area the river's westward course toward the border between Colorado and Utah takes it downdip into higher and higher rocks; the black rocks, the Chinle, the Wingate, the Kayenta, the Entrada and Summerville successively plunge beneath the river. By the time the boat ramp at Westwater Ranch is reached the river flows into the Morrison, and opens up a large agricultural valley. This 6-mile (9.7 km) portion contains many human influences, such as ranch buildings, hay meadows, the boat launching ramp and ranger station. Temporary sand and gravel operations in this vicinity have provided road material for Interstate 70 nearby. Beyond these intrusions and the riparian association of cottonwoods, willows, and tamarisk which largely screens them, the views from this valley are some of the longest available in the study area--up to 10 miles (16 km). Beyond stark rolling brown hills developed on the Morrison Formation are distant vistas east toward the Uncompahgre Plateau, whose dark-green forest of pinon and juniper are interrupted by pink bands of rock. To the west the barren hills interrupt the view in only a few miles. Downstream, through the green of the cottonwoods, is the imposing upfaulted cliff front that marks the beginning of segment B, Westwater Canyon.

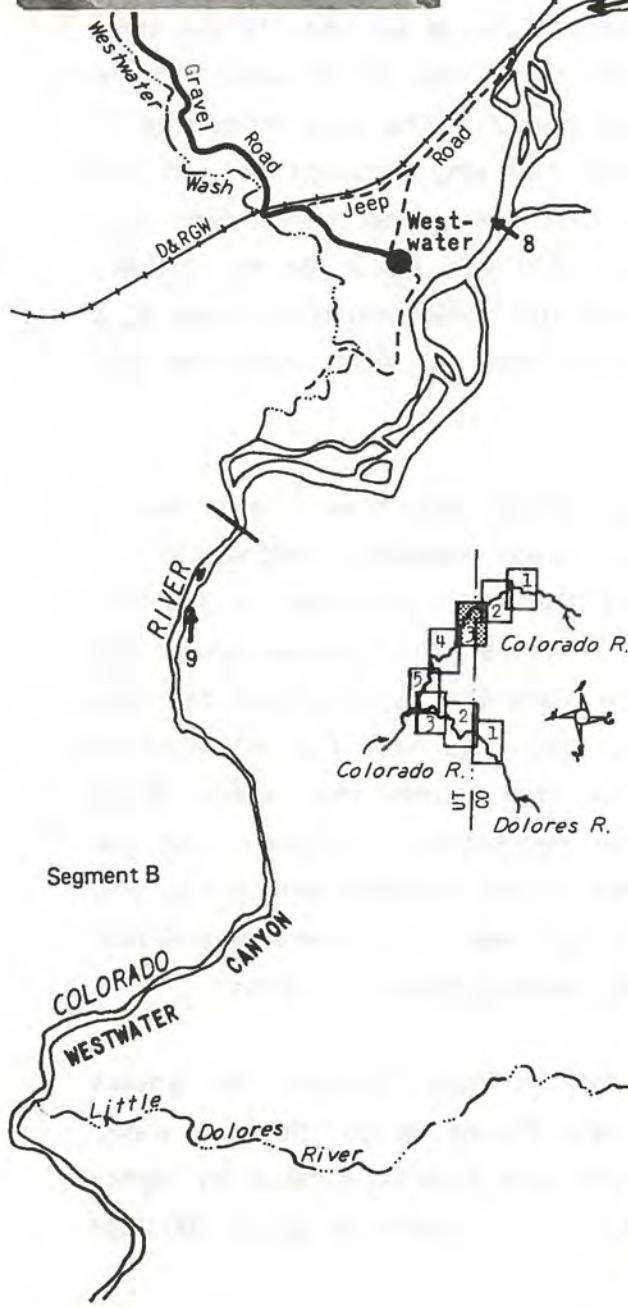
Segment B - Westwater Canyon (River Mile 1051.5 to River Mile 1038.5). About 2 miles (3.2 km) below the Westwater boat ramp the Little Dolores fault's displacement of about 500 feet (160 m) raises the southern block, toward which the river is flowing, until the Uncompahgre Complex is brought into contact with the Entrada



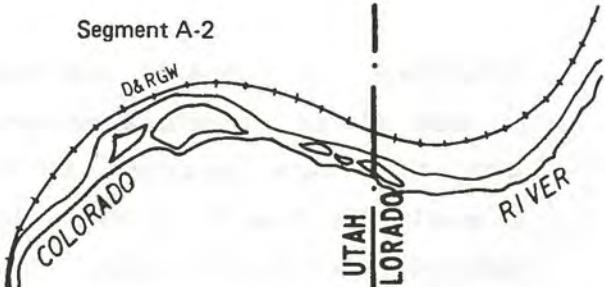
A raft party leaves the Westwater boat ramp area. The upthrust block through which Westwater Canyon is cut is visible in the distance. BLM



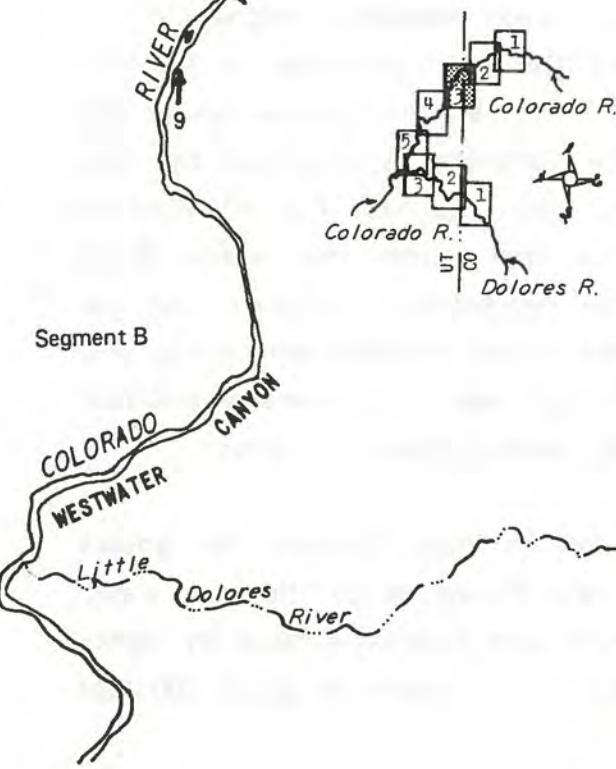
7. Ruby Canyon opens into Westwater Valley in Utah. At this point the railroad leaves the river and heads west. Riparian vegetation predominates along the river with crop production occurring away from the river. BLM



Segment A-2



8. The BLM ranger station at Westwater lies near the middle of Westwater valley and contains several buildings and other structures relating to boat launching. This area is a major launching area for whitewater boat trips through Westwater Canyon. BLM



9. Below Westwater Valley the Colorado River enters Westwater Canyon, the upper end overtopped by 600-foot massive red/brown cliffs stained with long, black streamers of desert varnish. HCRS

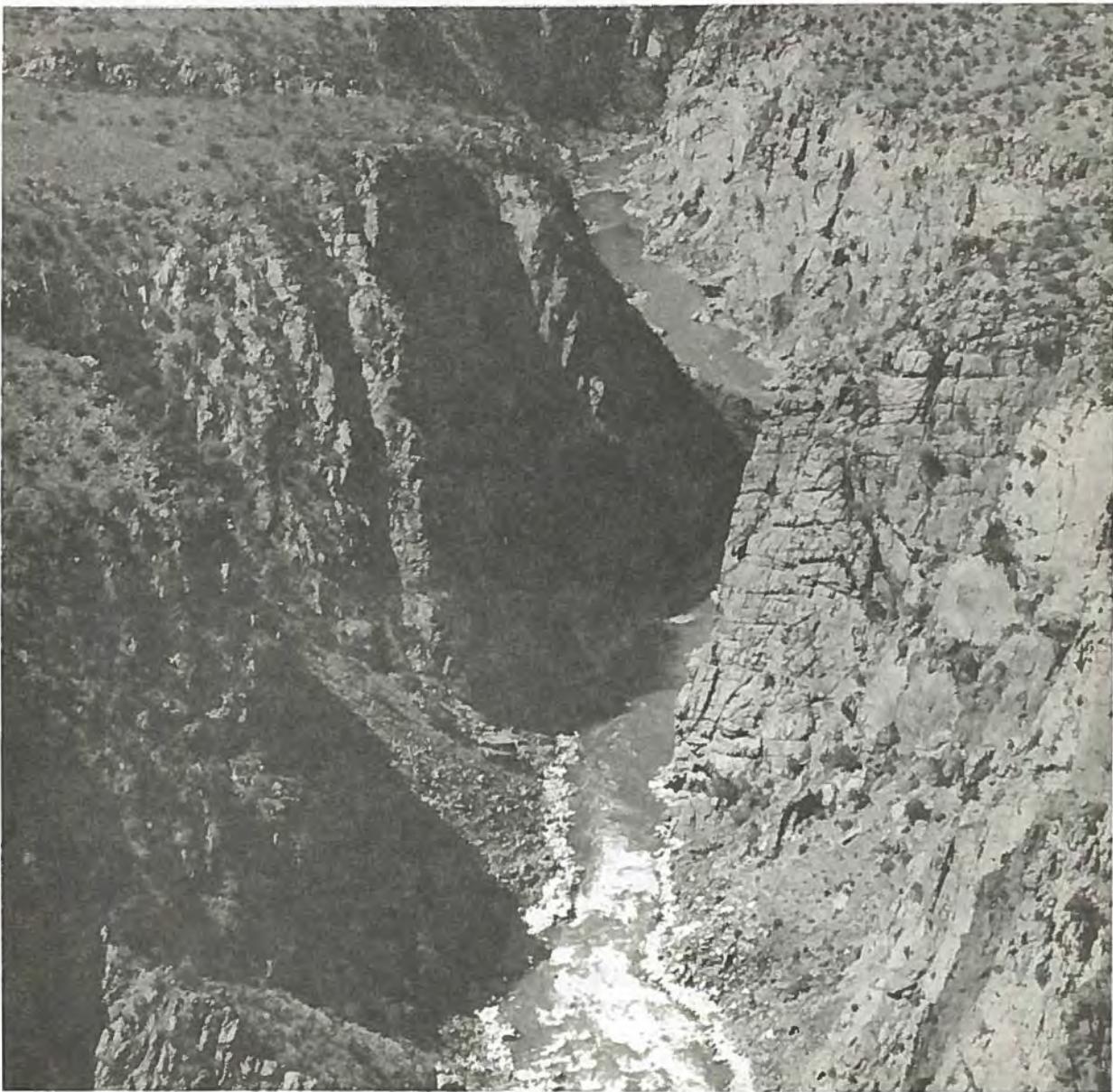


Sandstone. In front of the river the fault block, a 700-foot (225 m) wall of red Wingate Sandstone and the Chinle Formation, footed with the black pediment of the Uncompahgre Complex, stands athwart the river's course. Instead of being deflected by this massive dam into the softer rocks lying west of the area, the river cleaves it--a confirmation of the theory of stream piracy discussed in Chapter II.

Westwater Canyon, sometimes' known as Granite Canyon, is the most scenic, dramatic, and untouched portion of the study area. There are no roads or other vehicle access points. The only evidences of man's presence in the whole 13-mile (21 km) segment are an old dugout cabin at the upper end that was used by miners and trappers in the early 1900s; a cave that was inhabited by outlaws in the early part of the century; and the occasional blue gleam of a bottle in the massive piles of driftwood in some parts of the canyon.

The extremely hard rock through which the river flows has a number of effects. It narrows the stream--upper stretches in the valley parts of segment A permitted the river to widen to 700 feet (230 m) and even in Ruby Canyon it was still, in places, about 400 feet (130 m) wide, but when the Colorado is confined by this resistant rock, its channel is only about 35 feet (10 m) wide in places. The resistance of the rock also causes the rapids which have led to Westwater's nationwide recreational renown. At low stage a series of disconnected steep drops studded with holes and occasional rocks, the canyon is at high water a millrace of 6-8 foot (2 m) waves that offer no respite or landing place for miles.

As is true for the Black Rocks area in Ruby Canyon, the gneiss and schist are polished, scalloped and fluted up to the high water mark. Above that the rock is angular and interpenetrated by light-colored dikes. It has been cut to a depth of about 200 feet

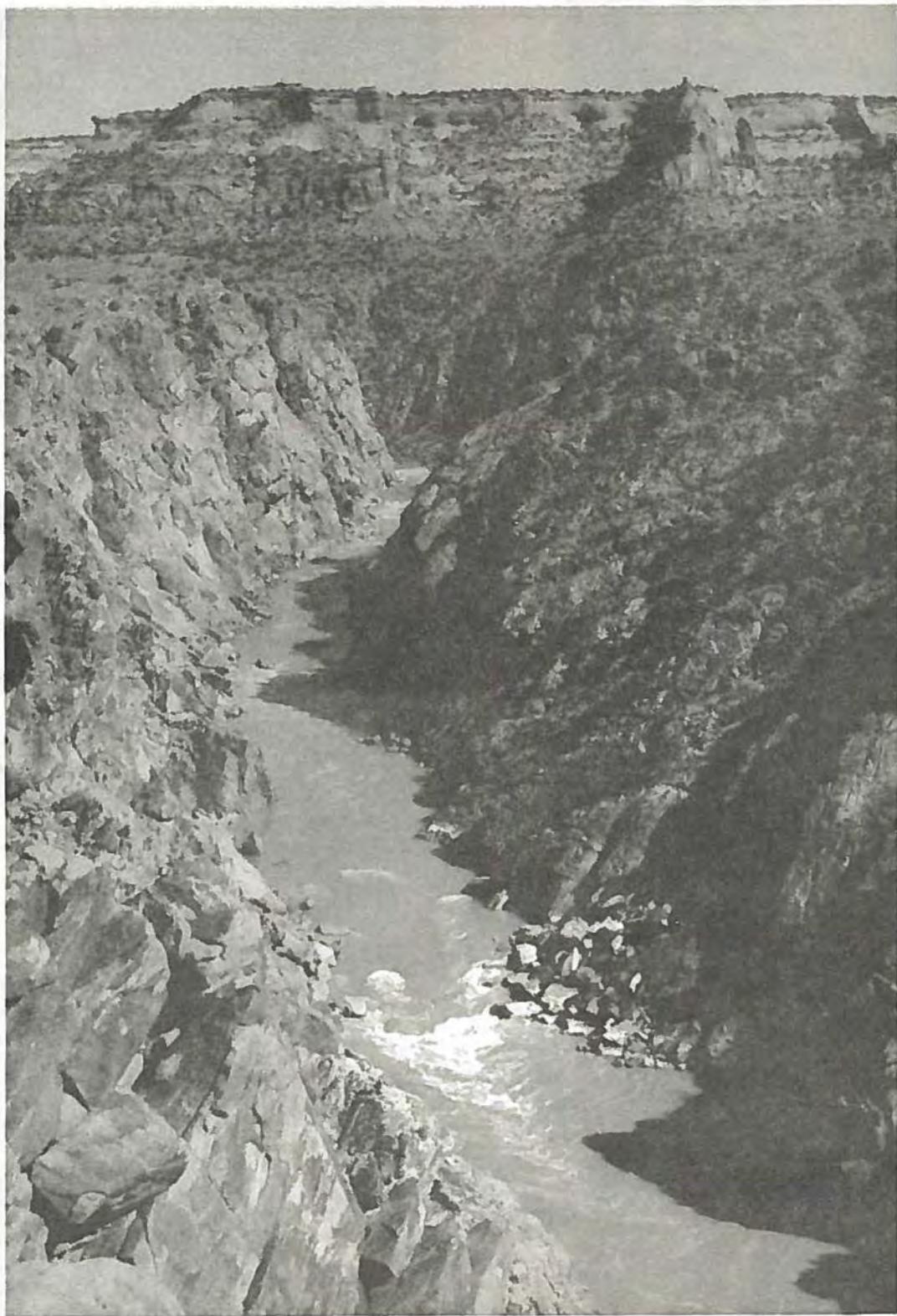


Marble Canyon Rapids – Westwater Canyon. A 6 mile (9.6 km) stretch with 11 major rapids begins at this point. Depth of the inner gorge is about 200 feet (60 m). Flow about 1000 cfs (28 m³/s). BLM

(60 m) in the vicinity of Marble and Star Canyons, creating an extremely narrow, claustrophobic gorge that lies within an outer gorge of flaring red sandstone walls stained with long black streamers of desert varnish. In places these upper walls have been covered by mudflows from the infrequent rains, leaving a braided pink pattern like the veins of a hand.

Near Skull Rapid the characteristic impression of Westwater Canyon is strongest. Such is the roar of the river, in the time of high water, that conversation must be carried on by shouting. In contrast to the wide red bench several hundred feet above and its low vegetation of shadscale and sage, the inner gorge is clamped by the dark iron-like walls; this portion of the canyon provides the impression of claustrophobia and constriction popularly associated with "canyons" but rarely offered by them. There is almost no shore but for occasional spills of massive talus boulders on which landing is difficult at low water and nearly impossible at high. Unlike the rapids on other large western rivers, those of Westwater have curious fountains, boils, and whirlpools caused by the narrowness, depth, and wall projections; these are found elsewhere only in the Inner Gorge of Grand Canyon and in portions of Hells Canyon of the Snake, at very high water. The walls are mudstained by the passage of previous floods, and up to 35 feet (10 m) above those stains are reminders of the rare, great floods--pieces of silvered driftwood that are wedged into the walls, waiting 50 or 100 years for the next flood that will reach up to them and release them.

The flutings sometimes reach up to the highest pieces of driftwood. In some places these resemble columns or the folds of great black curtains. In others, the rotating whirl of silt and trapped stones has cut potholes which open through small rounded windows onto the river or to each other. Some of these potholes do not open at all, except at the top, and look like large drilled holes. In one



An upstream view from the rim above Skull Rapid toward Funnel Falls reveals the constricted inner gorge and the red sandstone walls above it. River flow about 3500 cfs (100 m³/s). NPS



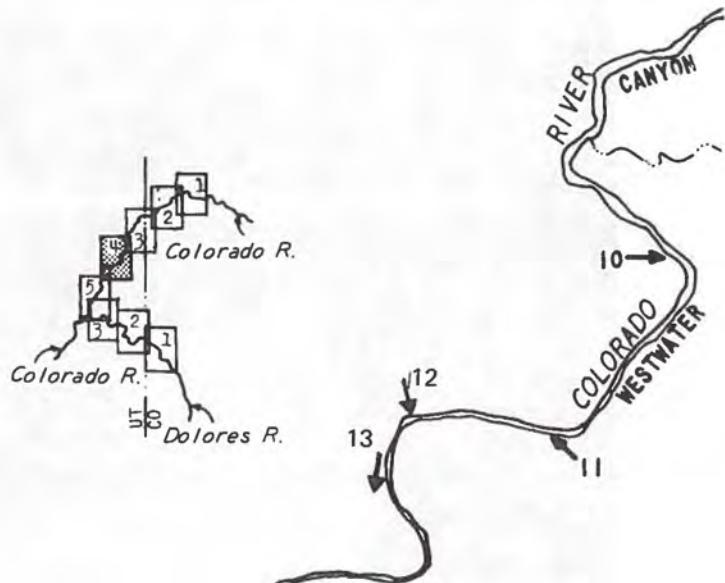
10. Outlaw Cave is a popular stopping place for river users. The cave is said to have been the hideout for outlaws. Remnants of their habitation still remain. BLM



12. Two kayaks and two rafts in the 'Room of Doom' Skull Rapid. Flow about 1000 cfs (28 m³/s). BLM



11. Resistant metamorphic rocks constrict the canyon to as little as 30 feet at one point. BLM



13. The steep-walled canyon limits vegetation, other than grasses and shrubs, to the benches high above the river. BLM



spot near Last Chance Rapid, the river has carved a huge femur, big enough to dwarf the fossil of a brontosaurus.

At the tail of Skull Rapid the river beats against a cliff. Part of it spills away downstream to rapids named Manila Folder, Sock-it-to-me, and Last Chance. But part surges into a great recess in the walls just below the main drop of Skull Rapid. At high water the river races into this angular bay, converting it to a swirling whirlpool whose outer margins are almost 3 feet (1 m) above the vortex. The grip of this whirlpool on its contents is so tenacious the rapid has sometimes been known as Dead Sheep: their bodies are sometimes found circulating in the whirlpool awaiting low water and release. Even at low or falling stages, when the river is largely free of driftwood, this recess, known to boatmen as the "Room of Doom," is filled with great rafts of twigs, sticks, boards, and logs which rise and fall on the surf driven into the bay by the rapid outside.

Skull Rapid approximately marks the deepest cut into the Uncompahgre Uplift; from that point on the river begins to pass downdip toward the southern margin of the anticline. One notable feature occurs a mile or so downstream on the rim. Big Hole is an abandoned meander. Known in most parts of the southwest as a "rincon" (Spanish for "corner"), this feature has a central tower surrounded by a circular valley. This one was formed at a time when the river's course was about 200 feet (60 m) higher than at present. It made an ox-bow surrounded by walls of Wingate Sandstone. Eventually, after the neck, with current directed against it from both sides, had gradually worn down, the river broke through.

By continuing its downcutting, the river has sunk about 200 feet (60 m) into the black rocks, leaving its former channel to a pair of ephemeral tributaries which have gullied but not much deepened it.

By about 4 miles (6.4 km) below Marble Canyon, the Precambrian rocks have passed beneath the river, and will not reappear until they crop out below Hance Rapids in the Grand Canyon, more than 300 river miles (480 km) downstream.

As the dip of the strata continues, the river is again lined by the Wingate Sandstone, the Entrada, and then by the slopes and scattered spall of the Morrison Formation. As the river is released by each hard rock into the softer ones which lie above it, its width increases and its current grows more sluggish. By the Rose Ranch boat ramp the river is as wide as it was at the very beginning of segment A. To the east a few junipers and pinon pines can be seen on the tops of the bluffs, but barring the green stands of riparian vegetation lining the stream, the area seems almost empty of vegetation.

Segment C - Rose Ranch to Cisco Wash (River Mile 1038.5 to River Mile 1027.5). Downstream from the Rose Ranch boat ramp the Colorado flows south, through a valley cut in the Morrison to a width of 2-3 miles (3-5 km). This broad valley is used for agriculture, with hay meadow and grazing lands lying beyond the thick screen of tamarisk that lines the river. This segment shows the influence of man: it contains fences, powerlines, trailers, and some riprapping on the shores, including old car bodies. A few farm buildings--sheds and barns--can be seen; these are old and not well maintained.

About two miles (3.2 km) downstream from the Rose Ranch boat ramp the river crosses the Dry Creek fault, which brings the Entrada Sandstone in contact with the Salt Wash member of the Morrison Formation, a displacement of about 400 feet (130 m). Below the confluence with Coates Creek, the river flows in a relatively narrow canyon cut in the Brushy Basin member of the Morrison Formation, and several small faults in the Ryan Creek zone



14. Below Westwater Canyon the River opens into a broad valley which is characteristic of the remaining portions of the study area. BLM



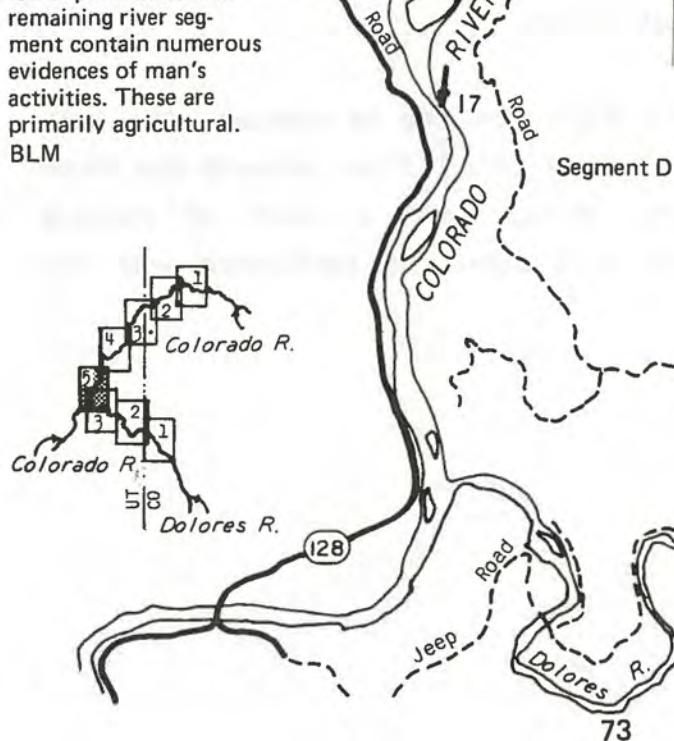
15. The upper and lower portions of the remaining river segment contain numerous evidences of man's activities. These are primarily agricultural. BLM



16. Riparian vegetation screens much of the agricultural lands adjacent to the river. Toward the lower end the scenic La Sal Mountains loom on the horizon. Harman, O'Donnell & Henniger Assoc, Inc.



17. Utah State Highway 128 parallels the last three miles of the study segment. This low-speed road which connects Moab and interstate 70, is becoming popular as a scenic highway. BLM



are visible in the interbedded shale and sandstone. The rock is still dipping; mesas made of the Morrison and capped by the Dakota Sandstone eventually diminish until, near Cisco Wash, the river flows in the Dakota.

Segment D - Cisco Wash to Dolores River (River Mile 1027.5 to River Mile 1023.5). In segment D the rock comes under the dominance of the La Sal Mountains, the laccolith near Moab which was described in Chapter II. Between the Uncompahgre Uplift and the uplifted rock ringing that range lies the Sagers Wash Syncline, a regional sag whose axis crosses the river about 1 mile (1.6 km) below the beginning of segment D. Here the river crosses the highest rocks it encounters in the geologic column; a wide valley opens in the soft saline Mancos Shale. Broad open expanses and long views characterize this section, with the dark blue and snow-capped La Sals providing a scenic contrast to the arid bluffs and dense riparian vegetation along the stream.

Human intrusions are also comparatively common in this reach. Houses, shacks, and agricultural land are visible, and the lower two-thirds of the segment is paralleled by Utah State Highway 128, which is occasionally visible from the river. As in segment C, the current is placid, even at high water.

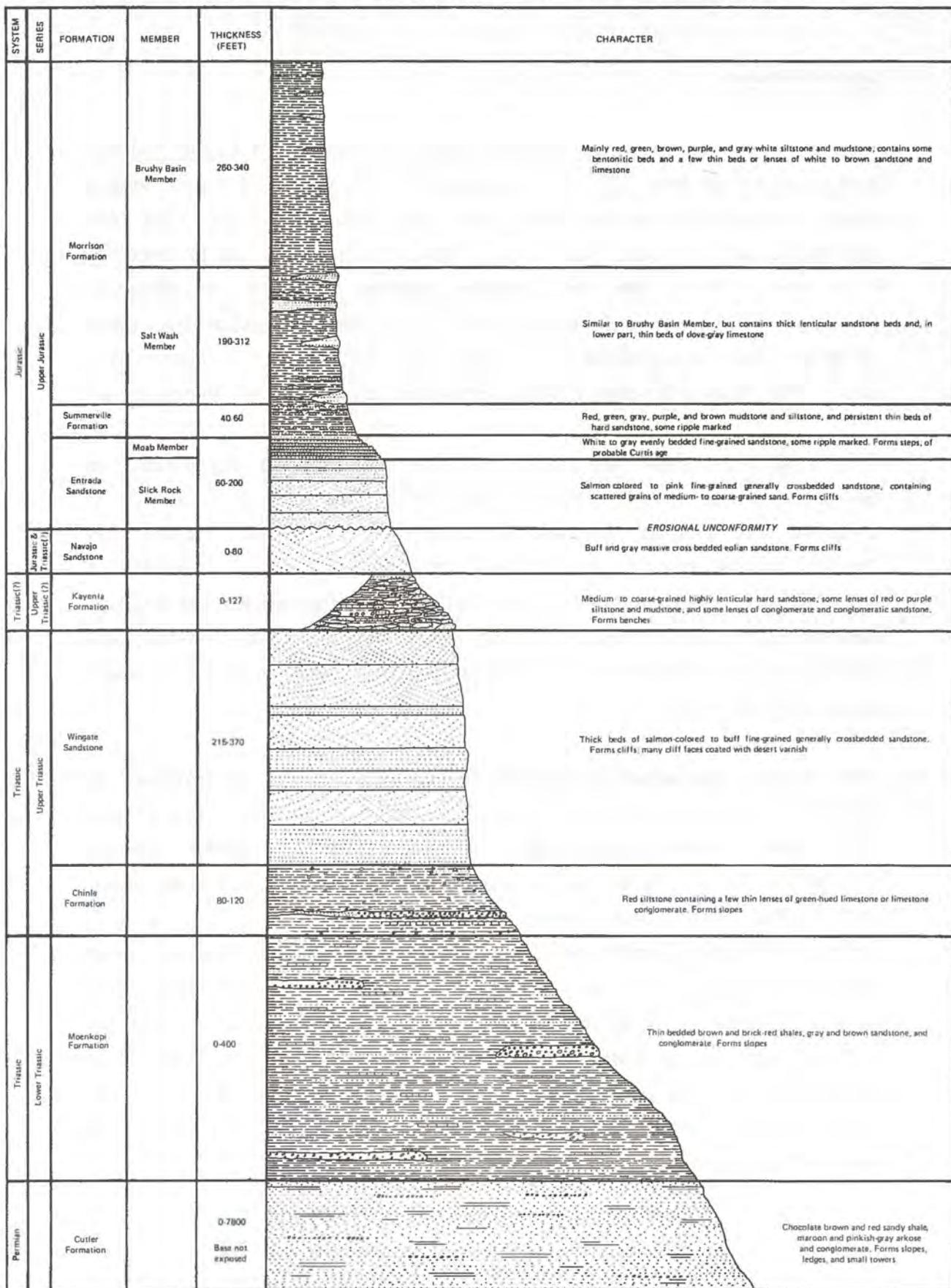
Once the axis of the Sagers Wash Syncline is crossed, the rock begins its slow rise toward the La Sals. From beneath the river successively older formations arise, until a bluff of Entrada Sandstone overtops the river just below its confluence with the Dolores.

Dolores River

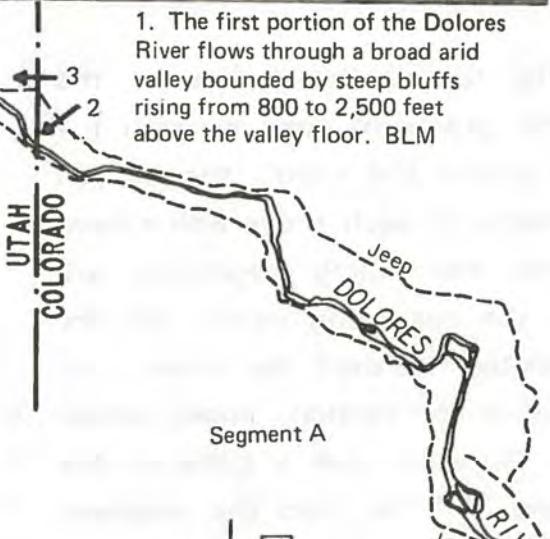
Segment A - Gateway to Fisher Creek (Cottonwood Canyon (River Mile 31 to River Mile 17)). The massive Uncompahgre Uplift was a major structural barrier at the time of its first rise (in Pennsylvanian-Permian time, about 300 million years ago), even as it is now. Thus the stratigraphic column south of the Plateau, where the Dolores has its course, is in certain important ways different from that north of it along the Colorado. In particular, along the Colorado the Chinle formation overlies the Precambrian rock. Along the Dolores a period of erosion at the time of that first uplift reduced the summit of the Plateau and deposited the resultant materials in thick red sedimentary sequences which underlie the Chinle; the black rocks are not seen. Below the Chinle, in the area of the Dolores, are the three shaly members of the Moenkopi Formation, and the Cutler Formation of purple arkosic sandstone and conglomerate. High above it, atop the Kayenta, are exposures of buff Navajo Sandstone, which also are not present along the Colorado.

The river's course at the start of the study area at Gateway is lined by Quaternary alluvium which veneers the Cutler, one of the rocks not present along the Colorado. Above these maroon sediments are the brick-red slopes and small ledges of the Moenkopi and Chinle, which slope about 800 feet (240 m) up to the vertical cliffs of Wingate Sandstone. The dominant color impression is of reds and greens. An alternation of purple ledges, red slopes, and pink cliffs stands up to 2100 feet (680 m) above the river, reaching high enough to be clothed in a dark-green forest of pinyon and juniper. At river level the intense, shimmering greens of cottonwood, willow and tamarisk stand boldly out against the dark red tones of the cliffs.

GENERALIZED SECTION OF ROCK FORMATION ALONG THE DOLORES RIVER STUDY AREA



AFTER S. W. LOHMAN, GEOLOGY AND ARTESIAN WATER SUPPLY OF THE GRAND JUNCTION AREA, COLORADO PLATE 2,
UNITED STATES GEOLOGICAL SURVEY PROFESSIONAL PAPER 451, WASHINGTON, D. C. (1965).



3. Vegetation in this area consists of cottonwoods, tamarisks, willows and sagebrush. Several farms are located adjacent to the river. BLM



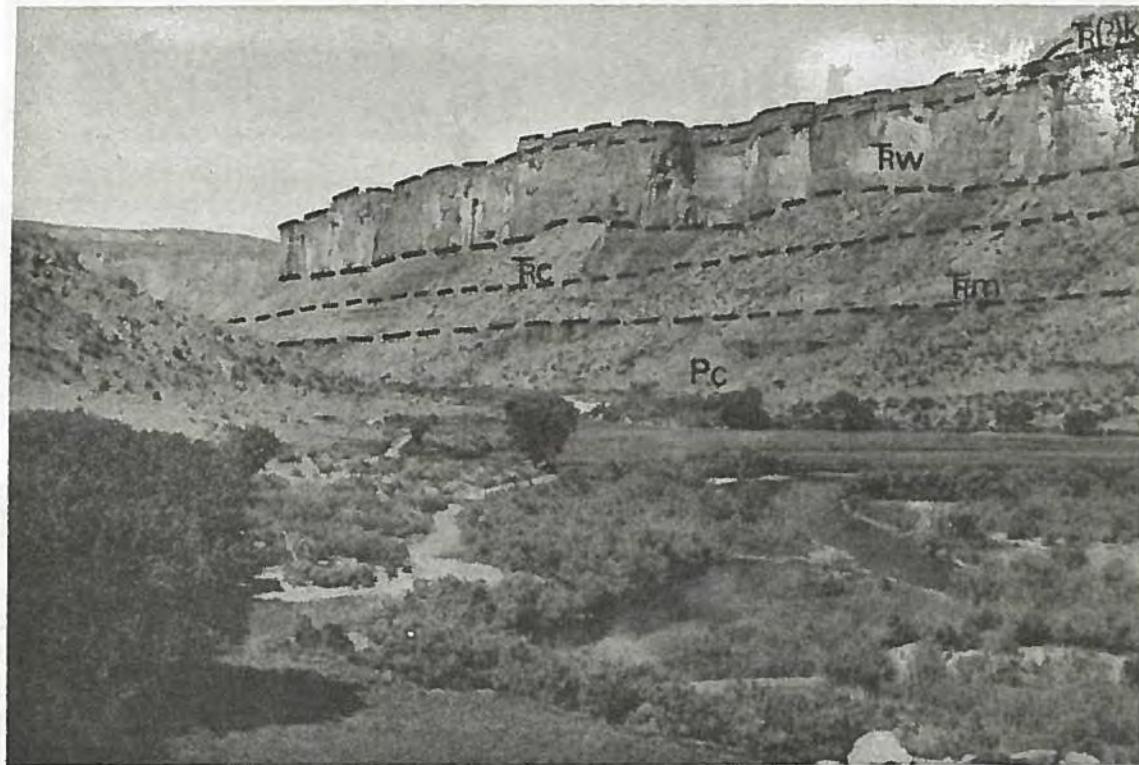
2. There are several rapids near the state line. These are floatable only during the high runoff in the spring. BLM



The river corridor in most of this portion is about 2 miles (3.2 km) wide. Bounded by cliffs so distant they darken into a purple color, the valley alternates bright green hay and alfalfa fields with barren terraces of ancient cobbles, covered by grayish sage and shadscale. In the upper valley is one rapid, an irrigation dam which is followed by a series of waves and rocks.

The strata in this valley are dipping toward the northwest, the direction of the river's flow, so they gradually pass beneath the river. As these softer rocks pass under the river, the canyon narrows. The low-standard gravel roads on each shore which have been periodically visible through the intervening vegetation are squeezed closer toward the river by the narrowing walls. By the state line, the southern road immediately borders the river. At this point is the most impressive rapid in the stretch, known either as Stateline Rapid or The Narrows. Outwash from a gully on the north bank has caused this rapid, and cliff fall from the southern walls of Wingate Sandstone has exacerbated it. The rapid, runnable only in the spring, is a complicated descent past and through holes and waves, through a constriction, and then to the right around the head of an island. Two irrigation ditches head at this point, one on each side of the river, making use of the declivity of the river.

Below this rapid lie others, also complicated by fallen boulders of Wingate Sandstone. On the south shore are fields farmed under a special use permit from the BLM. The north, right shore grows steeper and its angular talus slopes impinge on the river. The south shore has an understory of tamarisk, with large cottonwoods shading them. By this point, near the end of segment A, the north road has stopped and the south is well screened. The river's course is in the upper Moenkopi or lower Chinle, but these red shales are generally covered by fan-shaped talus slopes and detritus accumulations which support sage, shadscale, and

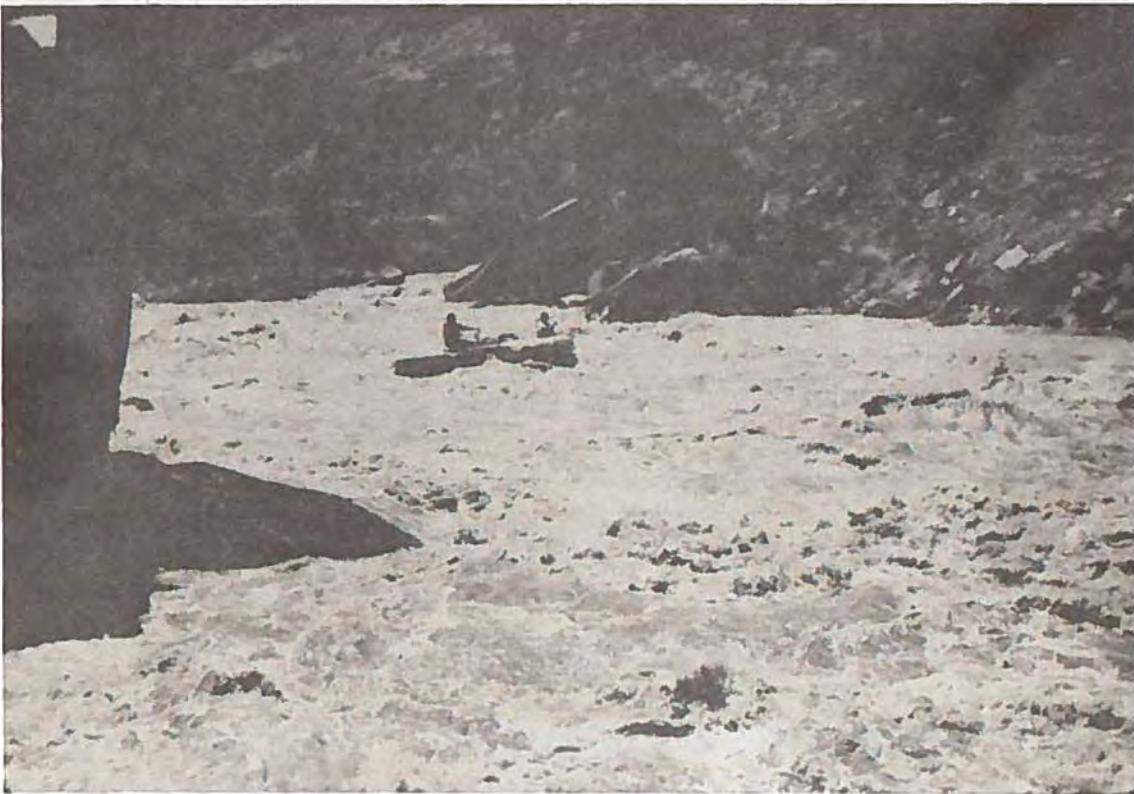


The valley of the Dolores below Gateway displays several formations absent along the Colorado.
This photograph near the end of Segment A shows the lower ones.

- T(?)k —— Triassic (?) Kayenta Formation
- Rw —— Wingate Sandstone
- Rc —— Chinle Formation
- Rm —— Moenkopi Formation
- Pc —— Permian Cutler Formation



BLM



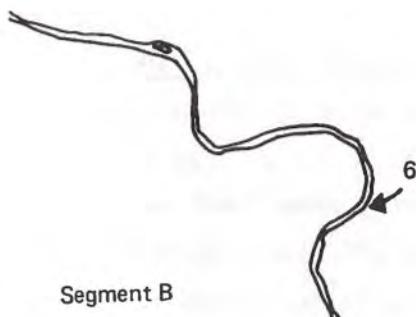
Stateline Rapid (The Narrows) on the Dolores in the fall of a normal year, and the spring of a wet year. Flows of about 75 cfs ($2.1 \text{ m}^3/\text{s}$) and 9000 cfs ($255 \text{ m}^3/\text{s}$). The large boulder shown in the first picture at the most constricted point in the rapid, forms the left border of the second. HCRS

greasewood. The canyon has narrowed to perhaps one-half mile (0.8 km) in width.

Segment B - Fisher Creek to Bridge Canyon (River Mile 17 to River Mile 11). This segment, barring a placer mine of about 5 acres (2 ha) at its lower end, has no substantial trace of human activity. The canyon is narrow, about one-quarter mile (400 m) wide, with sheer walls of Wingate Sandstone almost 500 feet (160 m) high lining the river's course. The few long vistas available in this narrow canyon reveal the colorful strata above the Wingate: the Kayenta, the Navajo (which makes a distinctive beige cliff), the pink band of the Entrada and the ledgy Morrison Formation. Though the flow of this reach is relatively quick, it has no rapids. Occasional side canyons invite exploration. In time of low water, the muddy shores near these side canyons may display the tracks of deer, great blue heron, coyote, mountain lion, and the drag-marks of beaver hauling brush. Throughout this reach the strata dip, so the rock formations successively plunge beneath the river. The boater gradually leaves behind the Chinle, Wingate, Kayenta, and Navajo Formations.

Segment C - Bridge Canyon to the Confluence with the Colorado River (River Mile 11 to River Mile 0). Once it encounters the higher, softer sediments of late Jurassic and early Cretaceous time, the river opens a wider valley. Longer views of mesas capped by the dark brown sandstone ledges of the Morrison and Burro Canyon Formations become more frequent, as do traces of human intrusion. Tamarisk, itself an exotic and therefore an intrusion, dominates the shores, and hides most traces of the placer and uranium mines which were the predominant human use of this area. A low-water ford, ranch buildings, and a gaging station may also be noted.

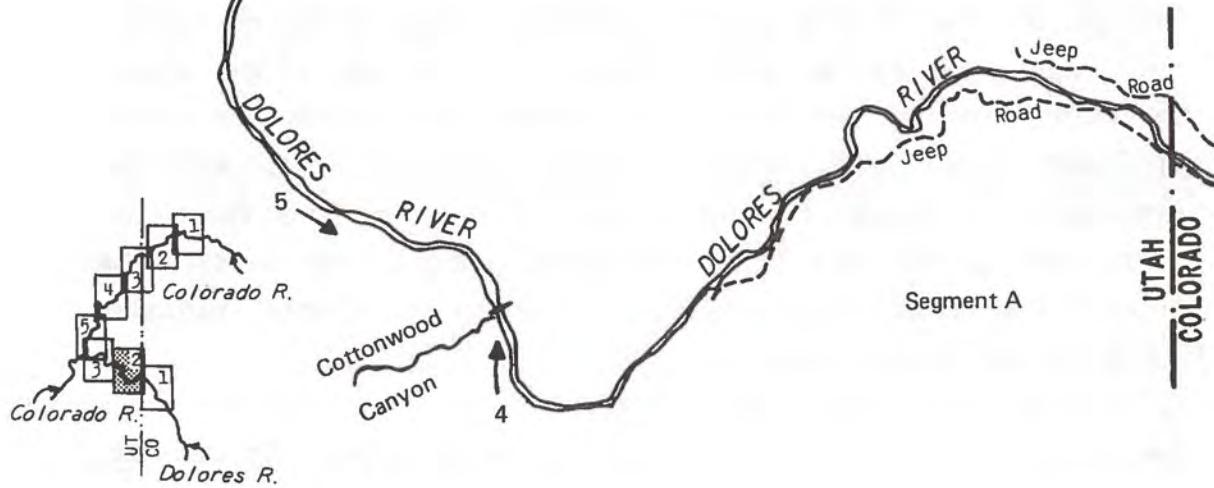
The upper portion of this reach is lined by the Entrada Sandstone. In the area of Utah Bottom, the axis of the Sagers Wash Syncline



Segment B



4. Near Cottonwood Canyon the river enters a narrow canyon about one-quarter mile wide. Rust-colored sandstone walls rise almost vertically to about 500 feet in this section. BLM



5. Willows, tamarisks, and other riparian vegetation occupy the narrow benches along the river. HCRS



6. The snow-capped La Sal Mountains are visible south of the canyon area. BLM





The Dolores Canyon in Segment B reveals one rock type not present on the Colorado – the Navajo Sandstone, near the area where it pinches out against the Uncompahgre Uplift.

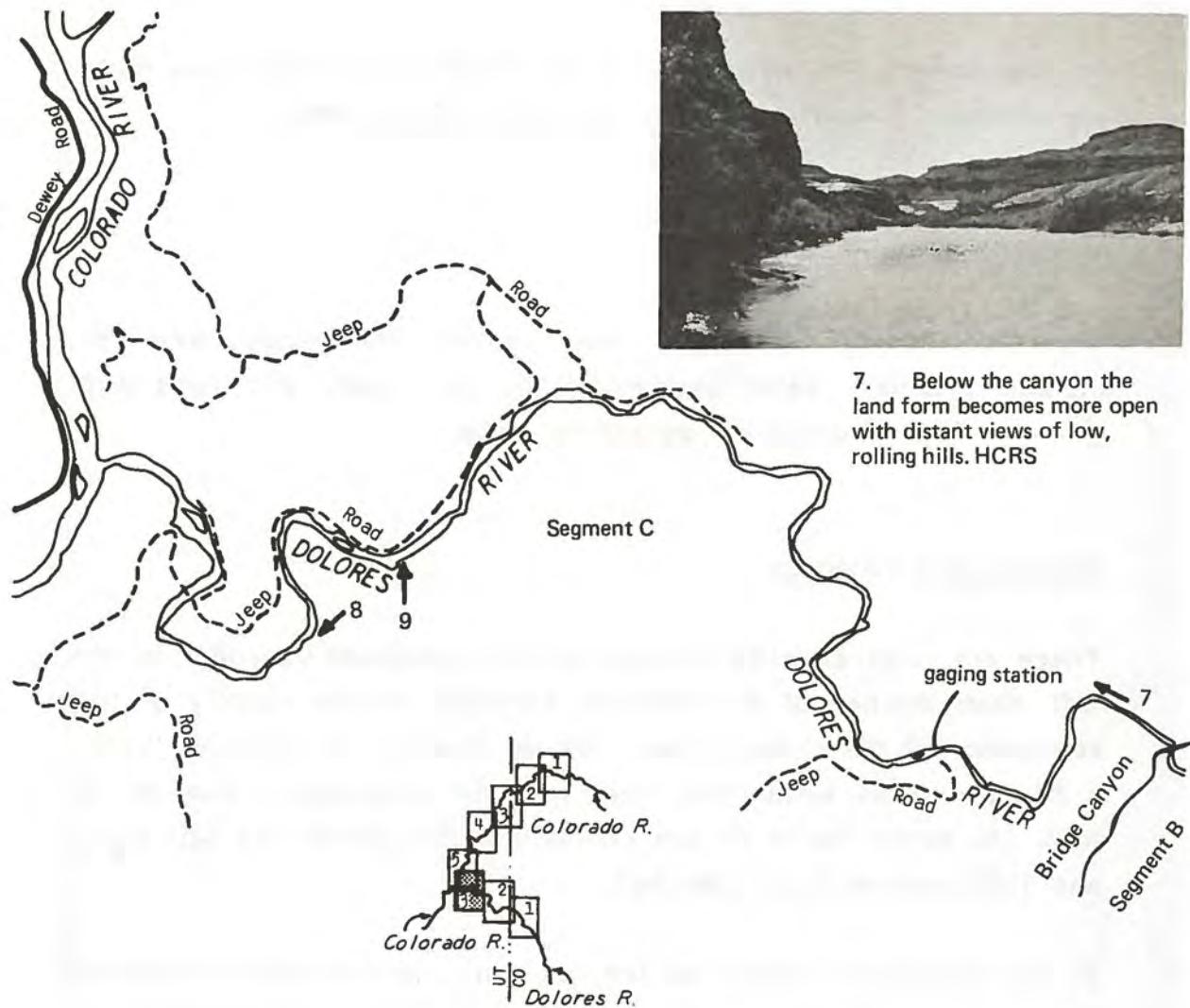
- Jm — Jurassic Morrison Formation
- Jec — Entrada Sandstone
- Jn — Navajo Sandstone
- R(?)k — Triassic (?) Kayenta Formation
- R_w — Wingate Sandstone
- R_c — Chinle Formation (obscured by talus)

(mentioned in the description of the Colorado River) crosses the river, replacing the general southwestern dip of the rock off the Uncompahgre Plateau with a northeasterly dip, the result of the Yellowcat dome that lies west of the Colorado River. Perhaps the most striking geologic feature in the Utah Bottom area is the smooth, sheer pink and white face of the Entrada sandstone. Known as the slickrock or slickrim in many parts of the southwest, it forms a distinct scarp on the cliff. In this area it displays a distinctive X pattern in its joints that is of considerable scenic interest.

Below Utah Bottom the Entrada disappears beneath the river, whose course is then in the Morrison. At first relatively narrow, after about 2 miles (3.2 km) the valley opens up for the remainder of the segment, attaining its greatest width near Lake Bottom. Colors in the rock become more subtle, and appeal to a different taste than in the canyon upstream. The Morrison walls are dominated by spall colored a burnt sienna. Through this accumulation of dark, varnished rock there are sometimes sights of the shale which also comprises the formation; this appears in all the earth tones including reds, purples, white, greens, and even blues. The higher slopes are sparsely covered with sagebrush.

Lake Bottom is the most wooded area in this segment of the Dolores. The river forms a large omega-shaped bend opening to the north. The open area within the meander contains a low-water ford and is thickly grown over with tall tamarisk clumps and cottonwoods that support the nests of great blue herons. Below this point, for the final mile of its course, the Dolores penetrates rising strata, so that by the confluence with the Colorado, it has re-encountered the Entrada Sandstone.

A low-water ford in this area is the only access to the Dolores Triangle, which is bounded by the two rivers and the state border.



7. Below the canyon the land form becomes more open with distant views of low, rolling hills. HCRS

8. Lake Bottom is dominated by cottonwoods, with willows and tamarisk along the river. BLM



9. Evidence of mining activities that have taken place along the lower portion of the Dolores River. BLM



At high water, the area can only be reached by a circuitous route via Colorado, requiring about a 100-mile (160-km) drive.

MINERAL RESOURCES

Important mineral resources found within the study corridors include uranium, vanadium, gold, oil, gas, coal, and sand and gravel. Each is discussed separately below.

Uranium and Vanadium

There are small deposits of uranium and associated vanadium in the Salt Wash Member of the Morrison Formation in the vicinity of the confluence of the Colorado and Dolores Rivers. During the 1950s, a few prospects within the river corridor produced a total of 50 tons (45 metric tons) of ore containing 180 pounds (81 kg) U_3O_8 and 1,900 pounds V_2O_5 (864 kg).

In its preliminary report on the national uranium resource evaluation program, the Energy Research and Development Administration (ERDA), now the Department of Energy (DOE), has indicated that a portion of the possible potential resources of the Thompson area occur within the corridors of the Colorado and Dolores Rivers near their confluence. The potential resources estimated within the corridors are as follows:

100,000 to 150,000 pounds (45,500 - 68,200 kg) U_3O_8
280,000 to 420,000 pounds (127,300 - 190,900 kg) V_2O_5

These resources are in DOE's \$30 per pound forward cost category. Of these, it is estimated that as much as 18,000 pounds (8,180 kg) might be recoverable--3,000 pounds (1,360 kg) in the Colorado

corridor and 15,000 pounds (6,820 kg) along the Dolores. Recent increases in the price of uranium will undoubtedly stimulate prospecting and exploration drilling in the confluence area. Uranium minerals have also been reported on the north side of the Colorado River in the Loma-Mack area, but at the present time, no significant mineral deposits are known in this area. The major deposits near the Dolores are on Beaver Mesa, outside and west of the study corridor.

Placer Gold

While placers have been worked at various places along the Colorado and Dolores Rivers, information about the location of the deposits, numbers, and locations of claims is sketchy and difficult to obtain. From the end of the last century to about 1942, placer operations along the Dolores netted about 1500 troy ounces (47.62 kg). Extensive new placer operations in the corridor of either river are unlikely.

Sand and Gravel

The Utah Department of Highways is currently obtaining sand and gravel from bars along the Colorado River near Cisco, Westwater, and Harley Dome for use on the section of I-70 from Green River to Floy Wash. The total amount of sand and gravel that will be extracted from these three sites is approximately 450,000 cubic yards. ($344,000 \text{ m}^3$).

Oil and Gas

The nearest oil and gas production has been from the Cisco field, near the town of the same name, approximately 4 miles (6.4 km)

west of the Colorado River. This field was discovered in 1954 and shut-in in 1965, after 7 wells produced 9,356 bbls oil from the Morrison and Dakota Formations at depths of less than 2,000 feet (610 m). Although the reservoirs are not large, low drilling costs offer economic incentives.

While it is impossible to estimate oil and gas potential along segments A, C, and D, the possibility of discovering oil and gas cannot be ruled out. Segment B (Westwater Canyon) has no potential for oil and gas discoveries. Oil and gas interest appears to be high along the Colorado River in T22S, R24E, or approximately the lower half of segment C and upper half of segment D. Application has been made for oil and gas leases in at least 50 percent of this area.

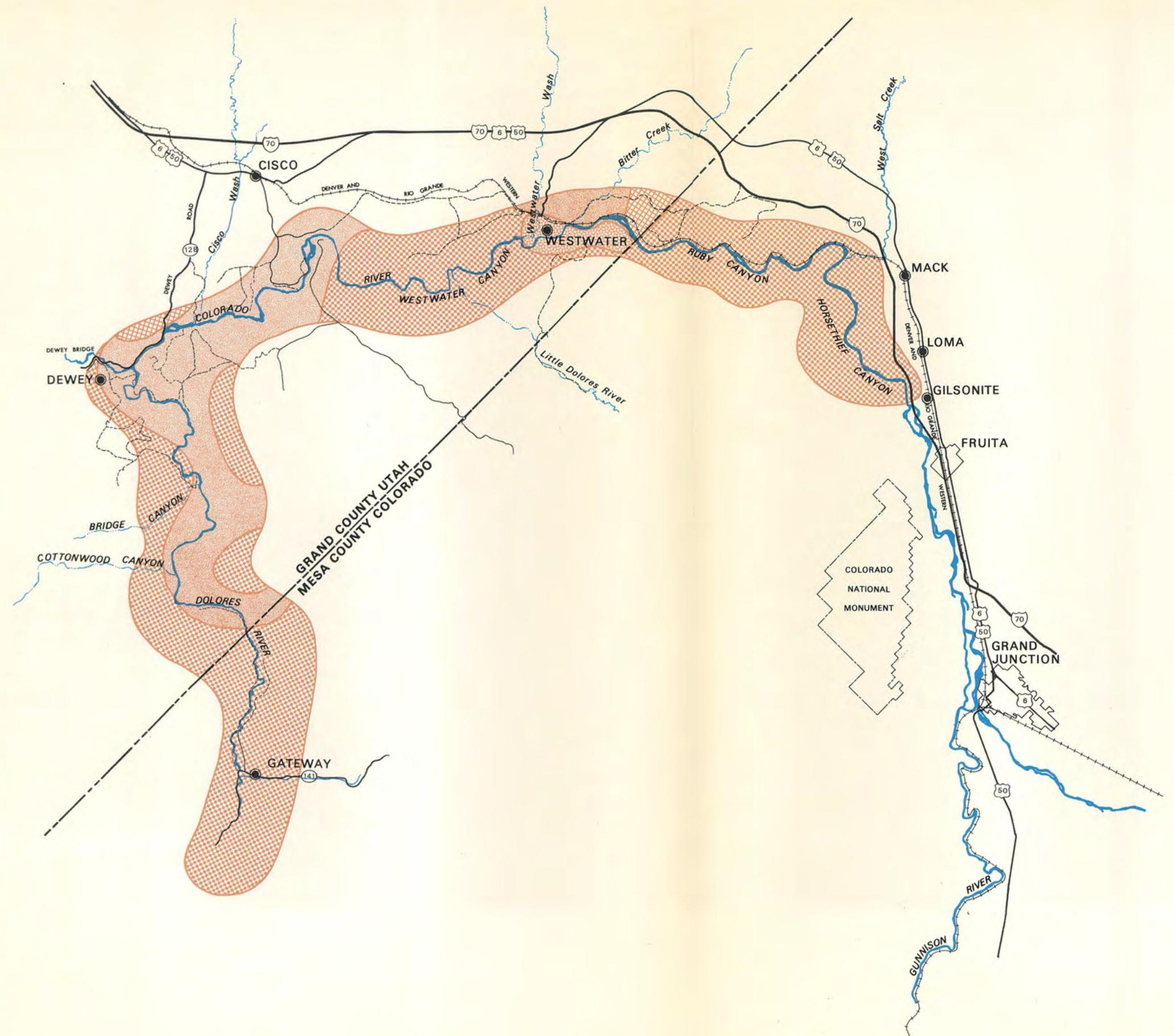
Coal

The Dakota Sandstone contains coal in many parts of western Colorado. A bed of subbituminous coal has been prospected on the hogback ridge between the Colorado River and U.S. Highway I-70 in the Loma-Mack area. This ridge lies within the study corridor during about the first 0.5 mile (0.8 km) of segment A. A prospect pit near Mack is about 1.5 miles (2.4 km) northeast of Horsethief Canyon.

SOILS

Detailed soil surveys have not been made on the study corridors. By utilizing Soils of Colorado and Soils of Utah¹, a map of the soil

1. Colorado State University Experiment Station, May 1976; and Utah Agricultural Experiment Station, September, 1973; both prepared in cooperation with the US Soil Conservation Service.



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
GENERAL SOIL ASSOCIATION

- GRAVEL ROAD
- - - JEEP ROAD
- 12/41 - LITHIC USTOLIC CALCIORTHIDS
LITHIC USTIC TORRIORTHENTS
- 51 - AQUIC XEROFLUVENTS AQUIC USTIFLUVENTS
- 63 TYPIC TORRIORTHENTS LITHIC CALCIORTHIDS
- 68 ROCKLAND

N 1 5 0 1 2 3 4 miles
1 5 0 1 2 3 4 5 kilometers

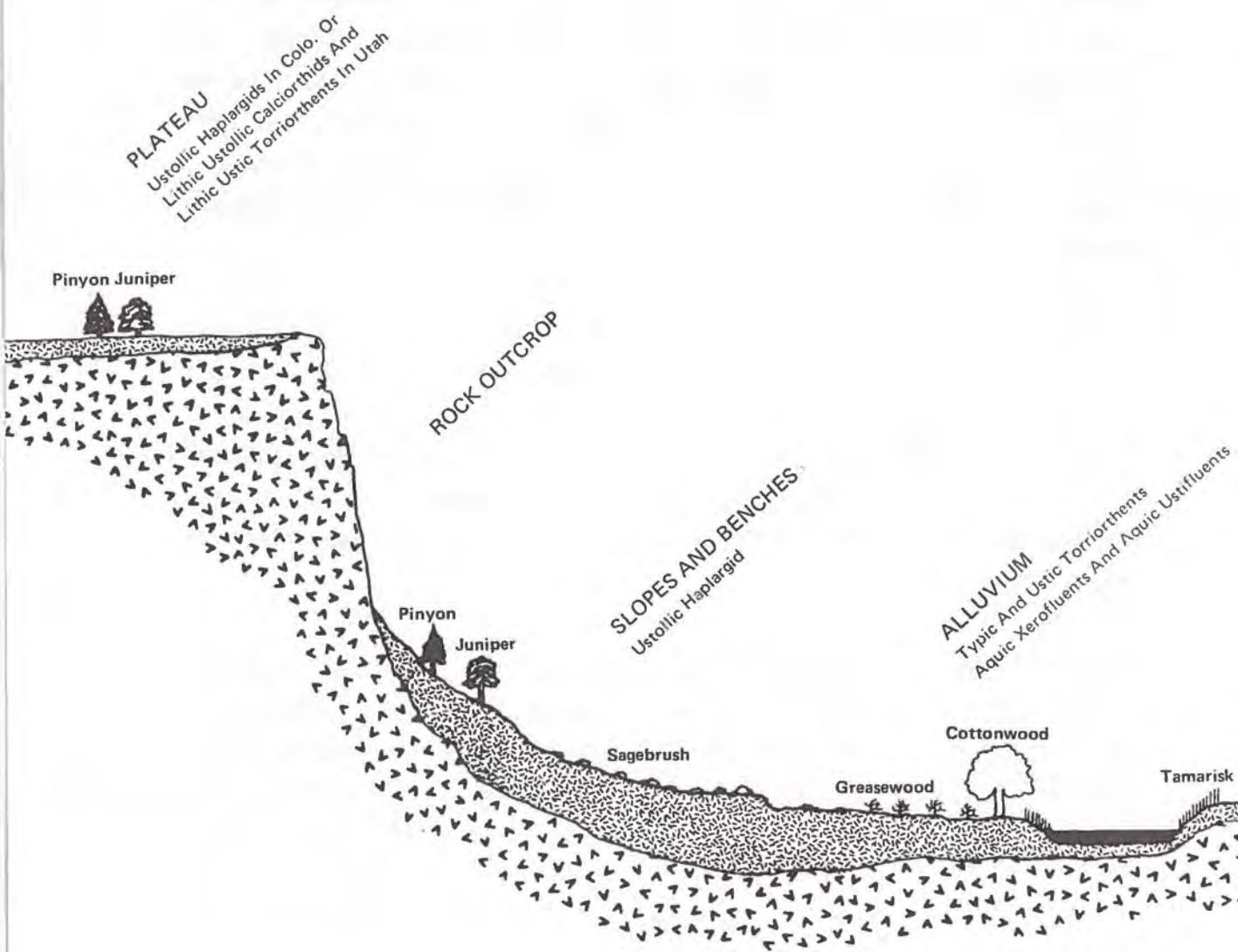
associations in the corridors was made. A drawing of the generalized position of soils in the corridor landscape displays the typical position of the associations along the rivers. As is to be expected from the description of geology in the previous section, Rock Land is one of the most common "soils" in the area, especially when it is noted that the other soil associations sometimes contain portions of rock outcrop or badland.

In examining the soils map, it should be noted that the title of map unit 12 in Colorado does not match the title of unit 41 in Utah where they meet at the state line. Since these mapping units include the same kinds of soils, a combined mapping unit (12/41) was created by combining the pertinent information of each state's description. The soils associations of the area are described by their numerical key below.

12/41. Lithic Ustollic Calciorthids (30%)--Lithic Ustic Torriorthents (15%), Ustollic Calciorthids (15%), Ustollic Haplargids (15%)--Rock Outcrop (25%). The soils in this unit occupy the mesas, high benches, mountain slopes, and narrow canyons of the study area. Formed in materials weathered predominantly from sandstone, these soils have slopes ranging from 2 to 50 percent. These well-drained soils display moderate to rapid permeability, with medium to rapid runoff and moderate sediment production.

These soils are used primarily for range, wildlife and recreation. Native vegetation is dominated by pinon and juniper with an under-story of sagebrush, Mormon tea, mutton grass, and Indian ricegrass.

51. Aquic Xerofluvents (30%)--Aquic Ustifluvents (25%)--Typic Torrifluvents (20%) Association (contains 25% Typic Natrargids and Vertic Fluvaquents). These soils are poorly drained, with water tables high enough to keep them moist for long periods. They are



GENERALIZED POSITION OF SOILS IN THE CORRIDOR LANDSCAPE

found along recent flood plains and low stream terraces adjacent to the major rivers.

The permeability of these soils is slow to moderately rapid, with runoff being slow to rapid and sediment production high, mainly because of banks slumping into the rivers. The principal native vegetation on these streamside soils is cottonwood, willow, tamarisk, greasewood, and associated grasses, forbs, and shrubs. Grazing and the nurture of wildlife are the principle uses of this association.

63. Typic Torriorthents (Shallow) (40%)--Lithic Calciorthids (20%)--Lithic Natrargids (20%) Association (contains 20% Lithic Ustollic Calciorthids and Badland). The soils in this association display moderate to slow permeability. Runoff is rapid and sediment production is high.

The principal native vegetation is shadscale, mat saltbush, Nuttall saltbush, greasewood, and associated grasses, forbs, and shrubs.

These soils are used mainly for range and wildlife habitat, with some small areas serving as irrigated pasture.

68. Rock Land. This association occurs mainly on canyon slopes of the Colorado River and its numerous tributaries. It also occurs on geologic folds and faulted areas and includes plateaus, mesas, and some basin areas. The relief varies from very steep canyon walls and fault scarps to undulating and rolling uplands. Elevations range from about 3,600 to 7,600 feet.

The bare rock in this land type is estimated to be from 50 to 75 percent of the area. Shallow and very shallow soils over sandstone bedrock comprise about 20 to 40 percent. The other 5 to 10 percent is deep and moderately deep soils. Runoff is high on this

association. The use of this land type is mainly for viewing scenery and recreation.

VEGETATION--COLORADO RIVER

Two major studies, one by Dr. Arthur H. Holmgren of Utah State University and three associates which studied Westwater Canyon for threatened or endangered flora,¹ and one by Randall S. Shin and Frank J. Smith,² which resulted in a description of vegetative associations in Horsethief and Ruby Canyons, have been made in the area. The remaining portions of the river were studied by the BLM.

Segment A (Loma, Colorado to Westwater, Utah)

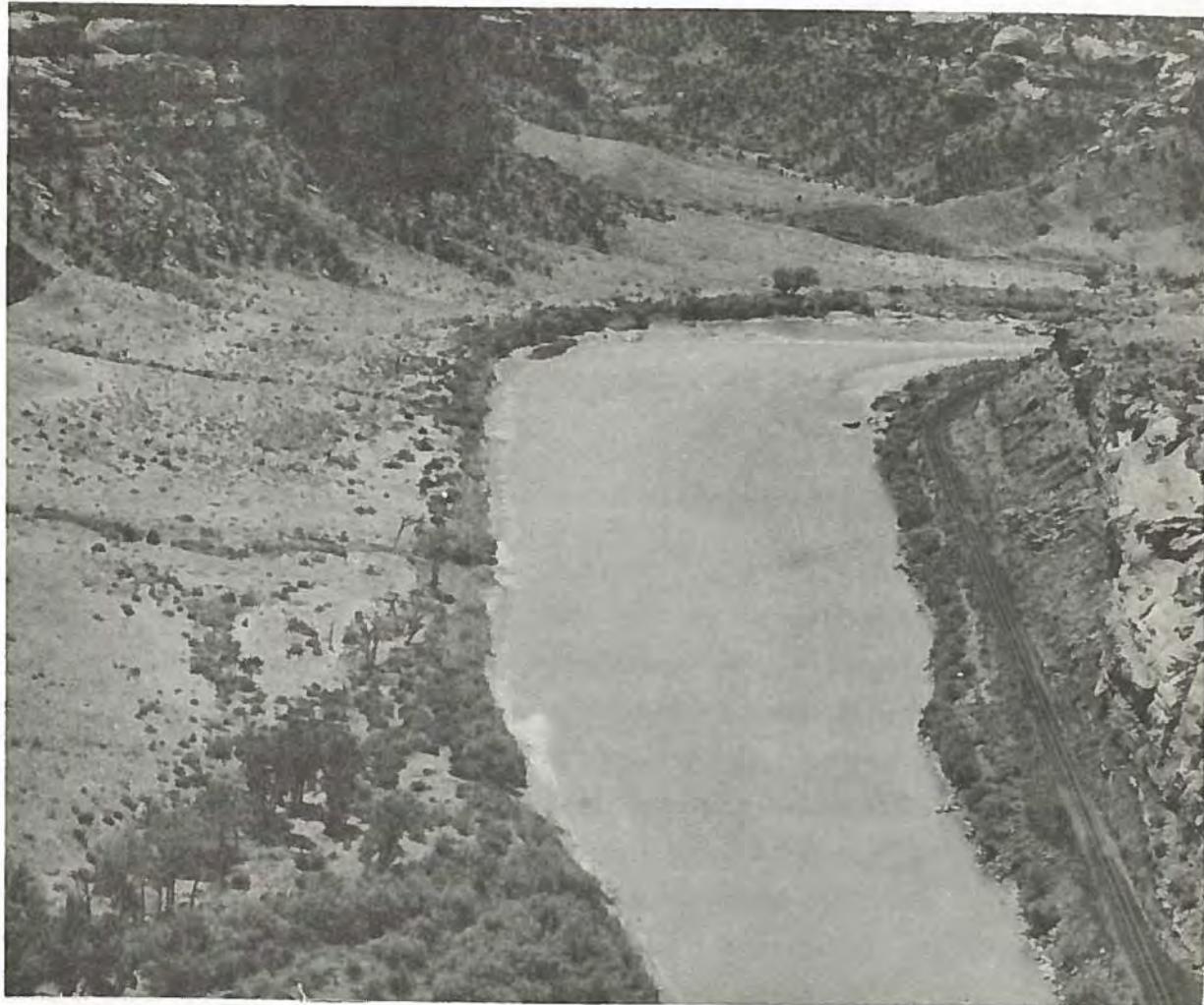
As a result of the study by Shin and Smith, more is known about the flora of this segment than any of the others in the study zone. This study identified four plant communities in the area--streamside, floodplain, island, and slope.

The dominant streamside vegetation is tamarisk, cottonwood, and willow. In small intermittent areas in Ruby Canyon, communities of grasses, forbs, and shrubs appear. The tamarisk, which is not native to this area, is an aggressive invader which is generally successful in competing with native vegetation, eventually replacing it.

1. Holmgren, Arthur. "Study of Threatened and Endangered Flora of Westwater Canyon." Blm Contract. Unpublished report (1976).

2. Shinn, Randall, S., and Smith, Frank J. "Vegetation Inventory for the Colorado Wild and Scenic River Study." Bio-West., Logan (1976).

the Colorado River. It follows the river through the valley floor, then turns upstream to follow the eastern base of the Mee Canyon escarpment. The river flows through a narrow valley between the Mee Canyon escarpment and the Colorado River floodplain. The river is surrounded by a mix of riparian vegetation, including cottonwood, greasewood, and tamarisk. The river is surrounded by a mix of riparian vegetation, including cottonwood, greasewood, and tamarisk. The river is surrounded by a mix of riparian vegetation, including cottonwood, greasewood, and tamarisk.



The juncture of Mee Canyon with the Colorado River in Ruby Canyon illustrates vegetative communities. Tamarisk lines the river; the floodplains are dominated by cottonwoods, greasewood, and the mixed riparian woodland association; slopes and cliffs support the pinyon-juniper community. Similar communities are found in Segment A of the Dolores. BLM

Floodplains, located at bends in the river or between the river and the slickrock canyon walls in Ruby Canyon, are slightly higher above the water than the typical streamside communities so they are dominated by cottonwoods, greasewood, and a mixed riparian woodland association.

On the slopes and slickrock ledges of Ruby Canyon, a characteristic pinyon-juniper community and various associations of shadscale and sagebrush exist.

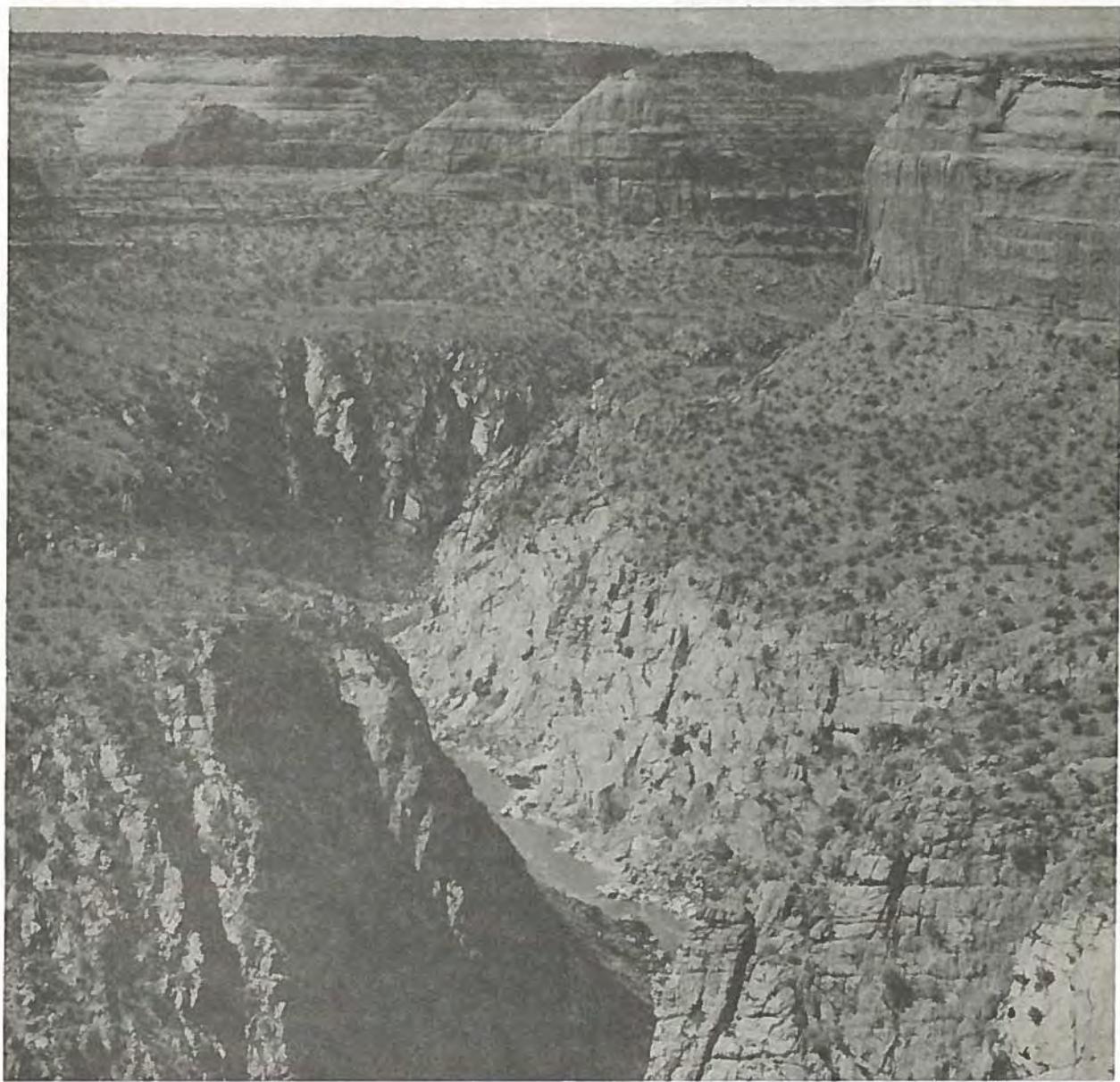
The major islands, like the shores, are dominated by tamarisk, willow, and cottonwoods, but they contain a much heavier understory of forbs and grasses. The lush growth on the islands can be attributed to a lack of grazing and an adequate water supply.

Man has disturbed the vegetation of the Ruby Canyon area in several ways. The most far-reaching disturbance is probably the spread of tamarisk up to the area from the vicinity of the Mexican border, where it was apparently introduced along the Imperial Canal. Some areas of land have been cultivated. Although these are mostly confined to the Loma and Westwater areas, a small site is located within Ruby Canyon, just above the mouth of Mee Canyon. Other human disturbances have been the clearings for roads and the railroad. A less obvious disturbance, at present, is that a combination of drought and overgrazing has almost completely eliminated the understory in the cottonwood, sagebrush, and greasewood communities.

Segment B (Westwater Canyon)

Westwater Canyon almost totally lacks significant vegetation within the Precambrian rock through which the interior of the canyon is

located at about 6,800 feet above sea level and has a width of 1,000 feet. The previous permanent camp had been established in the same general place since 1900, and the author had camped there many times.



Westwater Canyon. Vegetation is almost completely confined to the benches above the inner gorge. BLM

cut. This rock weathers extremely slowly, so it is only in isolated depressions or cracks where soil has been deposited by wind or water that limited stands of forbs, grasses, and even small shrubs have become established.

Above this layer on benches and slopes, or below it, on rare sand bars along the river's edge, vegetation flourishes. The benches above the inner gorge are dominated by shadscale; the steep slopes above them by juniper. The few sandy banks support tamarisk and willow.

The bottom third of this segment marks a gradual return to the vegetative association which characterizes the river corridor above Westwater Canyon--a meandering stream with large floodplains dominated by stands of tamarisk, cottonwood, and willow. These riparian associations are backed by large communities of shadscale and smaller communities of greasewood where the soils are deeper and moisture is sufficient. Extensive cultivation is occurring across the river from the Rose Ranch take-out.

Segments C and D (Rose Ranch to Confluence with Dolores River)

In spite of the substantial volume of water which flows in the Colorado River, the river influences vegetation only along its immediate banks. Tamarisk forms almost a solid line on both sides of the river for nearly the entire length of both segments. The tamarisk is backed by communities of large cottonwoods in many areas, especially on the floodplains, and greasewood communities which are generally not visible from the river. The shadscale association occupies the slopes and benches near the river. Other major vegetative species found dispersed in the various associations include rabbitbrush, willow, and squawbush.

recreational and cultural resources. In addition, the Bureau of Land Management

is responsible for managing public lands.



Tamarisk forms an almost solid line on both sides of the rivers in their lower segments. BLM

and other agencies have undertaken various control measures. These include herbicides, mechanical removal, biological control, and riparian restoration. While these methods have been effective in some cases, they can be costly and may not always be feasible or appropriate for all situations. The Bureau of Land Management has developed a comprehensive approach to managing tamarisk infestations, which includes prevention, detection, and removal, as well as research and monitoring to better understand the plant's behavior and develop more effective management strategies.

Clearings for agriculture, roads, and ranches have partially altered the natural vegetation in these segments.

VEGETATION--DOLORES RIVER

The vegetation along the Dolores River is very similar to that of the Colorado River. Streambank vegetation in segment A is primarily cottonwood and mixed riparian woodland association. Areas away from the river are generally shadscale and sagebrush with occasional junipers. Cultivation of hay and alfalfa has altered the natural vegetation to some extent in this segment.

Vegetation in segment B is primarily restricted to the streambank due to the steep cliffs and talus on both sides of the river. Tamarisk has almost totally taken over these banks although willows still survive in some places.

Segment C of the Dolores is very similar to segments C and D on the Colorado. Floodplains are dominated by cottonwoods, greasewood, and other mixed riparian vegetation. Tamarisk is abundant along the river bank. The area away from the river has shadscale and some greasewood.

Threatened or Endangered Flora

Although only limited investigations of threatened or endangered flora have occurred in the study areas, discussions with Dr. Holmgren, who studied portions of Westwater Canyon, and Dr. Stanley Welsh, a noted plant taxonomist who has made several studies in southeastern Utah, have resulted in a partial species list for the area. The list of threatened, endangered, or narrow endemics for the area includes but is not limited to the following species:

Astragalus eastwoodiae--A narrow endemic of the locoweed family whose type location has been given as Westwater, Utah.

Astragalus sabulosus--This species, also of the locoweed or milkvetch family, is believed to extend into the Westwater area near the river from its type location at Cisco, Utah.

Psoralea aromatica--Though collected near Fisher Towers and the Onion Creek area, this species of scurf-pea may extend into the lower reaches of the study area.

Aquilegia micrantha--This species of the Columbine family is found in many of the "hanging gardens"² in southeastern Utah, and thus could be found in any hanging garden in the study area.

Of particular interest is a large lupine which was collected by Edward Blake Payson in the early 1900s in the lower study area. It has not been collected since and is a subject of interest to present-day taxonomists.

A complete listing of these plants can be made only after an extensive on-the-ground inventory has been made of the river corridor. Such an inventory would undoubtedly reveal the presence of several other species.

2. A hanging garden is a clump of vegetation up on a cliff, supported by groundwater seeping through the rock. The inaccessible cliffs to which they cling, which in turn are often found in almost inaccessible canyons, have left them little known, so they are possible sites for several threatened, endangered, rare, or narrow endemic species.

FISH AND WILDLIFE

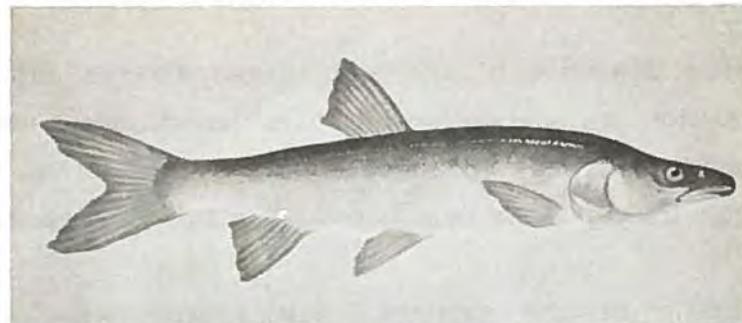
Fish--Colorado River

The Colorado River has been a harsh environment for fish. Widely fluctuating flow levels, water temperatures ranging from near freezing to 90° F (32° C), heavy sediment loads in the spring and after thunderstorms, and periods of high salinity produce high stress. Only a few species of fish were originally able to live under these conditions, of which four, the Colorado squawfish (Ptychocheilus lucius), the bonytail chub (Gila elegans), the humpback chub (Gila cypha), and the humpback or razorback sucker (Xyrauchen texanus), are today in danger of extinction, and are protected by Colorado and Utah state law. In addition, the squawfish and humpback chub are listed as endangered species by the U.S. Fish and Wildlife Service. The bonytail chub has been proposed for endangered status, and the humpback sucker has been proposed for threatened status.

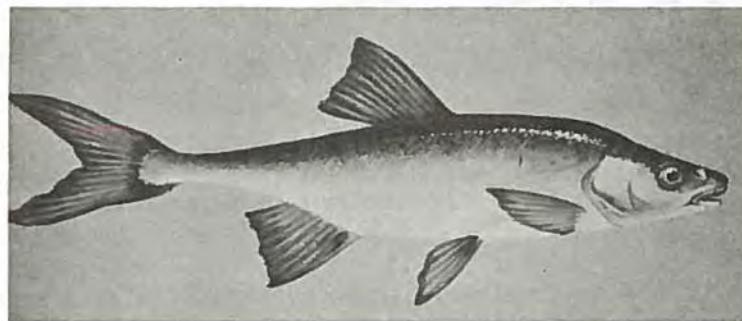
The range of all four of these species has been greatly reduced. Once found in the whole length of the Colorado and its major tributaries, they are apparently almost extirpated in the Lower Basin. The last populations known to exist are in the Green below the Yampa River and in the upper Colorado River above Lake Powell, which includes the study area. Recent inventories have found all but the bonytail chub in the study area, although it has been found in the area within the last 15 years.

Because these native fishes are adapted to the natural environment, they have survived where alterations of it have been least. Although there have been changes in the flow and chemical parameters of the Colorado River, the general physical conditions of the study area have remained much as they were originally.

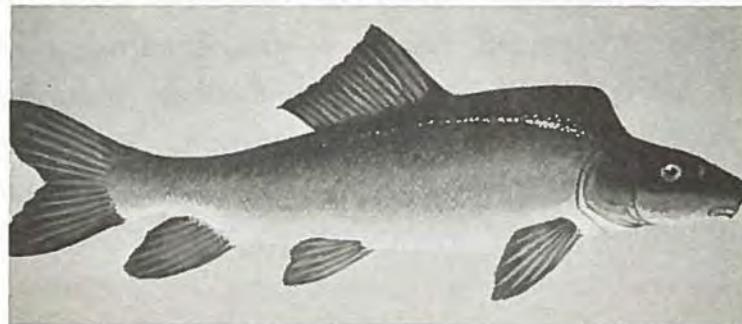
Endangered and Threatened Fish of the Colorado River Study Area



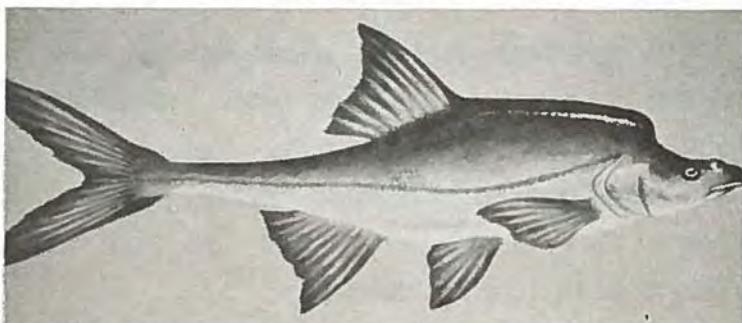
Colorado Squawfish (*Ptychocheilus lucius*). These giant minnows may reach 6 feet and 80 pounds (36 kg). Colorado Division of Wildlife



Bonytail Chub (*Gila elegans*). Another large minnow, which may attain lengths of 18 inches (0.5 m). Colorado Division of Wildlife



Humpback (Razorback) Sucker (*Xyrauchen texanus*). The knife-like dorsal hump helps stabilize the fish in the rapid currents of high water. May grow to 16 pounds (7.3 kg). Colorado Division of Wildlife



Humpback Chub (*Gila cypha*). This remarkably-shaped large minnow may grow to 18 inches (0.5 m). Colorado Division of Wildlife

Because of the presence of the endangered species and to ensure their continuation by maintaining natural conditions, much of the upper Colorado River, including the study area, is being considered for listing as critical habitat for the Colorado squawfish.

With the coming of the settlers, new species were introduced. These introduced fishes are by far the most numerous. Some of these, such as the carp, channel catfish, black bullhead, large-mouth bass, and the sunfishes, were introduced for sport purposes. Others, such as the red shiner, sand shiner, and fathead minnow, were probably introduced when people dumped bait fish into the river. Fish population trends, based primarily on studies by Holden and Kidd, are shown in Appendix C.

Current trends are for native fishes to remain static in number or to continue to decline as introduced fishes increase both in number and species. Alterations in the river that moderate conditions, such as reducing sediment levels or removing flood flows, favor survival of the introduced forms at the expense of the native species. The introduced fish have also evolved in competition with many other species, so they tend to outcompete the native species. Upstream sewage discharges, livestock pollution, and land erosion have also contributed to the decline of the fish.

Fish--Dolores River

The Dolores study segment contains good rearing areas, in addition to the riffles and rapids that produce food. Historically the river contained good populations of fishes, including some of the threatened and endangered Colorado River species. In recent years, however, fish populations have declined markedly and shifted to smaller, more tolerant forms.

Three factors have led to the change in fish populations. The first was the desiccation resulting from upstream irrigation diversions. This sometimes reduced flows in the lower portion of the river to less than 4 cfs ($0.1\text{ m}^3/\text{s}$) although they are usually above 50 cfs ($1.4\text{ m}^3/\text{s}$). The second factor was the high salt concentration. Ground water entering from Paradox Valley contains very high levels of dissolved solids. With low flows this highly saline inflow can raise salt levels in the Dolores to levels that exceed fish tolerances. The third factor was the pollution caused by uranium processing upstream, particularly at Uravan. This pollution was one factor in a sharp decline in fish populations in the 1950s and 1960s. Once the decline occurred, the low flows resulting from upstream withdrawals and high salinities precluded recovery of the populations even though pollution from the uranium industry has been reduced.

Today shiners and suckers are the predominant fish species. Depending upon the time of year and flow level, other species, such as channel catfish, roundtail chub, and carp can be found. Populations tend to be best near the mouth, indicating movement upstream from the Colorado River. Sampling in late summer during low water has produced no fish at all in some areas.

The river has the potential for excellent fish production, particularly if the Bureau of Reclamation desalinization project in Paradox Basin is implemented. It would, however, require more consistent downstream flows in order for fish populations to be maintained over the dry summer months.

Wildlife

The two segments under study provide very similar wildlife habitat. While wildlife species are found all along both rivers, certain

portions of the rivers are more attractive than others. The riparian habitat contains the greatest abundance and largest variety of wildlife, as shown in appendix C. The presence of water results in the riparian habitat providing more food and cover than other habitats.

The most common mammal species present are mule deer, coyotes, cottontail rabbit, and numerous species of rodents.

Most of the mule deer are residents since the river bottoms provide year-round habitat. However, some migrate to and from the surrounding high country. The Dolores Triangle area between the two rivers is deer winter range and has been utilized quite heavily in past years.

The Utah Division of Wildlife Resources believes that Westwater and Dolores Canyons can support desert bighorn sheep, and is introducing them in these areas. Bighorn sheep do not compete well with man or his activities, including livestock grazing, mineral exploration, or the pressures created by heavy recreational use. At present these canyon areas are fairly isolated and there is very little evidence of human activity. Even though recreational use of Westwater Canyon is moderately heavy (7,000 visitor days in 1976), this canyon would still make excellent bighorn sheep habitat, since recreationists mostly confine themselves to the bottom of the inner gorge.

The most common bird species present are rock doves, mourning doves, rock wrens, canyon wrens, Canada goose, mallard ducks, blue-winged teal, great blue heron, and a variety of raptors such as the turkey vulture, bald eagle, golden eagle, and sparrow hawk. Except for the golden eagle, which can be found throughout the year, these birds are all relatively abundant in certain seasons.

The only endangered terrestrial species positively occurring in the study area are the American peregrine falcon (Falco peregrinus anatum) and the bald eagle (Haliaeetus leucocephalus). Several sightings of peregrine falcons have been reported in Westwater Canyon and one suspected active eyrie has been identified. Because of the abundance of prey species, such as rock doves, swallows, ducks, geese, rabbits, and rodents, along with the steep canyon walls adjacent to the river, this area is excellent peregrine falcon habitat. Although none have been sighted in the Dolores Canyon area, this is also excellent peregrine falcon habitat.

The bald eagle is generally present along both river segments during the winter months. However, the frequency of late spring and early summer sightings suggests bald eagles are becoming more common. This indicates that there may be an active bald eagle nest in the area.

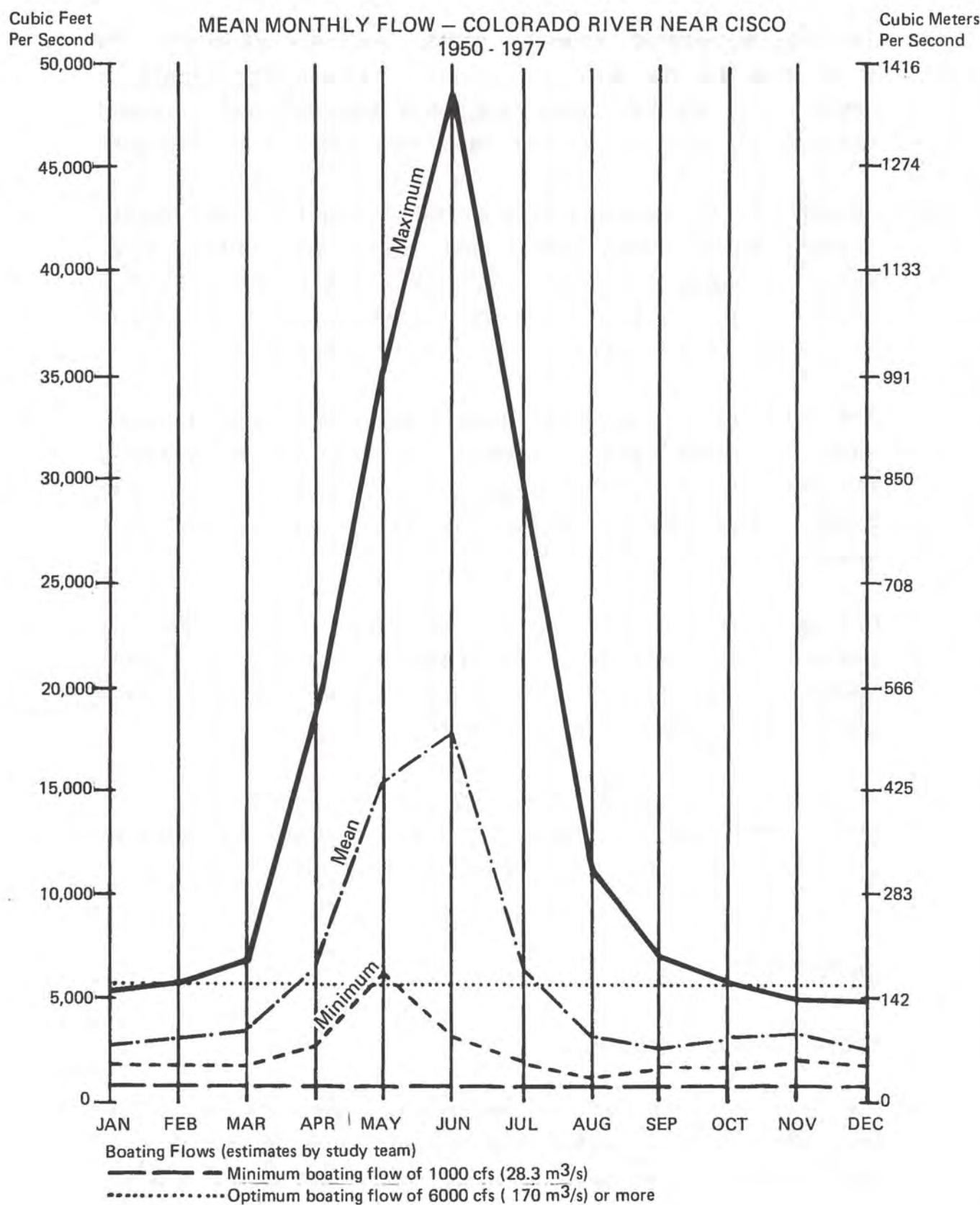
One great blue heron rookery has been identified near the Westwater Ranch and one at Lake Bottom on the Dolores. Canada geese are known to nest near the Utah-Colorado state line. This population is believed to be increasing.

There are several species of reptiles and amphibians present. The most common are the red-spotted toad, bullfrog, side-blotched lizard, striped whip snake, gopher snake, and collared lizards.

WATER RESOURCES

Colorado River Stream Flow

The flows of the Colorado are extremely variable. Its total annual flows, its maxima and minima, and its monthly averages betray very large variance. The lowest recorded flow of 558 cfs ($15.8 \text{ m}^3/\text{s}$)



contrasts with the highest, 76,800 cfs ($2175 \text{ m}^3/\text{s}$) in June of 1917; a factor of almost 140 separates the two.

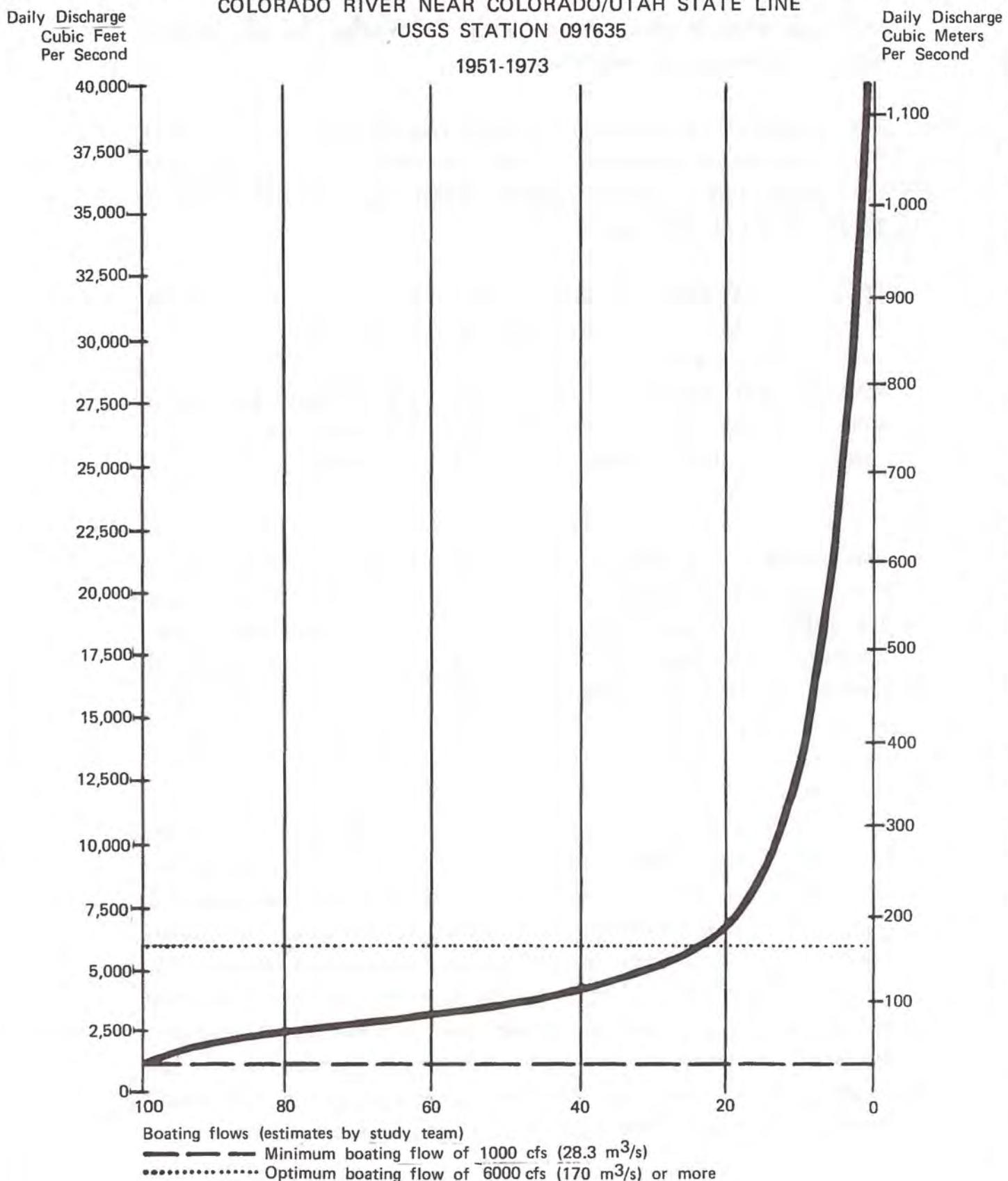
The greatest flood since white settlers reached the area, on July 4, 1884, reached an estimated 125,000 cfs ($3540 \text{ m}^3/\text{s}$), or 224 times the lowest flow. Normal annual crests are in the range of 20,000-30,000 cfs ($560-850 \text{ m}^3/\text{s}$).

The high water period of May and June produces the greatest range in monthly flows, with the month of June averaging as little as 3,481 cfs ($98.6 \text{ m}^3/\text{s}$) and as much as 43,830 cfs ($1240 \text{ m}^3/\text{s}$). In November and December, when the flows are sustained by ground-water, the monthly flows cluster more closely around the yearly mean value. These offseason flows are in the range of 2,000-4,000 cfs ($57-114 \text{ m}^3/\text{s}$).

Just as there is a wide range in daily and monthly flows, there is also a wide range in total annual flows. At the station near Cisco, 2.3 million acre-feet (2,813 million m^3) in 1954 was the smallest volume of water measured in the last 27 years. This represents an average flow of about 3,200 cfs ($91 \text{ m}^3/\text{s}$). In contrast, 8.9 million acre-feet (10,888 million m^3) of water flowed down the river in 1957, for an average of 12,280 cfs ($347 \text{ m}^3/\text{s}$).

When the Colorado rises from its winter flow to its spring crest, the river is first dotted with melting ice blocks. The melt gathers the waters of the foothills first, and gradually ascends the mountains to the elevations where most of the water is stored. Over the course of weeks the river widens to almost 1,000 feet (300 m) in the valley parts of the study area, and rises some 6 to 8 feet (1.8-2.4 m). The translucent brown color of lower stages gradually thickens to beige; an occasional beaver-cut stick drifting on the low stages becomes great rafts of driftwood released as the river slowly rises into driftwood piles stacked up years, and sometimes decades,

PERCENT OF FLOWS THAT EQUAL OR EXCEED A GIVEN RATE OF FLOW
 COLORADO RIVER NEAR COLORADO/UTAH STATE LINE
 USGS STATION 091635



previously. The current may double in speed. Beneath the surface of the calmer areas, the river scours its bed, sometimes several feet. Down in the narrows of Westwater Canyon, where the bed material cannot be scoured, the river may rise 10 or 15 feet (3-5 m), and its increases in velocity are huge. Individual rocky rapids merge into a turbulent millrace where the waves reach 8 feet (2.4 m) high.

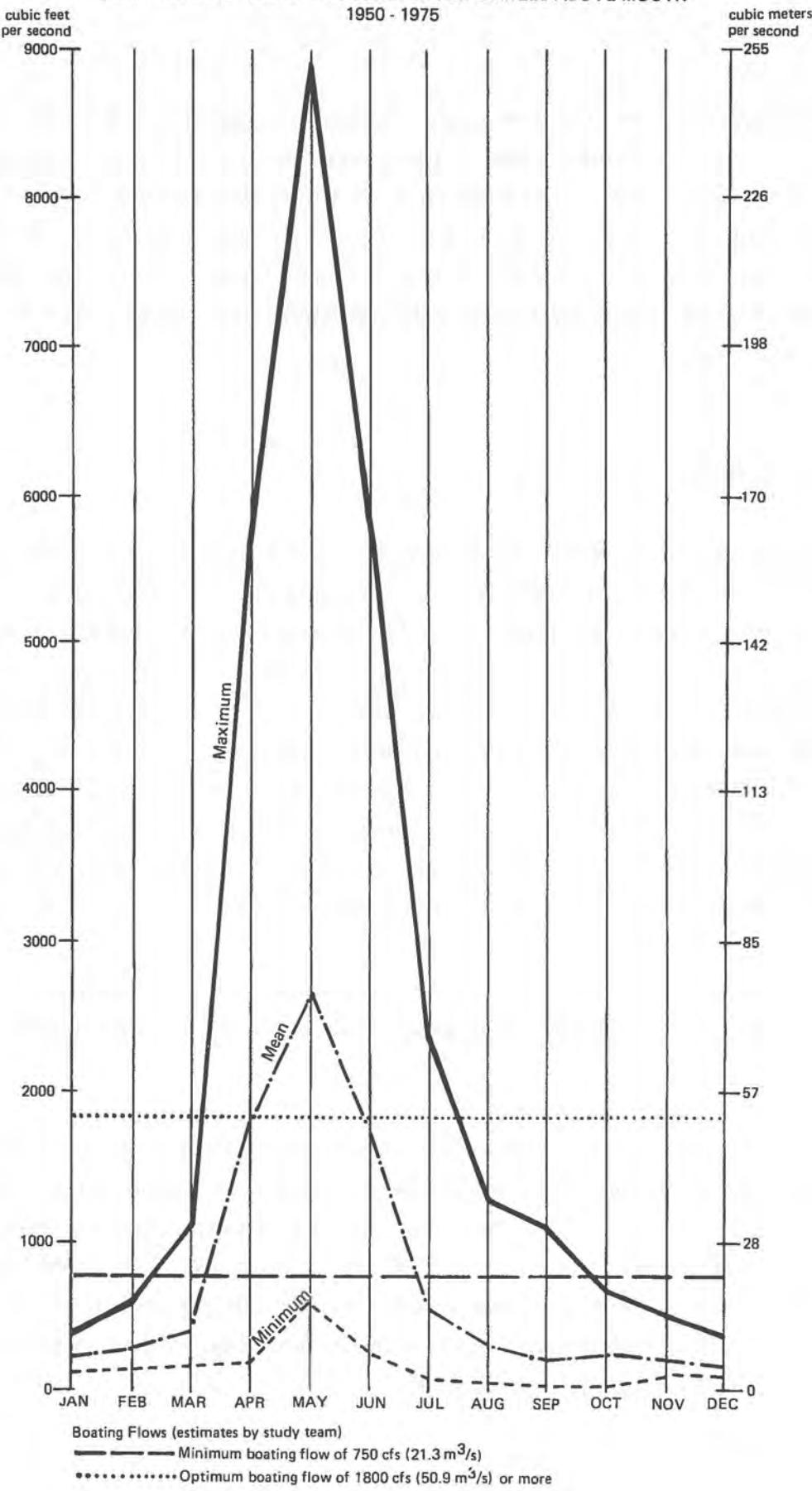
Dolores River Stream Flow

Even compared to other southwestern rivers like the Colorado, the Dolores in the study segment has spectacularly variable flows. The river has flowed as high as 1,095,000 acre feet (1,339.6 million m^3), and as low as 162,700 (199 million m^3) in two successive years (1951 and 1952), a factor of almost seven. There is a factor of over 5,000 between the highest recorded discharge, 17,400 cfs (493 m^3/s), and the lowest, 3.4 cfs (0.09 m^3/s). As with the Colorado, the greatest range in monthly flows coincides with the period of maximum runoff. In November through January maximum and minimum flows are very close to the mean values.

Almost twice as many years have flows below the mean as have them above it; this indicates that peak flows tend to be well above the mean.

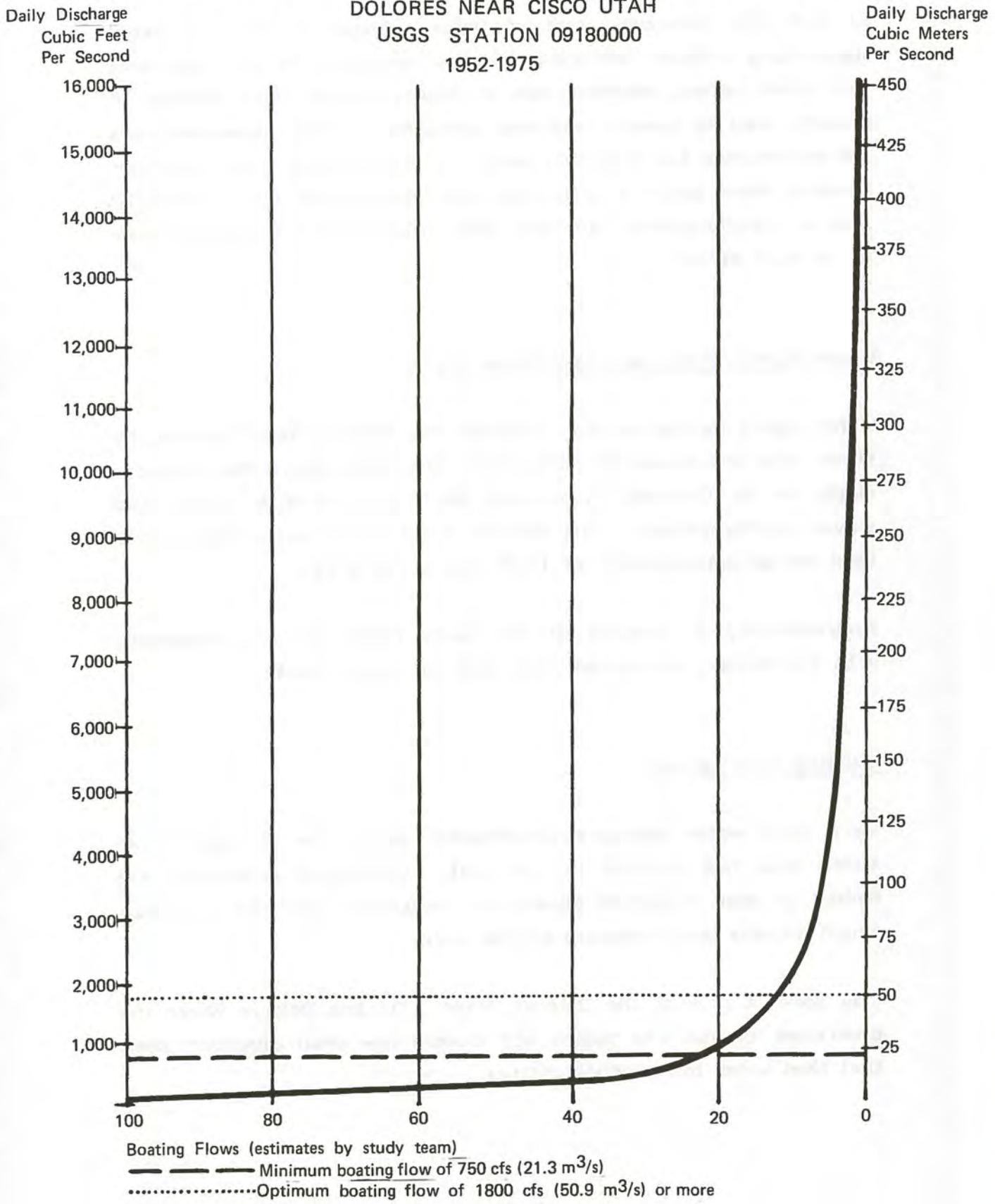
The river reaches its high stages in April, May and June, when it passes 50 to 80 per cent of a year's water. It turns a thick tan, rises 3 to 8 feet (1-2.3 m), and usually attains volumes between 3,000 and 7,000 cfs (85-200 m^3/s). Through the other nine months, it has relatively low even flows of 50-250 cfs (1.4-7 m^3/s) and occasional rain crests in the summer and fall, tinted red-orange by the redrock country upstream.

MEAN MONTHLY FLOW – DOLORES RIVER 9 MILES ABOVE MOUTH
1950 - 1975



PERCENT OF FLOWS THAT EQUAL OR EXCEED A GIVEN RATE OF FLOW

DOLORES NEAR CISCO UTAH
USGS STATION 09180000
1952-1975



As with the Colorado, most of these changes in flow represent season-long climatic variation. Heavy snowpack in the mountains and moist spring weather lead to higher runoff while periods of drought lead to greatly reduced streamflow. The highs and lows are accentuated by irrigation patterns; during drier years, proportionately more water is withdrawn than during wet ones. Localized intense thunderstorms can more than double the low summer flows for a short period.

Water Rights, Colorado and Dolores Rivers

Water rights located on the Colorado and Dolores Rivers within the study area are shown in table III-1. The table shows that 17 water rights on the Colorado River total 383.55 cfs ($10.86 \text{ m}^3/\text{s}$) of total annual appropriations. The Dolores River has 8 water rights for a total annual appropriation of 17.65 cfs. ($0.44 \text{ m}^3/\text{s}$).

Approximately 80 percent of the water rights are for irrigation, with the primary use period from July through October.

Existing Development

Very little water resource development along the Colorado River study area has occurred in the past. Existing developments are limited to small irrigation diversions, usually in the form of pumps which irrigate lands adjacent to the river.

The same is true of the Dolores River. On the Dolores River the diversions do not use pumps but instead use small diversion dams that feed water to irrigation ditches.

TABLE III-1
WATER RIGHTS -- COLORADO AND DOLORES RIVERS

Reference Number	Applicant	Source	QUANTITY		LOCATION				Status ²
			c.f.s.	ac.-ft.	Use ¹	T.	R.	Sec.	
1	Mack Pipeline	Colorado River	300.0		N,D,M,R	10S	103W	8	Cond.
2	Horsethief Forebay	Colorado River		38,408	P,N,D,M,R	10S	103W	8	Cond.
3	Ruby Canyon Pump A	Colorado River	2.0		I	10S	103W	18	Abs.
4	J. Loren Luster	Colorado River	10.0		I	20S	25E	13	App.
5	H.P. Pennington	Colorado River	5.0		I	20S	25E	12	Cert.
6	Emmett Elizondo	Colorado River	13.9		I,S	20S	25E	11	Cert.
7	Emmett Elizondo	Colorado River	10.92		I	20S	25E	11	Dili.
8	Gerald Laughter	Colorado River	2.0		I,D,S	20S	25E	1	Unapp.
9	Floyd W. Nielson	Colorado River	9.21		I,S	21S	24E	27	Cert.
10	J. Perry Olsen	Colorado River	3.86		I	21S	24E	15	Cert.
11	J. Perry Olsen	Colorado River	8.663		I	21S	24E	15	Dili.
12	Cameron B. Grant	Colorado River	3.0		I,D,S	22S	24E	28	App.
13	Robert J. Barnes, et al	Colorado River	2.0		Misc.	22S	24E	29	Unapp.
14	State Land Board	Colorado River	2.0		I,S	22S	24E	3	App.
15	Gerald Laughter	Colorado River	2.0		M	22S	24E	3	Unapp.
16	Gerald Laughter	Colorado River	5.0	+400	I,S,D	22S	24E	28	Unapp.
17	Paul Fritz	Colorado River	4.0		I,S	23S	24E	8	App.
18	George W. Wister	Dolores River	2.14		I	22S	24E	20	Cert.
19	Gerald Laughter	Dolores River	2.0		M	23S	25E	17	App.
20	L.L. Hubbard	Dolores River	2.23		I	24S	26E	4&7	Dili.
21	L.L. Hubbard	Dolores River	3.29		I	24S	26E	4&7	
22	Wines	Dolores River	.86		I	15S	104W	21	Abs.
23	Wines #1	Dolores River	5.81		I	15S	104W	27	Abs.
24	Boyd	Dolores River	.9		I	15S	104W	27	Abs.
25	Boyd	Dolores River	.42		I	15S	104W	27	Abs..

¹ I - Irrigation S - Stock N - Industrial M - Municipal
D - Domestic P - Hydropower R - Recreation

² Cond. - Conditional Cert. - Certificate Unapp. - Unapproved
App. - Approved Dili. - Diligence Abs. - Absolute

There are no authorized federal projects within the study areas of the Colorado or Dolores Rivers.

Other Projects

The Federal Energy Regulatory Commission (FERC) has identified the Dewey site, approximately 2 miles (3.2 km) downstream from the confluence of the Colorado and Dolores rivers, as a potential location for a hydropower dam. If constructed, this would back water to the top of the Colorado study area and more than halfway up the Dolores river study area. The project could provide up to 180,000 kilowatts of generating capacity, and up to 800 million kilowatt-hours annually. According to the FERC there is no interest at present by anyone to develop this site.

Industrial Resources, Inc., has a conditional decree in and near segment A of the Colorado. This project would install a 38,000 acre-foot (46.9 million m³) reservoir slightly above the mouth of Salt Creek, which would back water through Horsethief Canyon. From this reservoir, 300 cfs (8.5 m³/s) would be withdrawn for consumptive use north of the study area. An additional 2,020 cfs (57.2 m³/s) would be withdrawn above the study area, of which 2,000 cfs (56.6 m³/s) would be used non-consumptively for cooling water and the rest consumptively used. Of the 320 cfs (9 m³/s) for consumptive use, 10 cfs (0.28 m³/s) has been conveyed to Sheridan Enterprises, Inc., which has indicated the water will be diverted upstream from the study area. The uses to which the water would be put are irrigation, municipal, and industrial, including a thermal generating plant.

WATER QUALITY

Colorado River

The Colorado River in the study section is moderately saline. The river acquires salts from springs in the Glenwood Canyon area, and from several mostly ephemeral tributaries like Salt and Bitter Creek which flow off highly saline substrates. In particular, the Mancos Shale, north of the study area, is one of the largest diffuse sources of salinity in the entire Colorado River system.

Within the study area, the principal salts are sodium and calcium sulfates, bicarbonates, and chlorides. The average total dissolved solid (TDS) concentration is 609 milligrams per liter, with a maximum annual value of 1,058 mg/l, at the station near Cisco. This averages about 11,000 tons (10,000 metric tons) of dissolved solids per day in the Colorado study area. The Dolores River has a mean TDS value of 591 mg/l, with a maximum annual flow-weighted value of 1,322 mg/l.

Total suspended sediment values were not available for any station except the Dewey gaging station, below the mouth of the Dolores, where the mean concentration was 5,177 mg/l, or an output of 103,653 tons (94,230 metric tons) per day. The highest value recorded was 1,350,000 tons (1,227,000 metric tons) per day of suspended sediments. Turbidities are accordingly high; 41.5 Jackson Turbidity Units (JTU) at the state line and climbing to 133 JTU at Dewey. An overall total of nearly 115,000 tons (104,500 metric tons) of dissolved and suspended solids wash down the river each day.

Many of these suspended and dissolved solids are natural, the result of erosion from the arid regions of the Colorado Plateau. This erosion has been hastened by the activities of man, including

TABLE III-2
SUMMARY OF WATER QUALITY
Colorado and Dolores Rivers

Factor	Unit	Colorado River		Dolores River		Limiting Use
		State Line	Dewey	Utah Bottom	Standard ^{2/}	
pH		7.7	7.74	7.42	6.5-9	(1) + (3)
Total Coliform	Colonies/100 ml.	256	1/	1/	1/	
Fecal Coliform	Colonies/100 ml.	127.3	89.8	1/	200	(1)
Fecal Strep	Colonies/100 ml.	193	136.3	1/	1/	
Dissolved Oxygen	mg/l	10.5	10	12.6	5	(3)
Total PO ₄	mg/l	0.135	0.155	0.14	1/	
Sulfate	mg/l	377.6	434.4	408.4	1/	
Total Dissolved Solids	mg/l	719.5	1025.7	1870	1/	
Turbidity	J.T.U.	41.5	133.2	1/	1/	
Bicarbonate	mg/l	191	185	130.6	1/	
Arsenic	mg/l	0.0014	0.0041	1/	0.05	(3)
Boron	mg/l	0.0826	0.114	117.7	0.75	(2)
Cadmium	mg/l	0.01	0.01	1/	0.004-0.01	(2) + (3)
Calcium	mg/l	99.2	112	112.5	1/	
Chloride	mg/l	102.7	140.7	653	1/	
Chromium	mg/l	0.0033	0.0051	1/	0.1	(2) + (3)
Copper	mg/l	0.01	0.284	1/	0.01-0.04	(3)
Fluoride	mg/l	0.472	0.367	0.40	1/	
Iron	mg/l	1.277	5.244	1/	1.0	(3)
Lead	mg/l	0.1	0.1	0.004	0.004-0.1	(2) + (3)
Magnesium	mg/l	36.6	45.12	48.3	1/	
Manganese	mg/l	0.067	0.17	0.025	0.2	(2)
Mercury	mg/l	0.00003	0.00002	1/	0.00005	(3)
Potassium	mg/l	3.85	6.09	23.5	1/	
Selenium	mg/l	0.01	0.008	1/	0.02	(2)
Silica	mg/l	10.24	13.09	6.4	1/	
Sodium	mg/l	115.4	159.8	439.4	1/	
Zinc	mg/l	0.04	0.05	0.03	0.05-0.6 ^{3/}	(3)

1/ Information not available

2/ These standards were taken from the proposed Colorado Water Quality Standards, which do not yet have legal status. These standards depend on the uses to which the water will be put; different uses have different levels proposed. Since the rivers have not been classified by the Water Quality Control Commission, the study team assumed that the Colorado and Dolores Rivers would fit 3 use classifications:

- (1) recreation--primary contact (small amounts of water might be ingested inadvertently by a boater or swimmer)
- (2) agriculture
- (3) aquatic life--warm water biota class

The standards listed are the most stringent in each of the 3 classes; the "Limiting use" column of the table tells which type of use provided the standard applied. The study team assumed the water of the two rivers was not used for domestic supply; some of the parameters for which standards are not given only apply to domestic water supplies.

3/ Varies directly with hardness.

overgrazing of much of the area, construction, lumbering, and farming. A potential for a further source of erosion lies in possible development of shale oil deposits in the Roan Cliffs north of the study area, and from the oil and gas exploration now underway in the region.

Human use of the water, as well as the land, increases salinity. Almost 3,000 cfs ($90 \text{ m}^3/\text{s}$) of water for irrigation, domestic, and industrial use can be withdrawn in the Grand Valley area. The return flows carry a much higher load of chemicals from fertilizers added than does the withdrawn water. Besides adding many chemicals, the withdrawal-return cycle reduces the overall flow, concentrating the chemicals present. Phosphates, in particular, show comparatively high levels. Nitrogen values are usually lower, but occasionally have shown very high temporary peaks.

Another indication of human use is bacteria levels. These have generally been low in the study area, with an average value of 256 colonies/100 milliliters at the state line gaging station. Fecal coliform counts, an indication of pollution by warm-blooded animals, average 127/100 ml; interestingly, the few fecal strep counts made have been high, close to 200/100 ml. The Colorado River is listed by Utah as a Class C River. Under current State of Utah Standards for Class C waters, 2,000 colonies per 100 ml for total coliform and 200 colonies per 100 ml fecal coliform are permitted.

As is shown in table III-2, the Colorado generally meets the quality standards that will probably be imposed on it by the State of Colorado. Lead and cadmium ions are excessive, but these are probably caused by naturally mineralized areas on the headwaters.

Dolores River

When the Dolores River enters the Colorado, the main stream's water quality declines. Two major sources of pollution in the Dolores River, the saline seepage in Paradox Valley discussed in Chapter II and the industry along the San Miguel River, contribute to this degradation.

Mining and processing of uranium and vanadium have occurred along the Dolores River and its major tributary, the San Miguel River, since the turn of the century. Effluent from the Union Carbide mill on the San Miguel River grossly polluted the San Miguel and Dolores Rivers during the late 1950s and early 1960s. Effluent from the mill contained toxic wastes, suffered extreme variations in pH, and contained radioactive materials. Prior to 1956, the Dolores River below the confluence of the San Miguel had been considered a good catfish stream and a source of broodstock that was harvested for transplanting to other areas. Wastes discharged from the mill resulted in severe population declines by 1966.

The investigations in 1966 showed that radioactivity, namely Radium-226, increased in the San Miguel from 0.23 picocuries/liter (pc/l) above the Uravan mill to 2.33 pc/l below the mill. Radioactive levels have been reduced to 0.5 pc/l in recent years (1970-1974, Colorado Health Department data) because of cleanup efforts by Union Carbide. Radioactivity in the Dolores River does not now constitute a health hazard.

Currently, the greatest water-quality problem on the Dolores is the exfiltration of ammonia from holding ponds at Uravan. Excessive concentrations of un-ionized ammonia are toxic to aquatic life, but there is no agreement on the toxic level. Research by Union Carbide Corporation indicates that catfish are returning to and

surviving in the Dolores and San Miguel Rivers. Their most recent discharge permit requires them to maintain un-ionized ammonia levels in the San Miguel at concentrations that are not toxic to the aquatic life in the river.

Of the total dissolved solids discharged by the Dolores River into the Colorado each year (478,000 tons or 435,000 metric tons), more than 40 percent are derived from the 12-mile (19.3 km) reach in Paradox Valley. This is about 11-12 percent of the salt content of the Colorado below the confluence. As discussed in chapter II, as much as 180,000 tons (163,000 metric tons) of this may be removed by the Paradox Valley Salinity Control Unit.

The Dolores exceeds the potential standards in table III-2 in two areas--boron and manganese. Lead is just within the proposed standard. The very large amounts of boron are due to the Paradox salt anticline; the others are probably due to the mineralized headwater area.

CULTURAL RESOURCES

Archeology

Even though some time periods between the first peopling of the area (which would have been about 14,000 B.C.) and the Historic period are known to have had a wetter climate than at present and may thus have supported larger populations, the total population density of the study area was probably very low for the period of circa 14,000 years B.C. to circa A.D. 500. For the later Prehistoric Horticultural period of circa A.D. 500 to A.D. 1,200, the Fremont culture's population density may well have been greater than the current white population adjacent to the river.

Along the Colorado, 52 archaeological, 11 historic, and 9 paleontologic sites were found.¹ The known archeological sites consist of rockshelters and overhangs, open sites, vast amounts of rock art, and other miscellaneous archeological resources such as prehistoric steps cut into rocks, the remains of Pre- and Proto-Historic rain collection systems, fish weirs, etc. The "rockshelters" are found with and without interior stone structures (typically stone walls and caches). The rockshelters with such architectural features are probably from the Prehistoric Horticultural period, or even occasionally the Historic period. The rockshelters are not typically deep caves, but rather small overhangs with cultural material very close to the drip line. The "open-air" sites may be multicomponent and consist of Archaic campsites, small villages of the Horticultural Prehistoric period, Proto- and Historic Ute encampments, or some mixed combination of these.

The paleontologic sites contained vertebrate remains of the Jurassic period, e.g., allosaurus, crocodile, and turtle. Eight of the sites had high scientific value.

History

The Denver, Colorado Canyons, and Pacific Railroad, organized by F. M. Brown in 1889, began to survey the Colorado River from Grand Junction down all the canyons of the Colorado to the vicinity of Needles, California, and then to the Pacific. Brown's chief

1. Historical Museum and Institute of Western Colorado. "Antiquities Inventory for the Wild and Scenic Designation of the Colorado River." BLM contract, Grand Junction (1976).

engineer, Robert Brewster Stanton, is known to railroad buffs as the builder of the Georgetown loop in Colorado, and to boaters for his book, Down the Colorado. Members of this party were probably the first to run the river in the study stretch, though they carried their survey (and boats) on a bench above 12 miles (19 km) of Westwater Canyon.

Most of the historical sites along the Colorado and Dolores Rivers are related to early railroad, mining, farming, and ranching efforts. Two sites of interest are located in Westwater Canyon. One, a small dugout structure used by early miners and trappers, has been stabilized by the BLM. The other, Outlaw Cave, is reported to have been the hideout for outlaws about the turn of the century, and evidence of their habitation still remains.

LAND USE AND OWNERSHIP

Colorado River

More than 70 percent of the land fronting on the Colorado from Loma, Colorado, to the confluence of the Dolores River in Utah is federally owned, as is shown on the Corridor Land Ownership Map. All of this is administered by the Bureau of Land Management. It is classified for retention in federal ownership and management for multiple uses pursuant to the Classification and Multiple Use Act of 1964. Consistent with this, the land is used primarily for outdoor recreation, grazing, protection of watershed, and wildlife habitat.

In addition, all but a mile of public land along the study segment of the river has been withdrawn for reclamation, water power projects, and power site projects. These withdrawals, some of which date from 1918, segregate the land from surface and mineral entry, except that rights-of-way and some temporary uses may be

permitted with concurrence of the withdrawing agency. Most of this land has subsequently been opened to mineral exploration and extraction. Several rights-of-way have been granted for powerline and railroad uses within the corridor.

Private land within this corridor is concentrated in three sections. The upper reaches of the river corridor, around the Loma area, are primarily under private ownership and are predominantly agricultural. Private land holdings are also concentrated below Ruby and Westwater Canyon. These lands are predominantly agricultural and used for grazing and to some extent, crop production. The private land comprises about 21 percent of the total corridor acreage, or roughly 5,350 acres (2,160 ha).

State holdings total under 10 percent of the river study area and touch the river at two places for 1-1/2 miles (2.4 km) of the total river frontage. The Colorado Division of Wildlife owns the Loma launch site.

The BLM is conducting a wilderness inventory of its lands and has identified three units bordering the rivers for intensive study, based on their suspected values. These are the Black Ridge Canyons Unit (CO-070-113), which borders the Colorado River near segment A; the Palisade Unit (CO-070-132), which borders the Dolores corridor near segment A; and the Granite Creek Unit, which borders the Dolores near Segment B.

Dolores River

About 86 percent of the Dolores River study area is administered by the Bureau of Land Management. The federal land is managed for multiple uses pursuant to the Federal Land Policy and Management Act of 1976. Private land is under the control of

approximately eight landowners and is primarily agricultural. In addition to the private land, two parcels near the border in Utah are farmed under special land use permit from the BLM. There are about 1,640 acres (670 ha) of private land in the Dolores study area, of which about 920 acres (370 ha) are located in the upper 10-mile (32.2 km) reach.

All of the federal lands in the corridor are also under a withdrawal for reclamation water power projects and power site purposes. Several utility rights-of-way have been granted in the corridor.

Nearly all of the federal land in the corridor is under lease for oil and gas. However, to protect the visual corridor, all of the federal land for one-half mile (0.8 km) on each side of the river is in a "no surface occupancy" leasing category: Any drilling for oil and gas must be done from outside the area using slant-drilling methods.

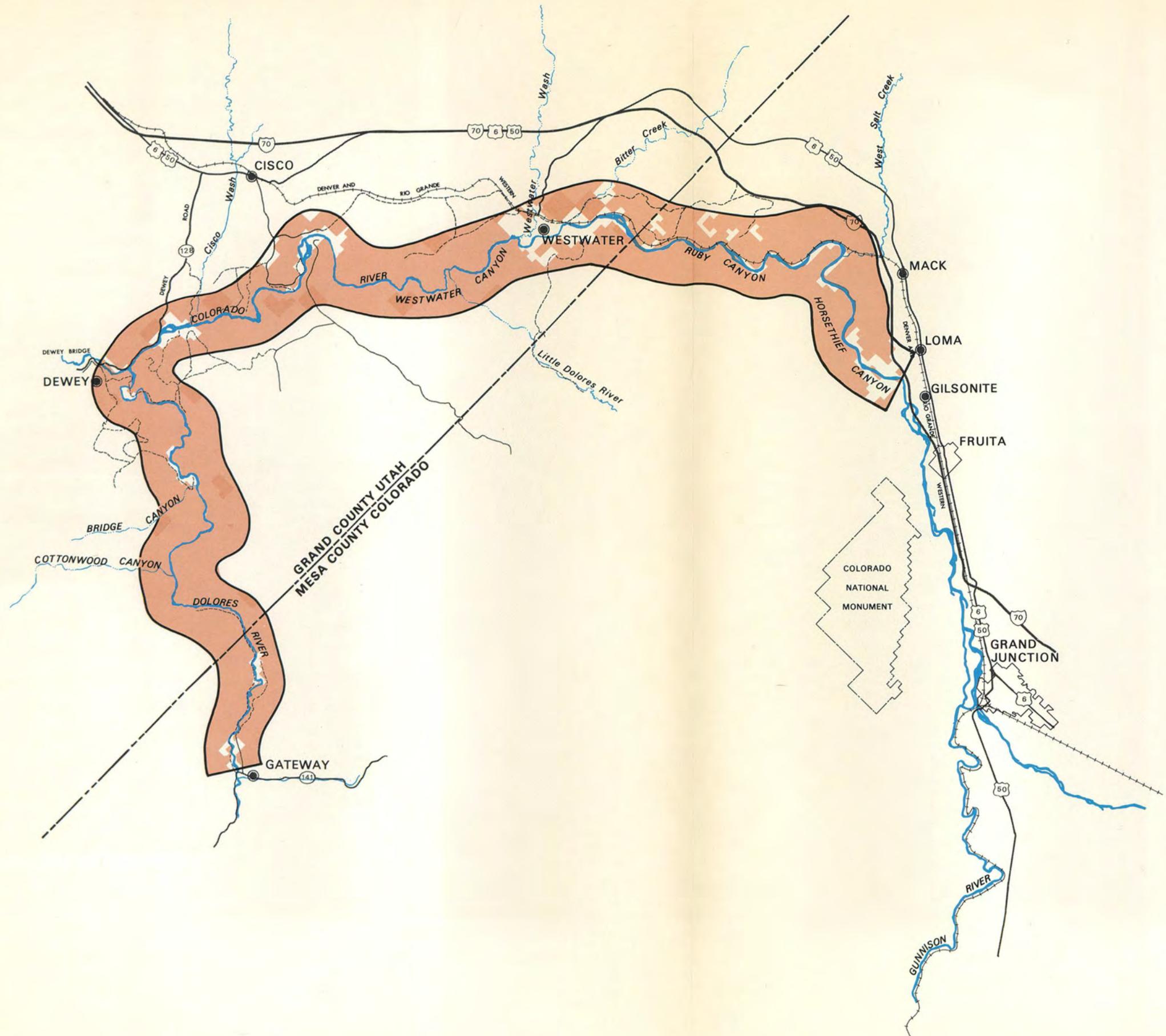
Present land use is agricultural, recreation, livestock grazing, wildlife habitat, and watershed protection.

RECREATION

Colorado River

The study area is generally primitive and contains very few developed use facilities. A raft launch area, restrooms and parking area are maintained at the Westwater BLM Ranger Station. These facilities, however, are primitive. Restrooms are also located at the Rose Ranch takeout area.

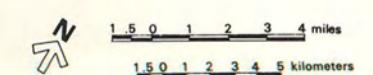
Future plans discussed in chapter VI call for increased development at both of these locations, including improved parking, sanitation, camping, and launch facilities.



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY

CORRIDOR LANDOWNERSHIP

- GRAVEL ROAD
- - - JEEP ROAD
- BUREAU OF LAND MANAGEMENT
- STATE
- PRIVATE



Whitewater Boating. Whitewater boating, with camping, is the main recreation in the area; fishing, hunting, and hiking also take place. Although the entire study segment is suitable for boating, past use has been concentrated mainly in segment B (Westwater Canyon). This virtually isolated segment contains a series of challenging rapids and high scenic values. Up until the late 1960s, when considerable interest was generated in whitewater rafting, relatively few people had run this part of the river. By the 1970s use had increased to the point that the principal managing agency, the Bureau of Land Management, recognized the need to protect the values of the area and reduce the possibility of environmental damage from overuse. In 1973 a BLM ranger station was established within this segment of the river. In 1974 criteria were established for allocating commercial permits to river guides and outfitters and the private use sector (50 percent allocated to guides and outfitters and 50 percent to the private sector). Permits are applied for in advance, so that the timing of the trips and use of camping areas can be scheduled to avoid crowding and overuse. An interim ceiling, pending the completion of a detailed management plan for the river, has been set at 10,000 passenger days³ use annually. A passenger day is one person on the river for one day.

Use figures for 1973 recorded nearly 5,000 passenger days for commercial and about 760 passenger days for private. Commercial use has remained relatively constant, but private use has grown so that in 1976 it equalled that recorded in the commercial sector. Total use in 1976 was about 6,900 passenger days. Use in the

3. Passenger days are similar to the recreation days used as the unit of analysis in chapters VIII and XI; recreation days are defined as an individual's participation in a recreational activity for a significant portion of a 24-hour period. Passenger days are used in river management because they exclude the recreation days amassed by an outfitter and his paid staff and therefore do not count against his allotment of river use.

study segment above Westwater Canyon was considerably lower and was estimated to be about 2,500 passenger days in 1976. Use from below Westwater Canyon to the confluence of the Dolores was estimated to be about 1,500 passenger days. Most of the use in both of these areas is by commercial outfitters. Minimum and optimum boating flows are shown on the water resource graphs in this chapter.

In Westwater Canyon, inflatable rafts are mostly used, although kayaks are rapidly growing more popular. Open canoes, rowboats, and similar craft cannot be used in this section of the canyon because of the challenging rapids (rated at Class III-V on the International Scale of Whitewater Difficulty, with the higher rating registered in the time of high water). Trips usually require 1-2 days, although some trips of 3-5 days duration run the whole study segment, ending at Dewey Bridge or Moab.

Segments A, C, and D contain no rapids and are suitable for use by canoes and other small craft. This type of use is increasing primarily in segment A due to the outstanding scenic and wildlife values in this area. With canoeing growing more popular, use will continue to grow. The Colorado, from Grand Junction to the state line, is classed as a navigable water of the United States, under the jurisdiction of the Corps of Engineers. The portion of segment A from the Loma launch to the border is under this jurisdiction.

One or two outfitters take parties up and down segment A in jet boats. At present this use is not extensive. Low water during the summer and fall hampers the use of outboard motors throughout the entire study area.

Fishing. Although use statistics are not available, fishing use is light in the area. Occasionally fishermen will put in at the Loma area and fish segment A. Some fishing also takes place in segments

C and D. Little fishing takes place in segment B in connection with whitewater float trips. Catfish is the main species of interest to the fishermen, although bass, bluegill, and black bullhead are found in small numbers. Because of the warm and turbid water, trout and other game fish are generally not found in this area.

Hunting. Some waterfowl and big game hunting takes place in the study corridor. Ducks and geese are hunted mainly in segment A, although some hunting takes place in segments C and D. Successful big game hunting in the corridor depends primarily on how early and severe the winter is. A hard winter will push the deer far enough down from the higher elevations to reach the study corridor in hunting season. Use pressures are light and most hunting occurs away from the river.

Limiting Factors. Several factors limit the type and amount of recreation that takes place within the corridor. The greatest limiting factor is the difficulty of the rapids in Westwater Canyon, which limits boating to those craft specifically designed for white-water use, and to those with the knowledge and skill to pilot the craft safely through the canyon. Low water during the rest of the year and in drought years such as 1977 limits the size of craft and use of motors.

The number of sites available for camping in Westwater Canyon is another limiting factor. Although there are many camping areas on the sand bars exposed at low water, high water covers most of these, leaving less than three areas available.

Within segments A, C, and D, campsite opportunities are relatively unlimited and do not limit public use, although some private land-owners have restricted shoreline access to their property.

Dolores River

Between Gateway and the confluence with the Colorado, the Dolores contains no developed recreation use facilities. No facilities are currently planned for construction along the river segment.

Whitewater Boating. The Dolores River is usually floatable by river rafts, kayaks, and other craft during the spring runoff, usually during the last part of April, May and June. At other times of the year, water volume is insufficient to support this type of activity. The season length varies with the snowpack; during periods of drought such as was experienced in 1977, the river could not be floated. During high water years like 1975, it can be run from April to August. Minimum and optimum boating flows for the Dolores are shown on the water resource charts in this chapter.

The Dolores River also received relatively little use before the late 1960s. In the early 1970s the Bureau of Land Management, recognizing the need for increased management, established use ceilings. These allocated approximately 5,000 passenger days to private use and 5,000 passenger days to commercial use. Actual use has remained considerably below this ceiling. It is estimated that during 1976 about 500 people floated the river for a total of 700-800 passenger days. Users sometimes put in at Gateway and float to Dewey Bridge on the Colorado. Others put in upstream at Bedrock, Slickrock, or near Cahone and float the entire length to the Colorado. Putting in at these higher locations offers an uninterrupted trip of up to 183 miles (294 km), one of the longest float trips available in Colorado.

Fishing and Hunting. Some fishing and hunting use takes place in the corridor although use is very light. The species hunted are mainly waterfowl and deer. Fishing is for catfish, and is limited by the habitat problems discussed under "Fish and Wildlife."

Other Recreational Uses. The only other significant recreational use known to be taking place in the area is sightseeing, and this is limited by inconvenient access.

CHAPTER IV

ELIGIBILITY AND CLASSIFICATION

ELIGIBILITY

The eligibility of the Colorado and Dolores Rivers for the National Wild and Scenic River System was determined by comparing the information in chapters II and III with the criteria in the Wild and Scenic Rivers Act. These criteria are supplemented by the Guidelines, a document jointly issued by the Secretaries of Agriculture and the Interior.¹ The most important criterion is the Act's requirement that a river offer at least one "outstandingly remarkable" value. The categories stated are: scientific, cultural, geologic, recreational, historical, fish and wildlife and "other." The Act also requires the river to be free-flowing i.e., without significant impoundments, channelization, or rip-rapping.

The Guidelines elucidate these basic criteria, and supplement them with others which require the river to meet certain standards of water quality, length, and volume. The river must be long enough to provide "a meaningful recreational experience", which is defined to be about 25 miles (40 km) long. It should have "sufficient volume of water during normal years to permit, during the recreation season, full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers." The rivers should also, according to the Guidelines, contain high quality water or water which can be restored to high quality. Those rivers

1. Guidelines for Evaluating Wild, Scenic, and Recreational River Proposed for Inclusion in the National Wild and Scenic River System; Departments of the Interior and Agriculture; Washington, D.C. (February, 1970).

considered for wild designation should meet the criteria for primary contact recreation (basically, waters which can inadvertently be swallowed in small amounts by a recreationist) unless natural background conditions exceed these standards. These criteria are summarized in table IV-1.

Both rivers meet these criteria from the Act and Guidelines. The Colorado has few diversions and no impoundments in the study reach, and the small bank alterations caused by the railroad in Ruby Canyon do not significantly affect either scenery or flow; they do not constitute rip-rapping or channelization. The study segment of the Dolores has three diversions, two of which are located at Stateline Rapids, where they are not noticed. None of these creates a slack-water pool and all are in keeping with the pastoral character of the area. Both rivers are sufficiently long to be included, at 55.7 miles (89 km) for the Colorado, and 31 miles (49.6 km) for the Dolores.

As the data in chapter III indicate, there is sufficient water in the Colorado to permit recreation all year long (barring periods of freeze-up). The river thus permits a far longer season for recreation than is normal in the region. The Dolores's recreation season (April to August in a wet year, May and June in a dry) is limited by its flows, but that season is comparable in length with the season on other rivers of its type, and the flows available are sufficient to permit full enjoyment of the river.

Both the Dolores and Colorado meet minimum criteria for primary contact recreation. Both rivers are too cold to meet these criteria at certain times of the year, and both sometimes carry floating debris, but these are characteristics of free-flowing snowmelt rivers, and enhance rather than detract from the experience of boating them. As noted in chapter III, both slightly exceed potential water quality standards in a few parameters, but these variances are naturally caused.

TABLE IV-1
Summary of Factors Determining Eligibility

	Colorado River					Dolores River		
	Loma Launch Site (mi. 1079.2) to Railroad Intersection (mi. 1070.5)	Railroad Intersection to Railroad Intersection (mi. 1070.5) to Westwater Canyon (mi. 1051.5)	Westwater Canyon (mi. 1051.5) to Rose Ranch (mi. 1038.5)	Rose Ranch to Cisco Wash (mi. 1027.5)	Cisco Wash to Dolores River (mi. 1023.5)	Gateway Fisher Creek (mi. 31) to Fisher Creek (mi. 17)	Fisher Creek (mi. 11) to Bridge Canyon (mi. 11) to Colorado River Bridge Canyon to Bridge (mi. 0)	Bridge Canyon (mi. 11) to Colorado River Bridge (mi. 0)
	A-1	A-2	B	C	D	A	B	C
Characteristics								
Free-flowing Nature								
Affected by:								
Impoundments	None	None	None	None	None	None	None	None
Diversions	None	None	None	None	None	3	None	None
Road fills	None	Some	None	None	Some	1	None	1
Length	8.7 miles	19 miles	13 miles	11 miles	4 miles	14 miles	6 miles	11 miles
Water Quality								
Meets Criteria for:								
Primary Contact Recreation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secondary Contact Recreation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water Aesthetics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fish and Aquatic Life Propagation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Outstandingly Remarkable								
Scenic Values	Yes	Yes	Yes	No	No	Yes	Yes	No
Recreation Values	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Geologic Values	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Fish and Wildlife Values	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Historic Values	No	No	No	No	No	No	No	No
Archeologic Values	Yes	Yes	Yes	Yes	Yes	No	No	No
ELIGIBILITY FOR NATIONAL WILD AND SCENIC RIVERS SYSTEM	Eligible	Eligible	Eligible	Eligible	Eligible	Eligible	Eligible	Eligible

The criteria discussed above are necessary but not sufficient for including a river in the system; they do not ensure that a river is worthy of the preservation, protection, and enhancement mandated by the Act. The outstandingly remarkable values required by the Act make sure it is a great river, or at least a great segment, which is preserved and protected.

Both the Colorado and the Dolores are eligible for the system; both demonstrate outstandingly remarkable values of several types, as shown in table IV-1.

Determining the outstanding values displayed by a river is one of the study team's most difficult tasks, since no guidance is offered by either the Act or the Guidelines. In the course of several river studies, it has been agreed that such values are rare or unique when compared to other rivers, and that they are of national, or at least of regional significance. Within this general definition more specific definitions of outstandingly remarkable values have been made for each category, and these are discussed in each explanation of the study team's findings. Many of the outstandingly remarkable values, such as fish and wildlife values, must be certified by specialists in that field.

In the following discussion each type of value is discussed, with reference to the segments of the two rivers.

Geologic Values

Both the Colorado and the Dolores display outstanding geologic values. Such values, the study team concluded, might include an unusually long sequence of rocks in the geologic column; a particularly full series of rocks from a given period or era; excellent visibility of geologic processes; the presence or possibility

of important paleontological finds or scientific discoveries; or the presence of regionally important rock types. In both Ruby and Westwater Canyons, the rock sequence runs from Precambrian to Cretaceous; along the Dolores this sequence is present with the addition of the Pennsylvanian-Permian rocks which lie between the Chinle and the Uncompahgre Complex. The rock sequence is unusually long, and the Jurassic-Triassic series of sediments is especially well represented. It is possible in this area to learn many of the important rock types for the whole Plateau Province.

Geologic processes in the area are both interesting and highly visible, given the aridity of the climate. At several points in Ruby Canyon, and at the very head of Westwater, are classic examples of faults and folds which lend themselves well to interpretation. The most impressive of these, the Little Dolores fault at the head of Westwater Canyon, brings the Precambrian rocks in contact with the Entrada Sandstone, a displacement of about 500 feet (160 m)--a textbook example of a reverse fault. Also of interest is the unconformity between the Uncompahgre Complex--about 1.8 billion years old, with quartz monzonite intrusions about 1.48 billion years old--and the overlying Chinle Formation, visible along the Colorado River. This represents a time gap of about 1.3 billion years. Along the Dolores the presence of other formations above this erosion surface allows important inferences to be drawn about the age of the Uncompahgre Uplift.

The capture of the ancestral Gunnison and Colorado, the details of which are still somewhat controversial among geologists, is rare in rivers of this size and importance. Traces of this piracy, though best studied in nearby Unaweep Canyon, increase the geologic values of the Colorado and Dolores Canyons. Also of interest is the wide variety of rock types available in the study area; this demonstrates how different rocks respond to the erosive agencies, from the recession of the walls to form a wide valley when the



The Little Dolores Fault, an easily interpreted example of the geomorphic processes that have formed the area, is at the head of Westwater Canyon.

- Jm — Jurassic Morrison Formation
- Js — Summerville Formation
- Jec — Entrada/Carmel Formations undifferentiated
- R(?)k — Triassic (?) Kayenta Formation
- Trw — Wingate Sandstone
- Rc — Chinle Formation
- pCu — Precambrian Uncompahgre Complex (obscured)

Chinle or Cutler Formations line the river, to the narrow, polished and fluted gorge that is cut in Westwater Canyon, when the river encounters the resistant black rock of the Uncompahgre Complex.

At the upper and lower end of the Colorado segment, and the lower end of the Dolores, are extensive exposures of the Morrison Formation. Sandstone ledges in that formation have, in many parts of the west, produced dinosaur fossils; they have been quarried near the upper end of the study area. Nine such finds have been made in the river corridor, which adds to the geologic value of the area.

Fish and Wildlife Values

A wide diversity of wildlife in an area, healthy populations, or the presence of rare, endangered, or threatened species were deemed outstandingly remarkable wildlife values. The Colorado and Dolores Rivers, in all segments, offer outstanding values due to the presence of endangered species. The Colorado River itself contains the humpback chub and Colorado River squawfish, which have been listed as endangered species. This reach is being considered as critical habitat for the squawfish. The study area also contains the bonytail chub and humpback sucker, which are on the Utah and Colorado state lists of endangered species.

The endangered American peregrine falcon has been sighted in the Westwater Canyon area, and the whole study segment of the Colorado River contains a wintering population of bald eagles, another endangered species.

The canyons of the Dolores also contain bald eagles--at present the only known endangered species along that study segment. However, the U.S. Fish and Wildlife Service notes that the areas surrounding the Dolores provide potential habitat for peregrine falcons. Abundant prey species, limited human access, and reasonable proximity to active eyries make the portion of the Dolores in Utah increasingly important for the recovery efforts for this species. The Dolores area is also used by a variety of other raptors, including several species of hawks and the golden eagle. The presence of these birds, as well as many species of big game, small game, furbearers, nongame species, fish, birds, and reptiles mentioned in appendix C, all indicate a healthy and relatively undisturbed ecosystem with outstanding wildlife values.

Archaeological and Historic Values

The Colorado and Utah State Archaeologists agreed that the archaeological values of the Colorado study segment are outstandingly remarkable. A recent study² of the Colorado River Area revealed 52 archaeologic sites along the river, of which 7 were judged highly significant and another 20 of scientific value. About 20 historic and paleontologic sites add to the value of the area. Part of the uniqueness of these sites is due to their being controlled directly by the availability of water. Most of the more sedentary sites were located within a kilometer or two of the Colorado. Long stretches of inaccessible waterline, particularly in

2. Historical Museum and Institute of Western Colorado. "Antiquities Inventory for the Wild and Scenic River Designation of the Colorado River." Bureau of Land Management contract, Grand Junction (1976).

Westwater Canyon, resulted in a linearly interrupted settlement pattern. Part of the value of the Colorado also lies in the probability that more sites will be discovered in future studies of the area.

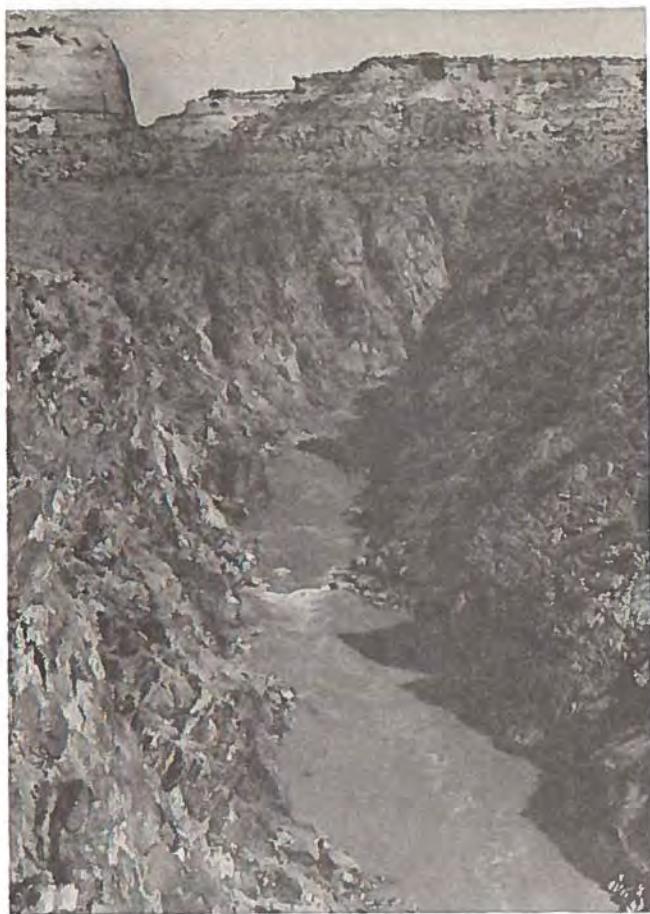
The Dolores Canyon has been studied,³ and it is the consensus of the state archaeologists of both states that the archaeological values of that area are not outstandingly remarkable. Most sites found were lithic scatter areas where stone tools were chipped and shaped; these did not provide particularly important information, nor were they unusual in the region.

Neither the Dolores nor the Colorado study areas offered outstanding historical values. Historic sites like the outlaw cave add interest to a trip through Westwater Canyon, and the tales of the first descent of the Colorado by members of the F. M. Brown party are also of interest to boaters, but these events and sites are not of much significance either regionally or nationally, nor are they associated with persons prominent in the nation's history.

Scenic Values

The two rivers flow around three sides of the Uncompahgre Uplift, through a vast sequence of different rock formations. The different colors of these rocks, from the black polish of the riverside rock in Westwater Canyon up through the towering red walls above, into the purple, red, green and blue shales of the

3. Toll III, Henry Wolcott, Dolores River Archeology: Canyon Adaptations as Seen Through Survey. Cultural Resources Series No. 4. Bureau of Land Management, Denver (1977).



Pink sandstone cliffs and the black inner gorge provide outstanding scenery in Westwater Canyon. NPS



The series of rock formations along the Dolores contrasts both in form and color with the brilliant green of the riparian vegetation. BLM

Morrison Formation, are in striking and pleasant contrast with the brilliant green of the vegetation that lines most of the shores. The two river areas also offer notable contrast in texture: still quiet reaches are followed by the shattered water in the rapids; stream-side meadows in the open areas are counterpointed by shaggy pinon-juniper forests; smooth red conchoidal fractures and jagged spires in the Wingate Sandstone contrast with both the rounded flutings of the Uncompahgre Complex below and the jumbled cliff spall from the Morrison above. Through the heart of the area flow the two rivers, whose annual color changes from the translucent beige of low flows to the muddy orange and buff tones of the flood witness the processes by which these canyons are carved.

These values are of national significance; comparable sites are available in the region, to some extent, but are not found in the rest of the U.S.

Scenic values are also furnished by animate nature and cultural sites; the diversity of wildlife and the presence of a number of endangered species provide important viewing experiences which are also conducive to the finding of outstandingly remarkable scenery. The archaeological sites, particularly the rock art sites, also heighten one's experience of the canyons.

Recreation Values

The study team felt that four factors could produce outstandingly remarkable recreation values. Particularly high quality recreation of a certain type, an extraordinary diversity of recreational opportunities, evidence that the recreation values drew visitors from all over the nation and not just the region, could all be termed outstandingly remarkable recreational values. Fourth, the presence of outstanding values of other types could also contribute to

outstanding recreation. By these measures both rivers are outstandingly remarkable for their recreation. Both rivers do have the value of the recreation associated with them increased by outstanding values in other categories; opportunities for geological study and wildlife observation are particularly valuable supplements to the boating or hiking. The rivers draw boaters from all over the nation, as has been confirmed by user studies on the Colorado segment and informal contacts on the Dolores. Segments A, C, and D of the Colorado, a total of 41.5 miles, offer open canoeing in a beautiful desert setting; water this gentle in such a setting is uncommon in most of the west. The whitewater boating on the Dolores is, with the exception of Stateline Rapid (which is Class IV--expert water), challenging without being too severe, if proper craft are used. Westwater Canyon is known nationally for its rapids, which offer one of the few opportunities left in the United States to try "heavy water"⁴ boating in a sombre and lovely setting. Canoeing on the gentler segments of the Colorado, and whitewater boating on both rivers, are recreation of particularly high quality. All these features combine to produce truly outstanding recreational values.

CLASSIFICATION

After the rivers were found eligible for the national system, they were evaluated to determine the appropriate classification (wild, scenic, or recreational river area) for which they qualified. This step is taken in order to conduct the Principles and Standards Analysis contained in chapter XI, and to aid in making the management recommendations found in chapter V.

4. Heavy water means waves of about 6 feet (1.8 m) or more.

The classifications provided in the Act are determined on the basis of shoreline development, or degree of human intrusion. The definitions in the Act are supplemented by the Guidelines, which stress that evaluations are to be made from the perspective of the river users, that the dominant impression produced by an area is to be considered rather than local peculiarities, and that while exceptions to the specified levels are permissible, too many exceptions would alter a river's classification.

To perform this analysis the rivers were broken into segments, on the basis of physiography, shoreline development, and the suggestion in the Guidelines that short segments (which are difficult to administer) be avoided. The segments were then measured against the specific criteria summarized below.

Wild river areas - Those rivers or sections of rivers that are free of impoundments, generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

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.

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.

These criteria from the Act were supplemented by those in the Guidelines, as summarized in table IV-2. The team also used

TABLE IV-2
Classification Level Criteria

The following criteria, summarized from the evaluation "Guidelines" and the Wild and Scenic Rivers Act, were used to determine the classification suitability of the river segments.

WILD

1. Flow - Free flowing. Low dams, diversion works, or other minor structures which do not inundate the natural riverbank may not bar consideration. Future construction restricted.
2. Accessibility - Generally inaccessible by road. No roads in narrow, incised valley. If broad valley, no road within 1/4 mile (0.4 km) of riverbank. One or two inconspicuous roads to the area may be permissible.
3. Shorelines - Shorelines essentially primitive. One or two inconspicuous dwellings, limited amount of domestic livestock, and land devoted to production of hay may be permitted. Watershed natural in appearance.
4. Water Quality - Water quality meets minimum criteria for primary contact recreation except where such criteria are exceeded by natural background conditions. Also, water must be capable of supporting propagation of aquatic life normally adapted to habitat of the stream.

SCENIC

1. Flow - Same as for wild.
2. Accessibility - Accessible by roads which may occasionally bridge the river area. Short stretches of conspicuous and well-screened roads or railroads paralleling river area may be permitted, but consider type of road use.
3. Shoreline - Shoreline and immediate river environs still have overall natural character. Small communities limited to short reaches of total area. Agricultural practices which do not adversely affect river area may be permitted. This could include unobtrusive row crops and timber harvest.
4. Water Quality - Water quality should meet minimum criteria for desired types of recreation except where such criteria are exceeded by natural background conditions. Also, water must be capable of supporting propagation of aquatic life normally adapted to habitat of the stream or is capable of and is being restored to that quality.

RECREATIONAL

1. Flow - May have undergone some impoundment or diversion in past. Water should not have characteristics of an impoundment for any significant distance. Future construction restricted.
2. Accessibility - Readily accessible, with likelihood of parallel roads or railroads along riverbanks and bridge crossings.
3. Shoreline - Some shoreline development. May include all agricultural uses, small communities, dispersed or clustered residential dwellings.
4. Water Quality - Same as for scenic.

criteria in a professional paper⁵ to crosscheck its evaluations, as well as public input.⁶

These three methods agreed quite closely in the classification findings they produced.

Thus, for example, the team divided the upper section of the Dolores (which has paralleling dirt roads, three diversions, some irrigated fields, and largely invisible buildings) from the middle (which has no traces of men) at the point where the roads ended and a major side drainage reached the main stream. The team found that the upper reach was largely primitive, though accessible in places by roads, with a pastoral character. It was assigned the scenic classification on the basis of the Act and Guidelines. Applying the filter system mentioned in Terry's paper, which assigns human intrusions various point values and sums them for each segment, produces an average "intrusion value" per mile, which in this part of the study area was 14 points per mile. Scenic river areas are considered to fall in the range of 11-30 points per mile, so the area also would receive a scenic classification using this technique. Public input, such as the University of Colorado Wilderness Study Group proposal of 1975, suggested a scenic classification for the reach from Gateway to Beaver Creek, which is slightly above the point at which the study team split the segments; this is in substantial agreement with the study team's determination.

5. Terry, Claude. "A Filter System for Determining River Suitability for National Wild, Scenic, and River Status." In Proceedings: River Recreation, Management and Research Symposium. General Technical Report NC-28, U.S. Forest Service North Central Forest Experiment Station, Minneapolis (1977), p. 372 et seq.

6. Of these methods, only the Act and its criteria have legal force; the others were used as an aid.

The following table shows the segments into which the Colorado and Dolores Rivers were divided and the classification for which each qualified.

TABLE IV-3
Classification Levels

<u>Segment</u>	<u>Length</u>	<u>Classification</u>
COLORADO RIVER		
A-1. Loma Launch site to intersection with Railroad	8.7 miles (14 km)	Scenic
A-2. Railroad intersection to Westwater Canyon	19 miles (30.4 km)	Scenic
B. Westwater Canyon to Rose Ranch	13 miles (20.8 km)	Wild
C. Rose Ranch to Cisco Wash	11 miles (17.6 km)	Scenic
D. Cisco Wash to Dolores	4 miles (6.4 km)	Recreational
DOLORES RIVER		
A. Gateway to Fisher Creek	14 miles (22.4 km)	Scenic
B. Fisher Creek to Bridge Canyon	6 miles (9.6 km)	Wild
C. Bridge Canyon to Colorado River	11 miles (17.6 km)	Scenic

In determining these classifications, the team considered whether the river is free-flowing, its water quality, accessibility, and its shoreline development. Since both rivers are free-flowing in the study area, and both have adequate water quality, only accessibility and shoreline development were determinants, so only these are discussed in the following section.

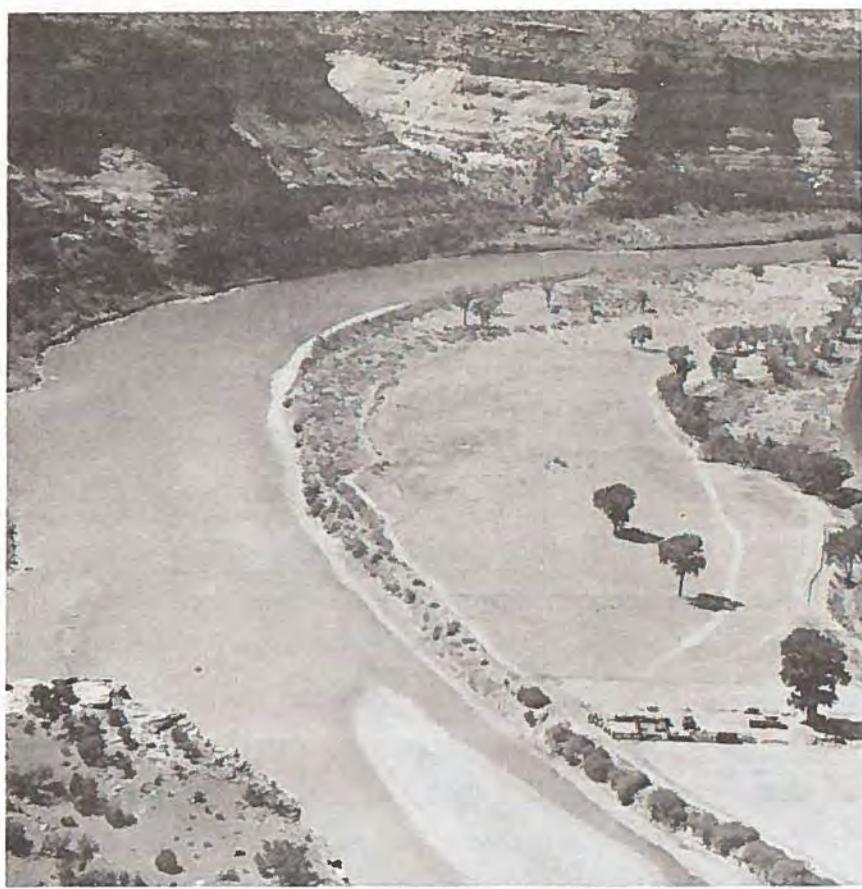
Colorado River

Segment A-1--Loma Launch Site (mile 1079.2) to Railroad Intersection (mile 1070.5). In this segment there is access to the launch site by gravel road, and two unimproved dirt roads lead to the canyon rim. Farm buildings in the first mile, a rock quarry and fences for about three miles are the shoreline developments; these factors make the classification for which the river is now eligible "scenic."

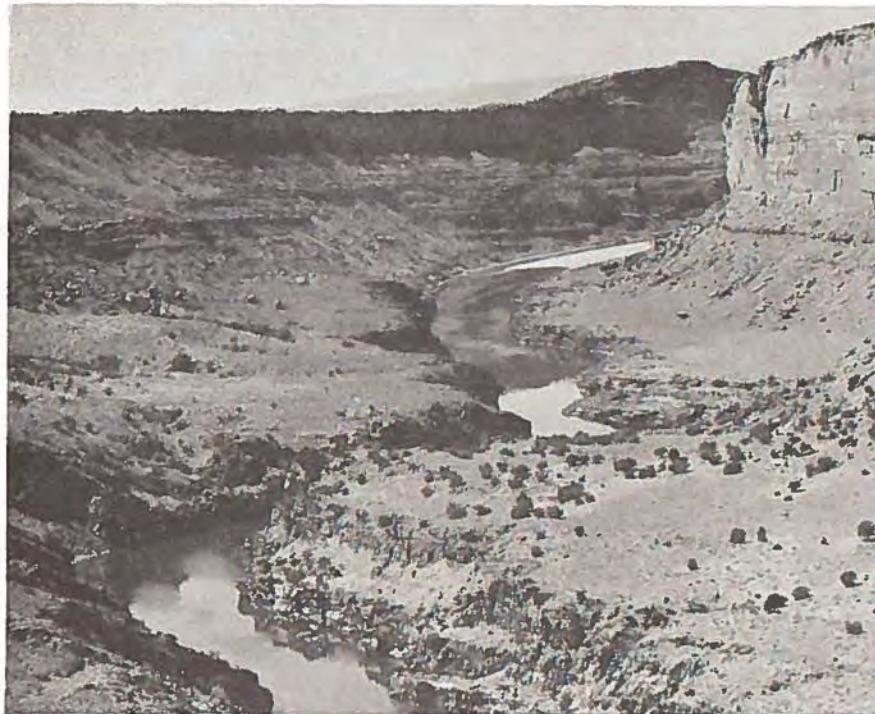
Segment A-2--Railroad Intersection (mile 1070-5) to Westwater Canyon (mile 1051.5). The Denver and Rio Grande Western Railroad parallels the Colorado here, and five unimproved dirt roads lead to the vicinity of the river. At the lower end, a gravel road leads to the Westwater Ranger Station. On the shores, the railroad and its associated poles and bridges are visible in places. There are also three irrigation pumps, occasional fences, and structures at Westwater Ranger Station. The classification for which this segment qualifies is "scenic."

The effect of the paralleling railroad on the classification of this segment is not immediately apparent. However, the Guidelines contain two statements relative to determining the classification for this segment. First, the Guidelines state that they are not absolutes but are to be used as a guide in assisting the investigator in making judgements in cases with extenuating circumstances. The document also notes that long stretches of screened road or railroad do not necessarily preclude scenic classification and that consideration should be given to the use for which the road or railroad is intended.

The railroad in Ruby Canyon is seen primarily when trains are passing through, although some bridges and other railroad facilities are occasionally visible. Since the trains do not stop, the railroad



Occasional dirt roads, a railroad, and agricultural activities make 'scenic' the classification for which Ruby Canyon qualifies. BLM



Access only by foot or boat and the lack of human intrusions produce a 'wild' classification for Westwater Canyon. BLM

does not provide access to the canyon as would a road. These factors, combined with the outstanding scenery in this area, led the study team to its decision to classify this section as "scenic."

Segment B--Westwater Canyon (mile 1051.5) to Rose Ranch (mile 1038.5). This area is inaccessible except by boat and foot; its shorelines are undeveloped; its appropriate classification is "wild."

Segment C--Rose Ranch (mile 1038.5) to Cisco Wash (mile 1027.5). There are two improved gravel roads and two unimproved dirt roads in the reach, as well as a gravel road to Rose Ranch. There are two irrigation pumps and two powerlines in the corridor above Rose Ranch, and one powerline, one irrigation pump, and one fence below it. There is a structure at the Rose Ranch take-out. These levels of development make the segment eligible for a "scenic" classification.

Segment D--Cisco Wash (mile 1027.5) to Dolores River (mile 1023.5). This segment is very accessible: One unimproved dirt road lies in the corridor and the river is paralleled by State Highway 128. In addition, some roadfill, a powerline, a fence, and buildings are visible from the river. This relatively developed stretch is eligible for "recreational" classification.

Dolores River

Segment A--Gateway (mile 31) to Fisher Creek (mile 17). A dirt road parallels the river on the west bank down to Fisher Creek; a dirt road on the east side extends for about eight miles. There are three diversions, some agricultural land away from the river, farm buildings near the state line, and a small roadfill at State Line Rapid. The appropriate classification for this segment is "scenic." Although it would seem that since the river is paralleled by two

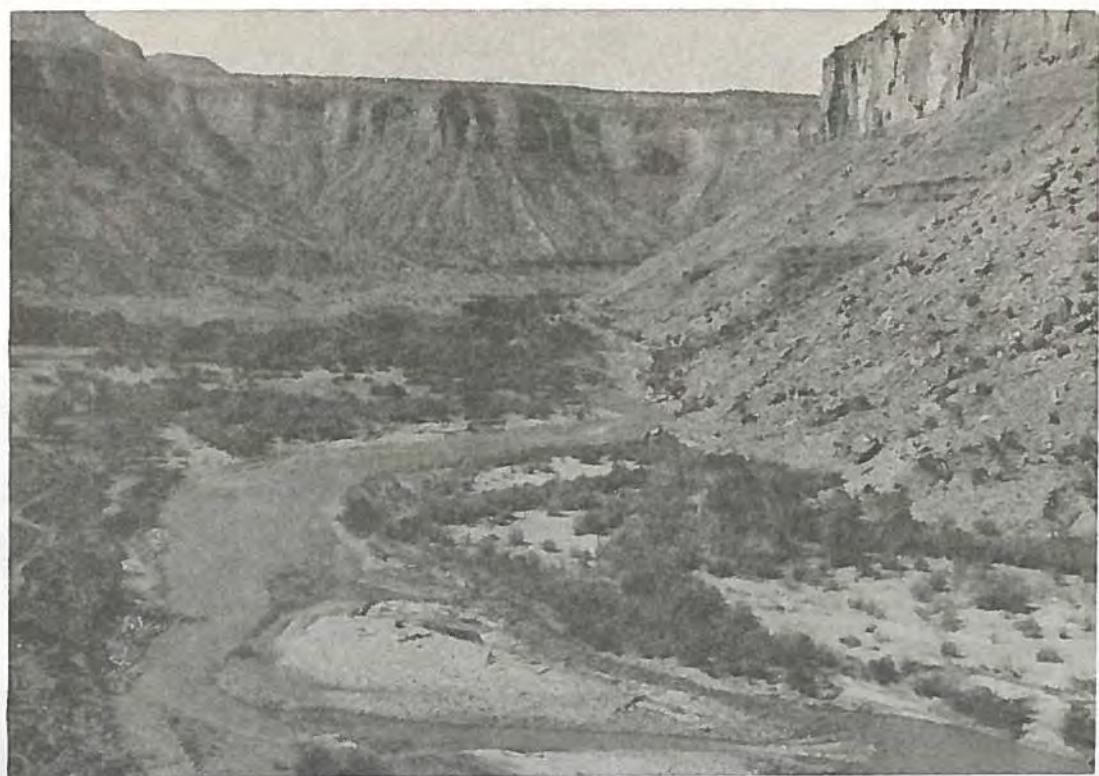
dirt roads, it would qualify only for "recreational river area" classification, they are generally screened from the river. They are primarily used for access to the agricultural lands near the state line, so there is very little traffic.

Segment B--Fisher Creek (mile 17) to Bridge Canyon (mile 11).

There is no access within the segment, although it is accessible at both ends by dirt roads. The shorelines are undeveloped except for one abandoned mining operation near the lower end, so this segment qualifies for a "wild" classification.

Segment C--Bridge Canyon (mile 11) to Colorado River (mile 0).

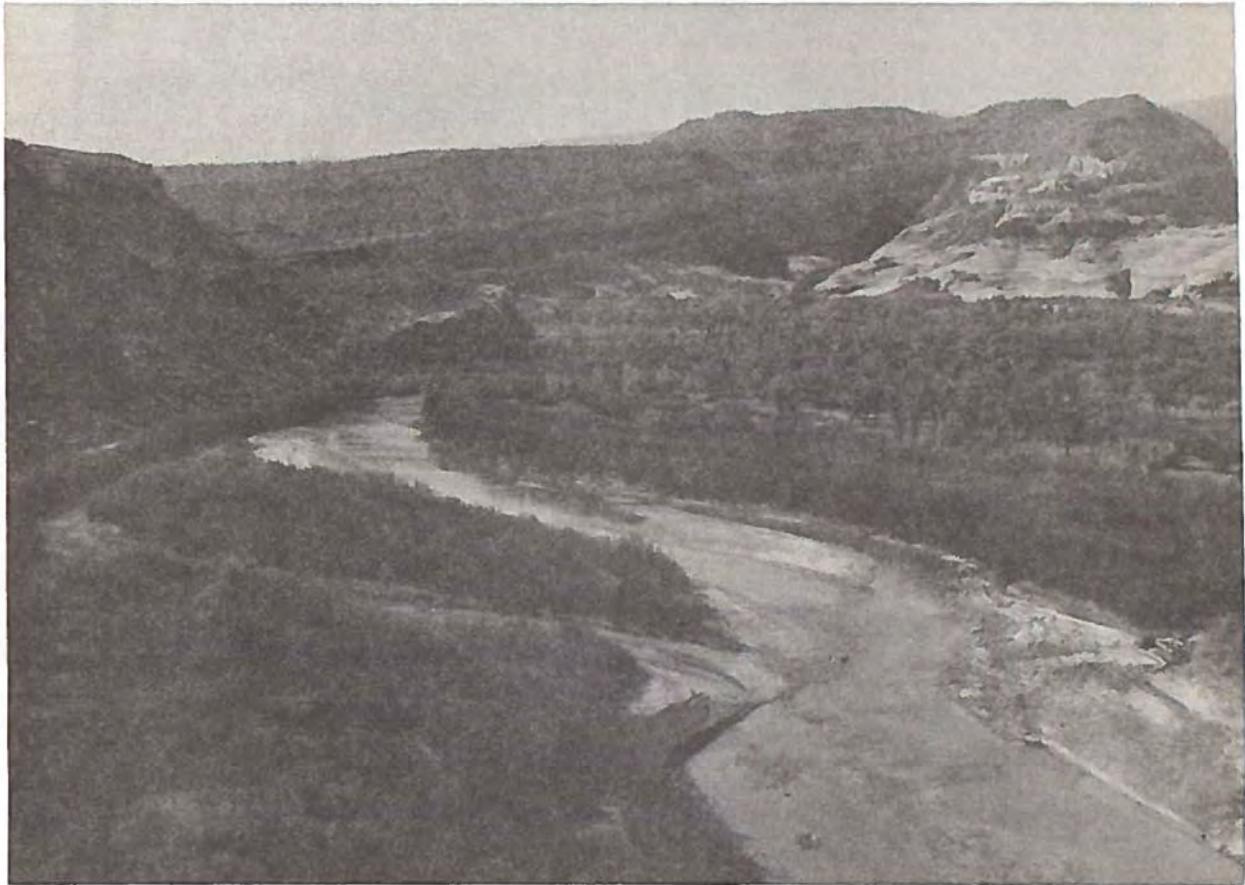
A dirt road reaches Utah Bottom and another extends from Lake Bottom up the river for about three miles. A spur from this road is the only convenient access to the Dolores Triangle. Shoreline intrusions include two abandoned mining operations, one current mining operation, one powerline crossing, some buildings associated with mining, and some roadfill. This segment is eligible for "scenic" classification, since the developments are relatively well-screened from the river.



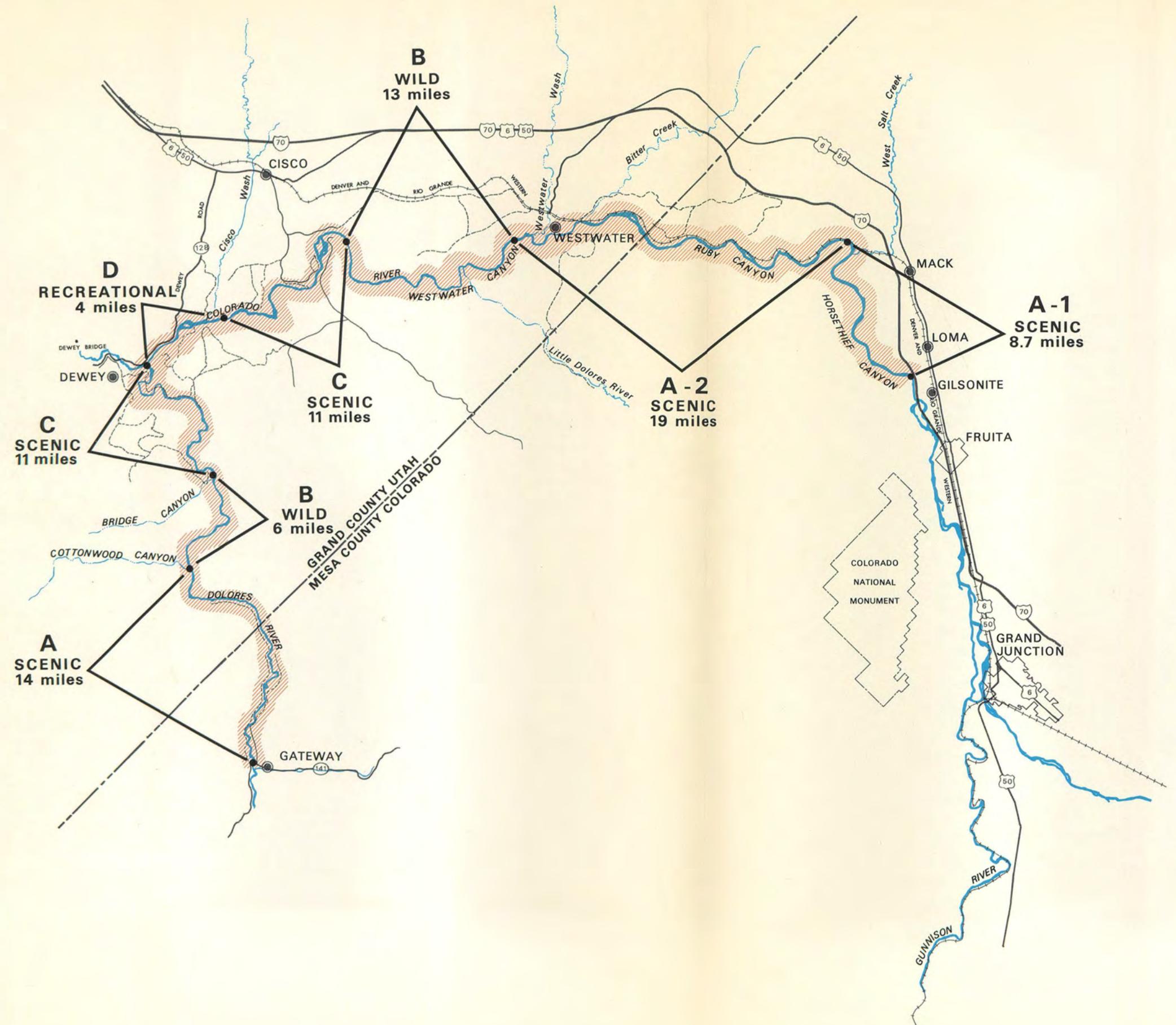
Ranching activities and a road make 'scenic' the appropriate classification for Segment A of the Dolores. BLM



The 'wild' reach of the Dolores (Segment B) can be reached only by hiking or boating. BLM

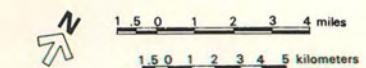


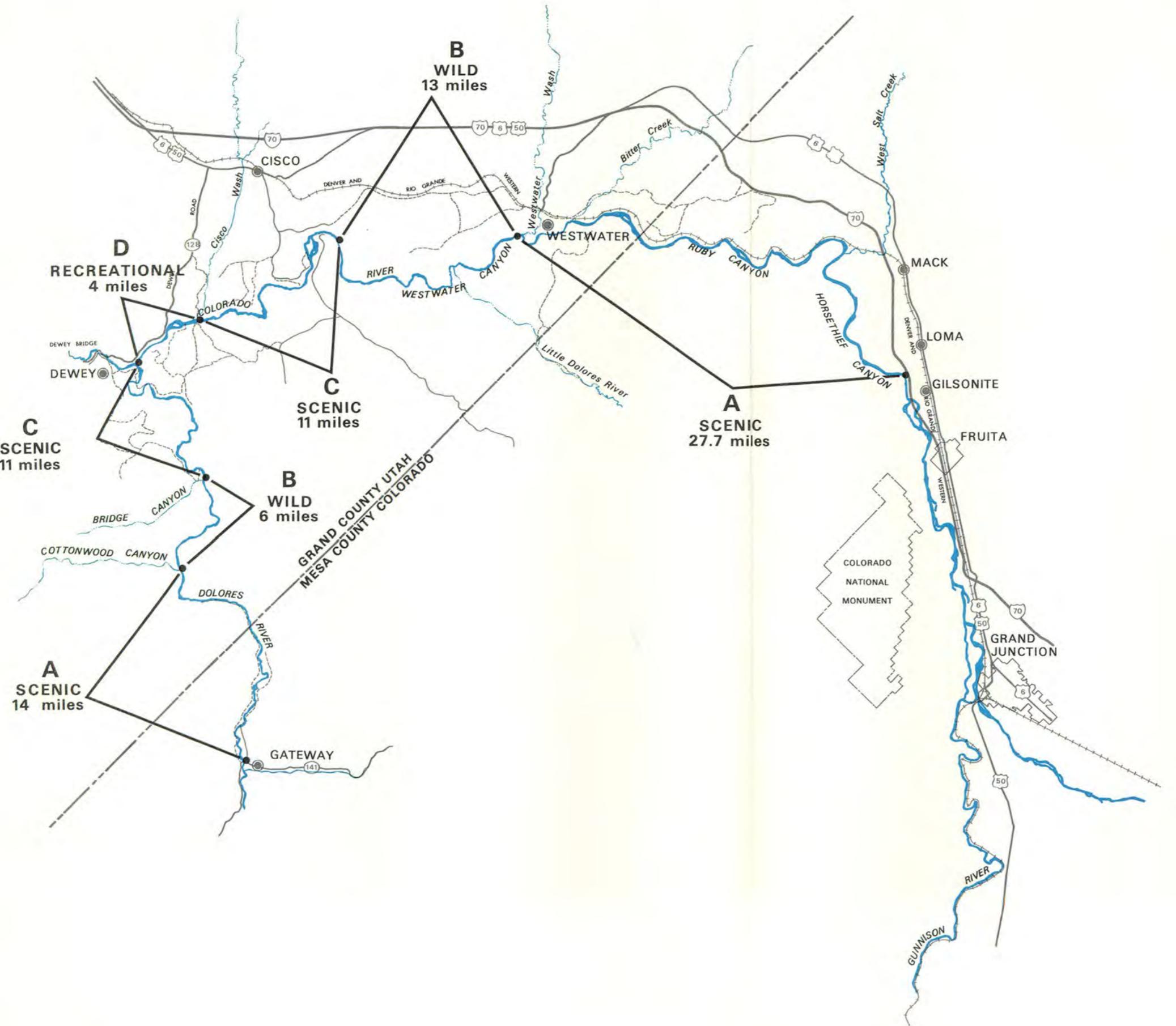
In Segment C, where there are ranches, some dirt roads, and generally well-screened mining operations, the appropriate classification is 'scenic'. BLM



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
ELIGIBILITY AND CLASSIFICATION

- GRAVEL ROAD
- - - JEEP ROAD
- ■ ■ ELIGIBLE SEGMENTS





COLORADO / LOWER DOLORES WILD AND SCENIC RIVER STUDY RECOMMENDATIONS

— GRAVEL ROAD
- - - JEEP ROAD



C H A P T E R V

F I N D I N G S A N D R E C O M M E N D A T I O N S

The data in the previous chapters were used to make the following findings, designation and management recommendations, and cost estimates.

FINDINGS

1. The Colorado River, from the Loma launch site, 20.7 miles (33.3 km) upstream from the Colorado-Utah border, downstream to its confluence with the Dolores River in Utah is eligible for inclusion in the National Wild and Scenic River System. This portion of the river contains outstandingly remarkable scenic, geologic, cultural, recreation, and fish and wildlife values.
2. The Dolores River from Gateway, Colorado downstream to its confluence with the Colorado River in Utah is eligible for inclusion in the National Wild and Scenic River System and possesses outstandingly remarkable scenic, geologic, recreation, and wildlife values.
3. The Principles and Standards Analysis revealed that designating these rivers would protect their outstanding values while making substantial contributions to the regional economy.

RECOMMENDATIONS

1. The Colorado River study segments, including a corridor of associated lands averaging approximately 0.35 miles (0.6 km)

in width on each shore and containing about 25,000 acres (10,100 ha), should be designated a component of the National Wild and Scenic Rivers System, with the following classifications:

- (a) Loma Launch to Westwater Canyon (River mile 1079.2 to river mile 1051.5), 27.7 miles (43.8 km) - - - - - Scenic
 - (b) Westwater Canyon to Rose Ranch (River mile 1051.5 to river mile 1038.5), 13 miles (20.9 km) - - - - - Wild
 - (c) Rose Ranch to Cisco Wash (River mile 1038.5 to river mile 1027.5), 11 miles (17.7 km) - - - - - - - - - Scenic
 - (d) Cisco Wash to Dolores River (River mile 1027.5 to river mile 1023.5), 4 miles (6.4 km) - - - - - Recreational
2. The Dolores River from the vicinity of Gateway to the confluence with the Colorado River, including a corridor of associated lands averaging approximately 0.3 miles (0.5 km) in width on either shore and containing about 11,900 acres (4,820 ha), should be designated a component of the National Wild and Scenic Rivers System, with the following classifications:
- (a) Gateway, Colorado to Fisher Creek (River mile 31 to river mile 17), 14 miles (22.5 km) - - - - - - - - - Scenic
 - (b) Fisher Creek to Bridge Canyon (River mile 17 to river mile 11), 6 miles (9.7 km) - - - - - - - - - Wild
 - (c) Bridge Canyon to Colorado River (River mile 11 to river mile 0), 11 miles (17.7 km) - - - - - - - - - Scenic

3. The State of Utah is making an inventory and analysis of its rivers, scheduled for completion in the spring of 1980. Until this is completed, the State will not take a position on designation of either of these rivers.¹

The State of Colorado fully supports designation of the segments within its borders.²

4. The Bureau of Land Management, which at present administers the rivers, should continue to do so after designation. The management plans for the rivers should be prepared in cooperation with the states of Colorado and Utah, with the general goals of protecting the outstanding values which have made the rivers eligible for the system, and encouraging the amounts and types of recreation that will not degrade these values. The management plans will determine the actual boundaries of the river corridors.

The BLM should identify, during the management planning period, environmentally acceptable sites for access to the Dolores Triangle (north of the Dolores River), in the event future access improvements to that area are required. The BLM should also investigate the possibility of providing access on public lands near Gateway, since convenient sites exist and this could minimize interference with private property.

-
1. Letter of July 18, 1979, from Governor Matheson (signed by Kent Briggs) to Ben Zerbey. See public comment section of Chapter 12.
 2. Letter of August 3, 1979, from Governor Lamm to Cecil Andrus. See public comment section of Chapter 12.

5. Approximately 5,350 acres (2,160 ha) of private land along the Colorado River and 1,640 acres (690 ha) along the Dolores should be preserved in their present natural or pastoral state. This should be accomplished, if possible, by the present landowners. If this approach is implemented during management planning following designation, a notice requirement should be instituted for landowners to inform the Bureau of Land Management of any plans for major changes in land use, so that the agency can determine whether the planned change would degrade the rivers' values. If it be found that the change in land use would degrade the rivers' values, a one-year negotiation period would ensue. During this period an attempt would be made to agree on land use changes that would be acceptable to the landowner while still preserving the outstanding values of the area. If no agreement on an acceptable land use change could be reached, the Bureau of Land Management should purchase a scenic easement on the lands involved.

To effectuate this system, the BLM should make use of its power to enter into contracts, by signing memoranda of agreement with landowners. These agreements, which would have the force of any contract, would bind the landowners to notify the BLM of any land use changes specified in the document that would affect the values of the corridor adversely. After this notification, the negotiation period discussed above would commence.

In turn, the BLM would bind itself not to exercise its authority to condemn easements unless it received evidence that a conflicting land use change had been initiated without notification, or unless the 1-year negotiation period expired without agreement being reached on the land use change proposed by the landowner. Such memoranda would contain a provision that any of the specified land use changes initiated in violation of the agreement would not

constitute a "regular use exercised prior to acquisition of the easement," as mentioned in section 15 of the Wild and Scenic Rivers Act (P.L. 90-542, as amended).

MANAGEMENT RECOMMENDATIONS FOR THE COLORADO AND DOLORES RIVERS

Including the Colorado and Dolores Rivers in the National Wild and Scenic Rivers System will provide statutory protection for and preservation of the natural and scenic values of the rivers and their immediate environments. Approximately 25,000 acres (10,100 ha) of the Colorado River corridor should be included in this designation. These lands are within a visual corridor which averages 0.35 miles (0.6 km) on either side of the river. About 11,900 acres (4,820 ha) within a visual corridor averaging 0.3 miles (0.5 km) on either side of the Dolores River should be included in the designation of that river.

The Bureau of Land Management will continue to manage the two rivers after they are included in the system. The Wild and Scenic Rivers Act allows a period of one year after designation for the administrative agency to prepare a management plan, including detailed boundaries (governed by the terrain and by provisions of the Act), classifications, and plans for any necessary developments that do not conflict with the rivers' classification levels. These management plans must be published in the Federal Register and do not become effective until 90 days after they have been forwarded to the President of the Senate and the Speaker of the House of Representatives.

The objective of these plans is to protect and enhance the values that caused the rivers to be included in the national system. Provisions in these plans determine the nature and the extent of

the effects that inclusion in the National Wild and Scenic Rivers System will have on private landowners. It is recommended that these plans be prepared by the BLM in cooperation with concerned federal, state, and local interests.

The general objectives of including these rivers in the system are:

1. to preserve the rivers and their immediate environment, with special emphasis on their outstanding natural qualities.
2. to preserve the free-flowing condition of the rivers.
3. to maintain the excellent recreational opportunities associated with these free-flowing rivers for present and future generations.
4. to provide recreational use of fish and wildlife resources, including hunting and fishing, within the framework of appropriate federal and state laws.
5. to allow for utilizing the area's land and water at only that level which will leave the existing environment unimpaired.
6. to provide for the continuation of current land uses including agriculture, grazing, mining, and recreation.
7. to provide a variety of interpretive, scientific, educational, and wildlife uses.
8. to assure preservation of historic and archeological values.

The actions projected to accomplish these general objectives are stated below.

The proposal will provide, within the capacity of the areas, a wide range of public recreation opportunities in settings that vary from areas without substantial evidence of man's activities to those where there may be substantial past and present activity. The number of people visiting the areas will be monitored and use will be distributed by means of access control and use regulations, if necessary, to maintain existing environmental conditions.

Additional recreational facilities are already planned in the corridor to handle the increasing boating traffic. Most of this increase, as described in chapter XI, is expected whether or not the rivers are designated to the system, so the developments to accommodate it will take place under existing management plans of the Bureau of Land Management. A list of these planned developments follows:

Colorado River

Planned Developments

1. Westwater Ranger Station - acquire access road
 - develop 20-unit campground
 - build permanent ranger station
2. Rose Ranch boat ramp
 - acquire 6 acres (2.4 ha)
 - improve boat ramp
 - parking
3. Dewey boat ramp
 - develop boat ramp
 - parking
 - sanitation facilities

Dolores River

Planned Developments

1. Utah Bottoms - acquire access easement

Extreme care will be taken in the location of the additional recreation facilities, with primary emphasis on retaining the existing environment setting. Separate environmental assessments will precede construction of these facilities, and construction techniques will be planned to produce minimal pollution and surface disturbance.

To reduce the possibility of water and land pollution from human waste disposal, vault toilets will be installed at all development areas, and portable chemical toilets will be required in the inaccessible areas. In addition, a "bring out what you take in" program will be implemented to reduce litter.

Minerals in federal lands designated as wild river areas [13 miles (21 km) on the Colorado and 6 miles (9.6 km) on the Dolores] will be withdrawn from all forms of appropriation under the mining laws and from operation of the mineral leasing laws. Existing claims, if their validity is proved, will be exempt from this withdrawal. The boundaries of the withdrawn areas, which generally will follow the canyon rims, will be drawn during the writing of the management plans. Within the entire river corridor, disposal of lands under the public land laws will be prohibited, again subject to valid existing rights.

Scenic and recreational river areas [42.7 miles (68.7 km) on the Colorado and 25 miles (40 km) on the Dolores] will continue to be open to mineral location and entry under the 1872 Mining Law.

However, these areas will be subject to Section 9 of the Wild and Scenic Rivers Act: only a right or title to the mineral deposit will be patented on such claims. This will include use, but not fee title ownership, of the surface, as required to extract the minerals.

Mining in all designated portions of the corridor will be regulated to protect the rivers' values. The BLM, in consultation with other federal and state agencies and user groups, would implement mining regulations consonant with protecting the river areas.

These regulations will provide safeguards against pollution and unnecessary impairment of the scenery and may require that notice of intent and operating plans be filed with the BLM for mining claim location and assessment work. They will determine the need for retention of topsoil, restoration of topography, screening of operations, replanting or reseeding with native vegetation, removal of sediment from wastewater, and advance notice of intention to start prospecting or mining activities where substantial alteration of the existing environment might occur. Also, since prospecting and mining activities often require heavy equipment such as bulldozers, stationary engines, water pumps, and generators, these regulations will deal with noise pollution. These regulations will apply to valid existing claims located in scenic and recreational river areas.

Improved access to the Dolores Triangle may become necessary. The BLM will study the lower 11-mile (17.7 km) reach to locate environmentally acceptable sites for such access, in case improvement is necessary.

Use of off-road vehicles, aircraft, snow machines and motor boats will be strictly regulated within the river area. These regulations will be implemented by the BLM in cooperation with federal, state, and local agencies and user groups. These regulations will assure that access is provided in a manner which protects soil, vegetation

and scenery; prevents harassment of wildlife; prevents conflicts with other uses; and abates noise pollution.

Adjacent federal lands will be managed to protect the natural values of the Colorado and Dolores Rivers. This will require the active cooperation of other federal and state agencies in developing and enforcing land use practices that protect the area from surface dumping of garbage, sewage, other contaminants, and unsightly developments located beyond the management zone but within the visual corridor.

The Bureau of Land Management will develop appropriate management programs and enforcement procedures to assure protection of the fauna, flora and their habitats in the proposal area which are listed by the Department of the Interior as Endangered or Threatened or which may be candidates for such status. These programs and actions will require compliance with the procedures outlined in Section 7 of the Endangered Species Act.

Fishing, hunting, trapping, and rockhounding will continue within the Colorado and Dolores Rivers proposal area under applicable federal and state regulations. Except as noted below, national designation of the Colorado and Dolores rivers will not affect jurisdiction or responsibility of the states of Colorado and Utah over fish and wildlife resources for sport or subsistence purposes. The Secretary of the Interior, however, may designate zones or periods when hunting would not be permitted because of public safety, administration, or public use and enjoyment. Such action would be undertaken only after consultation with the Colorado Division of Wildlife and the Utah Division of Wildlife Resources. No such action is expected in these areas.

Based on current knowledge and materials found by artifact collectors, it is likely that there are many buried and still intact

surface deposits containing cultural materials from all time periods. A careful reconnaissance may reveal such larger cultural features as the remains of irrigation systems and horticultural fields, which are very poorly known at present and therefore deserving of special attention. Management plans for the area will devote attention to the protection of any sites found in the corridor.

LAND ACQUISITION

In order to maintain the river area in its present outstanding condition, the Act binds the managing agency with requirements that it preserve and enhance the river's values. It also permits controls on private lands so that changes in the landowner's present activities do not degrade the area's natural qualities. To accomplish such control the Act allows the purchase, or if necessary, the condemnation and purchase of scenic and public access easements.

Scenic easements are agreements in which the administering agency buys certain future uses of the land¹ which might, if exercised, degrade the natural qualities of the river corridor. Thus, for example, land used at present only for grazing, but which had the potential for supporting clear cutting, sand and gravel operations, high-density building construction, and industrial development might have a scenic easement purchased which would prevent the landowner from exercising these future uses, or developmental rights, in order to preserve the natural values of the river area. Such an easement would also prevent billboards, trash dumping and the like.

1. Existing uses of the land cannot be condemned under a scenic easement; they can be altered only on a willing buyer-willing seller basis.

The value paid for such an easement is theoretically equal to the value of the development rights which are sold; they are relatively expensive in the case of land with high development potential.

Public access easements on the Colorado and Dolores would probably be limited to a narrow corridor covering the river and a strip of shoreline, in order to permit hiking, floating, and emergency stops without possible trespass.

The study team noted that the current owners of private land in the recommended sections of the rivers have been good stewards of those lands; though there are intrusions these rarely degrade the natural qualities of the river areas. While BLM retains the authority to acquire easements, it was thought that acquiring easements should be held in abeyance until threatened changes in land uses require its exercise. Similarly, the authority to acquire public access easements on the river and its shores probably should be restrained until there is necessity to use it.

The study team felt this could most efficiently be accomplished by requiring landowners to notify the Bureau of Land Management in advance of any major proposed changes in land use, utilizing the procedure outlined on page 162. This system, with such modifications as are found necessary during the management planning period, would restrict the acquisition of easements to circumstances when they are actually necessary.

Within the Colorado River corridor are about 25,000 acres (10,100 ha), of which approximately 21 percent or 5,350 acres (2,160 ha) are in private ownership. The Dolores River corridor will encompass approximately 11,900 acres (4,820 ha), of which about 14 percent or 1,640 acres (690 ha) are privately owned.

These acreages are found within the critical line of sight from the river, and include the riverbed, banks, and zone of adjacent land which have a visual impact on the river use. If the natural and scenic appeal of the rivers are to be retained, they must be protected from adverse use. In developing the management plans for the rivers, the BLM will determine boundaries for the river corridors and exact figures for the amount of land included. Factors to be considered in determining these lateral boundaries include:

1. preserving the area seen from the river in a natural state.
2. providing river users with a feeling of spaciousness consistent with the type and extent of recreational and other uses in each segment.
3. protecting key fish and wildlife habitat.
4. protecting and making available historical and archeological resources of the river area.
5. protecting unique or important vegetative types.
6. protecting unique scenic or geologic features.

Rehabilitation of the Loma Launch site, mentioned below, will be contingent upon acquiring the area, or negotiating a cooperative agreement with the Colorado Division of Wildlife, which controls it.

DEVELOPMENTS

In addition to the easements that may prove necessary, two additional campgrounds and improvements to the Loma and Gateway

launch sites will be required to accommodate increased use in the river corridor caused by designation. The facilities at Loma and Gateway may require acquisition of or access easements on private land, depending on the results of detailed management planning. The Bureau of Land Management already plans to develop some facilities to handle increases in use expected whether or not the rivers enter the national system, as described above. The following list includes only those which are proposed as a result of river designation.

Colorado River

Proposed Developments

1. Loma boat ramp
 - improve boat ramp
 - parking
 - sanitation facilities
2. Dewey boat ramp
 - add 5-unit campground

Dolores River

Proposed Developments

1. Gateway launch site
 - construct boat ramp
 - parking
 - sanitation facilities
2. Lake Bottom
 - develop 5-unit campground

COSTS

The costs below are only those attributable to including the Colorado and Dolores Rivers in the system. These costs are in addition to those projected for the planned developments (shown on page 163) and on-going river management.

Colorado River

Recreation Facilities	\$ 38,000
Public Use and Scenic Easements, if all private acreage must be covered	2,140,000
	<u>\$2,178,000</u>
Additional AO&M	\$ 1,500

Dolores River

Recreation Facilities	\$ 26,000
Public Use and Scenic Easements, if all private acreage must be covered	656,000
	<u>\$ 682,000</u>
Additional AO&M	\$ 2,000

Totals

Recreational Facilities	\$ 64,000
Easements, if necessary	\$2,508,000
Additional AO&M	\$ 3,500

the same period. This is due to the fact that the first two years of life are the most important for the development of the brain and the formation of the nervous system. During this time, the brain grows rapidly, and the connections between neurons are formed. After this period, the brain continues to grow, but at a much slower rate.

Conclusion

In conclusion, the first two years of life are the most important for the development of the brain and the formation of the nervous system. During this time, the brain grows rapidly, and the connections between neurons are formed. After this period, the brain continues to grow, but at a much slower rate. It is important to provide children with a stimulating environment and proper nutrition during this critical period of their development.

FINAL ENVIRONMENTAL STATEMENT

1. *Leucania* *luteola* (Hufnagel) *luteola*
2. *Leucania* *luteola* (Hufnagel) *luteola*

S U M M A R Y

() Draft (X) Final Environmental Statement

Department of the Interior, National Park Service

1. Type of action:

() Administrative (X) Legislative

2. Brief description of action:

The Colorado and Lower Dolores Wild and Scenic Rivers Study was conducted pursuant to the Wild and Scenic Rivers Act (PL 90-542) as amended, and the request of the Governor of Utah, and recommends legislative action to include a 55.7-mile segment of the Colorado River and approximately 25,000 acres of adjacent land in the states of Colorado and Utah to the Wild and Scenic River System, classified as 13 miles of Wild River area, 38.7 miles of Scenic River area, and 4 miles of Recreational River area. Legislative action to include 31 miles of the Dolores River in the states of Colorado and Utah, with approximately 11,900 acres of adjacent land, in the system is also recommended, with 25 miles classified as Scenic River area and 6 miles as Wild River area. Both rivers would continue to be managed by the Bureau of Land Management.

3. Summary of environmental impact and adverse environmental effects:

Including approximately 86.7 miles of the two rivers and the associated 33,000 acres of corridor lands will have the overall effect of preserving the existing scenic, geologic, cultural, recreation, and fish and wildlife values for the enjoyment of present and future generations. Adjacent land uses would remain relatively unchanged. Easements on up to 6,990 acres of private land might be necessary to safeguard the rivers' values from adverse developments. Water resource developments in the corridors will be

prohibited. Mining operations along the final 4 miles of the Colorado segment and the final 11 miles of the Dolores will become more expensive. Minor soil, vegetation, and wildlife disturbance will occur at development sites.

4. Alternatives considered:

In addition to the proposed action, other alternatives considered were (1) no action, ie, continuation of present management, (2) a National Economic Development Plan for both rivers based on provision of additional recreation, and (3) classification options allowing different levels of development in the corridor. A total of five plans for each river was considered.

5. Comments were requested from the following:

Advisory Council on Historic Preservation
Water Resources Council
Department of Agriculture
Department of Defense
Department of Commerce
Environmental Protection Agency
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Transportation
Department of the Interior
Fish and Wildlife Service
Heritage Conservation and Recreation Service
Bureau of Land Management
Bureau of Indian Affairs
Geological Survey
Bureau of Reclamation
Bureau of Mines
Department of Energy
State of Colorado Clearinghouse
State of Utah Clearinghouse

Areawide Clearinghouses in Montrose and Rifle, Colorado and
Price, Utah

Southwestern Water Conservation District

The Wilderness Society

Sierra Club

Western River Guides Association

Colorado White Water Association

Colorado Open Space Council

Federal Timber Purchasers Association

Denver and Rio Grande Western Railroad

University of Colorado Wilderness Study Group

American Rivers Conservation Council

Industrial Resources, Inc.

Upper Colorado River Commission

Colorado State Historical Society

6. Date statement made available to CEQ and the public:

Draft - May 23, 1979

Final -

C O N T E N T S

Final Environmental Impact Statement

Chapter VI--Description of the Proposal

Background

Management Goals

Corridor Area

Easement Acquisition

Planned and Proposed Developments

Costs

Relationship with other Programs

Chapter VII--Description of the Environment

(see chapters II and III)

Chapter VIII--Environmental Impacts of the Proposed Action

Colorado River

Impact on Mineral Resources

Impacts on Land Use

Impact on Water Resource Development Projects

Impact on Recreation

Impact on Economic and Regional Development

Impact on Social Well-being

Other Impacts

Dolores River

Impact on Mineral Resources

Impact on Land Use

Impact on Water Resource Development Projects

Impact on Recreation

Impact on Economic and Regional Development

Impact on Social Well-being

Other Impacts

Chapter IX--Mitigating Measures and Unavoidable Adverse Impacts of the Proposed Action

Mitigating Measures

Unavoidable Adverse Impacts

Chapter X--Relationship Between Short-term Use of the Environment and Long-term Productivity;

and Irreversible or Irretrievable Commitments of Resources Involved in the Proposed Action

Chapter XI--Analysis of Alternatives and their
Impacts

Planning Procedure

Alternative Plans

Colorado River

- No Action Plan
- National Economic Development Plan
- Environmental Quality Plan 1 (see chapter VI and VIII)
- Environmental Quality Plan 2
- Environmental Quality Plan 3

Dolores River

- No Action Plan
- National Economic Development Plan
- Environmental Quality Plan 1
- Environmental Quality Plan 2
- Environmental Quality Plan 3 (see chapter VI and VIII)

Summary and Comparison of Effects of Alternative Plans

Colorado River

Dolores River

Selected Plans

Chapter XII--Consultation and Coordination in the the Development of the Proposal and Environmental Statement

Public Comments on the Draft Environmental Impact Statement and Responses

Appendix A--Rock Formations of the Colorado and Dolores River Study Area

Appendix B--Water Flow Data

Appendix C--Fishes of the Colorado and Dolores Rivers

Appendix D--Wildlife of the Colorado and Dolores River Study Areas

Appendix E--Outline and Application of Principles and Standards Procedures to

Appendix F--List of Contributors

Bibliography

C H A P T E R V I I

D E S C R I P T I O N O F T H E P R O P O S A L

THE PROPOSAL

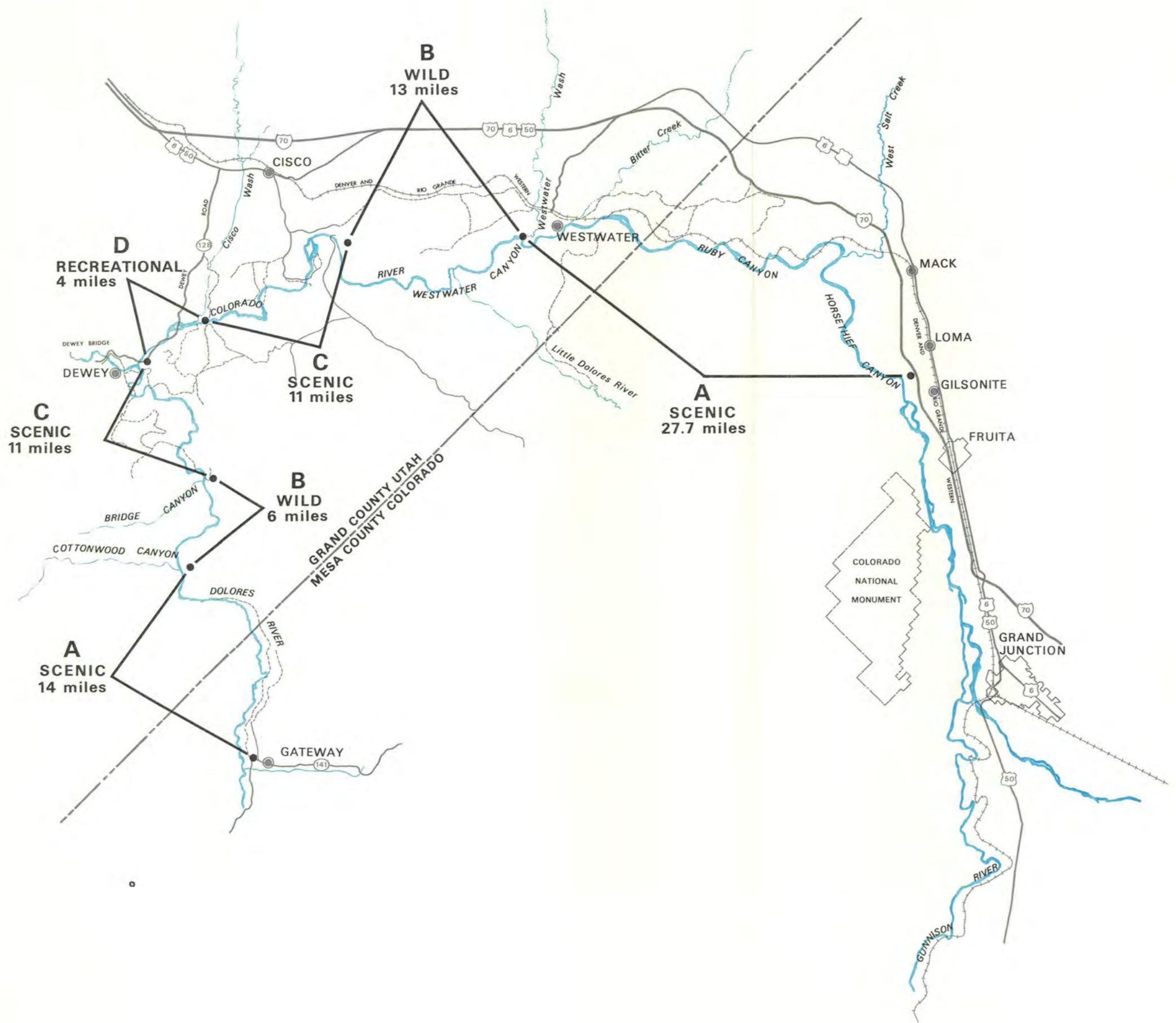
The Department of the Interior proposes that 55.7 miles (89.7 km) of the Colorado River and 31 miles (49.9 km) of the Dolores River be designated components of the National Wild and Scenic Rivers System. The portion of the Colorado River proposed for designation extends from the Loma, Colorado, launch site downstream to the confluence with the Dolores River in Utah. Of the total, 13 miles (20.8 km) are recommended for designation as "wild," 38.7 miles (60.7 km) as "scenic," and 4 miles (6.4 km) as "recreational."

The Dolores River area extends from the Colorado Highway 141 bridge at Gateway, Colorado, downstream to the confluence with the Colorado River in Utah. Of the total, 6 miles (9.6 km) are recommended for designation as "wild" and 25 miles (22.4 km) as "scenic." The segments, with their classifications, are shown on the Recommendations Map.

Background

The amendment of January 3, 1975 (PL 93-621) to the Wild and Scenic Rivers Act (PL 90-542) required the study of the Colorado from a point 19.5 miles (31.4 km) above the Colorado-Utah border, to the confluence with the Dolores River in Utah.

At the request of Governor Rampton of Utah, a request supported by Governor Lamm of Colorado, the Utah portion of the Dolores was studied. The study team found the two rivers were free flowing and possessed the "outstandingly remarkable" qualities required for candidate rivers for the system, as is discussed in Chapter IV of



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
PROPOSAL

the study report. It also determined the appropriate classification levels for the various segments of the two rivers, and agreed to recommend inclusion and the management actions which are contained in chapter VI of the report and summarized here.

Management Goals

Administration and management of both rivers will be the responsibility of the Bureau of Land Management (BLM). The BLM will prepare a management and development plan for each of the river corridors that will delineate the boundaries of the areas to be designated and specify development plans for the facilities necessary to accommodate river users. These proposed developments, only two of which are attributable to river designation, are discussed below. The management plans will be filed with the Congress within one year after the rivers are included in the system.

The detailed management plans for these two rivers should emphasize the following general goals:

1. maintaining the free flow of the rivers.
2. preserving the natural values, the undeveloped and nearly primitive character, and the historical and archeological features of the corridor. Using screening techniques such as vegetation and natural rock and non-specular (flat, non-reflective, earth tone pigments) paints to preserve or enhance scenic values.
3. preventing degradation of existing water quality and encouraging water quality improvements so long as these do not adversely affect the river's values.

4. providing access, use, and interpretation of the corridor for the public in a way consistent with the protection and enhancement of the rivers and their associated environment.
5. providing recreational opportunities at a level of use that does not degrade the area's values, lower the quality of experience, or adversely affect riparian landowners.
6. providing for the protection, use, and enhancement of fish and wildlife within the framework of appropriate federal and state laws.

Chapter V of the report has a fuller discussion of the projected management for the area.

Corridor Area

Table VI-1 shows the ownership of the area involved in the proposal. Because of the varying land parcel shapes, amounts of river frontage owned by the various entities do not reflect the amount of land controlled by each in the corridor.

TABLE VI-1
Corridor Landownership
Acreage and River Frontage

Colorado River

<u>Ownership</u>	<u>River Frontage</u> <u>Miles (km)</u>	<u>Acreage (ha)</u>	<u>Corridor</u> <u>Acreage</u> <u>Percent of</u> <u>Total</u>
Bureau of Land Management	72.9 (117.3)	17,500 (7,080)	70
State	1.5 (2.4)	2,250 (910)	9
Private	<u>37 (59.5)</u>	<u>5,350 (2,160)</u>	<u>21</u>
Subtotal	111.4 (179)	25,100 (10,150)	100

Dolores River

Bureau of Land Management	35 (56.3)	7,080 (2,870)	88.5
Private	<u>5 (8.1)</u>	<u>920 (370)</u>	<u>11.5</u>
Subtotal	40 (64.4)	8,000 (3,240)	100
Total	154.4 (243.4)	33,100 (13,390)	

Easement Acquisition

Private lands occupy approximately 37 riverbank miles (59.6 km) on the Colorado River; scenic and public use easements may be required on about 5,350 acres (2,160 ha) if any changes in existing land use of these lands threaten the river's outstanding values. On the Dolores River there are about 5 riverbank miles (8.1 km) occupied by private lands; easements may be necessitated on approximately 1,640 acres (690 ha). The management plans should specifically delineate the boundaries of the river areas and contain specific development and administration plans, a task which will require intensive investigation. Therefore, these estimates of

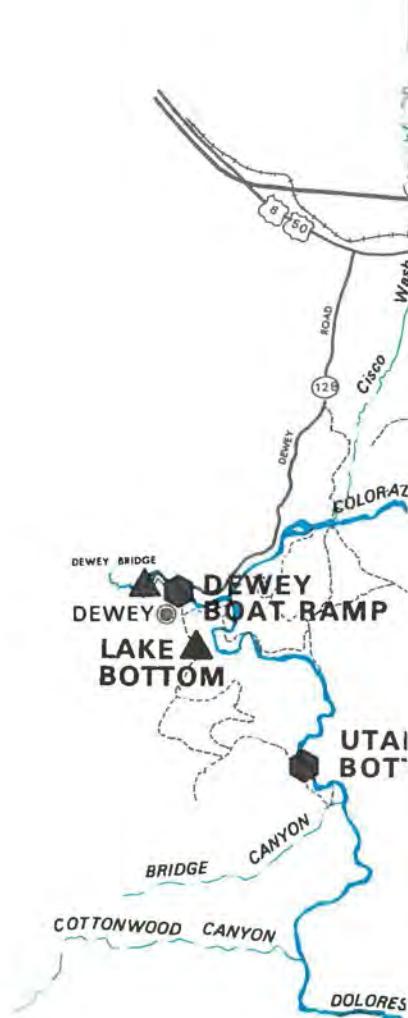
scenic and access easement which may need to be acquired are tentative. They are approximations made for cost estimates and to aid the administering agency in the more intensive planning which will follow if the rivers are included in the system.

Planned and Proposed Development

In addition to the easements that may be required to protect the river corridors and provide public access, some new facilities will be required to accommodate increased use in the river corridors. The Bureau of Land Management already has plans to develop all but two of the sites, since considerable increases in river use are expected whether or not the rivers are designated. The following list describes both those already planned for development and those proposed to accommodate any extra use if the river is designated.

Colorado River--Developments Planned Under Existing River Management

1. Westwater Ranger Station
 - (a) acquire access road
 - (b) develop 20-unit campground
 - (c) improve boat ramp
 - (d) build permanent ranger station
2. Rose Ranch boat ramp
 - (a) acquire 6 acres (2.4 ha)
 - (b) improve boat ramp
 - (c) parking
3. Dewey boat ramp
 - (a) develop boat ramp
 - (b) parking
 - (c) sanitation facilities



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
**PLANNED AND PROPOSED
DEVELOPMENTS**

- GRAVEL ROAD
- - - JEEP ROAD
- PLANNED DEVELOPMENTS
(existing plans not dependent on wild and scenic river designation)
- ▲ PROPOSED DEVELOPMENTS
(with wild and scenic river designation)



1 5 0 1 2 3 4 miles
1 5 0 1 2 3 4 5 kilometers



Colorado River--Additional Developments Proposed Due to Designation

1. Loma boat ramp
 - (a) improve boat ramp
 - (b) parking
 - (c) sanitation facilities
2. Dewey boat ramp
 - (a) develop 5-unit campground

Dolores River--Developments Planned Under Existing River Management

1. Utah Bottoms
 - (a) acquire access easement

Dolores River--Developments Proposed Due to Designation

1. Gateway
 - (a) construct boat ramp
 - (b) parking
 - (c) sanitation facilities
2. Lake Bottom
 - (a) construct 5-unit campground

Costs

The following list of costs contains only those attributable to including the Colorado and Dolores Rivers in the system. These costs are in addition to those for on-going river management.

Colorado River

Recreation Facilities	\$ 38,000
Public Use and Scenic Easement Acquisition, if necessary	\$2,140,000
	<hr/>
	\$2,178,000
Additional AO&M	\$ 1,500

Dolores River

Recreation facilities	\$ 26,000
Public Use and Scenic Easement Acquisition	\$ 656,000
	<hr/>
	\$ 682,000
Additional AO&M	\$ 2,000

Relationship with Other Programs

Statewide Comprehensive Outdoor Recreation Plans and Nationwide Outdoor Recreation Plan. Preserving segments of the Colorado and Dolores Rivers is consistent with the goals expressed in the plans for Colorado and Utah. Both states recognize the need for preserving high quality streams and their environs at both the state and federal levels. The proposed action is also in agreement with Outdoor Recreation - A Legacy for America which recommends including additional rivers in the National Wild and Scenic Rivers System.

National Historic Preservation Act and Executive Order 11593. Designating the rivers applies the Act's protection to cultural resources; section 10(a) requires that "primary emphasis" be placed on "protecting . . . historic, archaeologic and scientific features." Although an inventory of the historic and cultural values for the

Dolores River has been completed, only preliminary survey information is available for the Colorado River. The BLM will be responsible for continued consultation and compliance with section 106 of the National Historic Preservation Act and E.O. 11593. A survey of the Colorado River may be required as part of the management plan, to be completed within one year following designation.

If properties listed or eligible for listing in the National Register of Historic Places are affected by designation or development of facilities, any activities affecting them will be in compliance with the protective provisions of section 106 and E.O. 11593.

Endangered Species Act. The Endangered Species Act of 1973 made it a violation of federal law to take any species listed as endangered, except under permit, or to imperil the propagation or survival of the species. Two fish species and two bird species which are listed as endangered occur in the Colorado River corridor. The provisions of the Wild and Scenic Rivers Act that require preservation of the outstanding values of the river are in conformity with the purposes of the Endangered Species Act.

Bureau of Land Management Planning. The Federal Land Policy and Management Act of 1976 authorized the BLM to give priority to the protection of areas of critical environmental concern, such as the river corridors. The management framework plans (MFP) for the units through which the rivers pass recognize the recreational and scenic values associated with each river. The MFP for the Dolores Planning Unit in Utah recommends the development of intensive management plans for the Colorado and Dolores Rivers, which will be completed within one year following designation of the rivers. The MFP also recommends that access be obtained at Westwater and Rose Ranch for boat launching and takeout and that the river corridors be protected from man's intrusions. These BLM plans for river protection and recreation development are compatible with river designation.

Executive Orders 11988 and 11990 -- Floodplain and Wetland Developments. While no part of the proposal involves wetlands, the developments proposed at Loma, Gateway, and Dewey Bridge will lie partly in the 100-year floodplain. No official designation or mapping of the floodway in the study area has been done.

Recreation is one of the permissible uses of floodplain, and since the facilities must be used at normal and low water stages, there exists no practical alternative to siting them in the floodplain. Other alternatives would entail environmental damage caused either by floaters descending to the river from the facilities, or failing to use them because of their inconvenient distance from the river. To the extent practicable, these facilities will be floodproofed and designed to minimize pollution during a flood.

In keeping with the provisions of E.O. 11988, public review of the proposal to build these facilities is being sought with the issuance of this report, by submission to the A-95 clearinghouse. Further public involvement will be handled by the BLM during the preparation of the management plan for the rivers, and during site specific planning when the developments are to be constructed. The BLM will also apply for the necessary permits and any required variances in the respective counties and states.

CHAPTER VII

DESCRIPTION OF THE ENVIRONMENT

For a description of the environment, see chapters II and III of the Study Report.

Description of the Probable Future Environment Without the Proposal

The probable future environment without the proposal is described as the no action alternatives for the Colorado and Dolores Rivers in chapter XI.

C H A P T E R V I I I
E N V I R O N M E N T A L I M P A C T S
O F T H E P R O P O S E D A C T I O N

COLORADO RIVER

Inclusion of 55.7 miles (89.7 km) of the Colorado River and the 25,000 acres (10,100 ha) comprising its immediate environment in the National Wild and Scenic River System will ensure the river's free-flowing condition and the natural values of the river and its associated land areas are maintained. This action will have two primary effects. Designating the river will preclude federally licensed or assisted water development projects and other incompatible developments within the corridor, and will also increase recreation use and the attendant visitor impacts.

Impact on Mineral Resources

Designating the river will have a different impact on the area classified wild than it will on the scenic and recreational segments. Except for valid existing claims, the federal lands in the "wild" segment (Westwater Canyon) will be withdrawn from mineral entry under the mining laws and operation under the mineral leasing laws. About 4,000 acres (1,620 ha) of steep canyon terrain will be affected.

Existing valid claims in this area will be purchased or made subject to regulations written by the BLM during the management planning period. These will safeguard the river's values by requiring screening, reclamation, and other measures. Invalid claims in this area will revert to the federal government without compensation to the holder.

Since there are no known mineral reserves in the wild segment, withdrawing the area and instituting regulations are not expected to have any significant impacts.

Scenic and recreational river areas are open to mineral entry and leasing, but both exploration and extraction are subject to Secretarial regulation to preserve the river environment. As with wild river areas, unpatented claims revert to the federal government if mineral value cannot be proven.

The regulations designed to preserve the river's outstanding values will add slightly to the cost of exploration and extraction in the scenic and recreational river areas. Those areas may contain possible potential resources of U_3O_8 and V_2O_5 (100,000 to 150,000 pounds or 45,500 to 68,200 kg U_3O_8 and 280,000 to 420,000 pounds or 127,300 to 191,000 kg V_2O_5) near the confluence of the Colorado and Dolores Rivers. Small deposits may also exist near Loma, Colorado. The amounts of these minerals in the corridor are so limited that the impact on their extraction should be insignificant. Gold, oil, gas, and coal are also found in very limited quantities, and impacts on their extraction should not be significant.

Impact on Land Use

Land use practices on federal lands in the corridor (about 70 percent of the total) that would have an adverse effect on river values will not be allowed or will be subject to regulation. Grazing is the primary use on public lands; it will not be affected by designation. The same is true for state lands in the corridor (about 10 percent of the total).

Scenic and/or public use easements may be required on about 5,350 acres (2,160 ha) of private land to provide access and to protect

the wildlife, geologic, cultural, and scenic values of the corridor. Since this is primarily agricultural land, the easements will not significantly alter present land use. However, they will preclude any future developments (homesites, resorts, junkyards, etc.) that would degrade river values. Since such developments are unlikely, this impact is not expected to be significant.

Impact on Water Resource Development Projects

Federally licensed or assisted water resource development projects in the corridor that would diminish the existing scenic, recreation, fish and wildlife, and other values of the river area will be prohibited. Federally licensed or assisted projects upstream could be built if the Secretary of the Interior finds they do not unreasonably diminish the values for which the river is designated. As indicated in chapter III of the study report, the Federal Energy Regulatory Commission (FERC) has identified the Dewey site, located approximately 2 miles (3.2 km) downstream from the confluence of the Colorado and Dolores Rivers, as a potential location for a hydropower dam. This project would back water into both the Colorado and Dolores River study areas. Although at present there is no interest in developing this site, designation of the Colorado River would preclude further consideration of development.

The effect of the proposal on the Industrial Resources conditional decree for a reservoir and other structures in segment A (see chapter III) requires some discussion. The Colorado River contains endangered fish, as described in chapter III. Before the BLM could grant a permit for the construction of the reservoir, a consultation with the Fish and Wildlife Service would have to be held to determine whether the reservoir and the other facilities would adversely affect these fish. Since reservoirs and substantial decreases in flow (the decree involves 320 cfs ($9\text{ m}^3/\text{s}$) of the

normal base flow of about 3,200 cfs or $90 \text{ m}^3/\text{s}$) have previously been found to affect the fish adversely, it seems probable the Fish and Wildlife Service would invoke the provisions of the Endangered Species Act of 1973, which does not allow federal agencies to aid measures which adversely affect endangered species or their habitat. If so, the BLM would not issue the permit, and portions of the project would be precluded. In such a case, any impact on the project could not be ascribed to this proposal.

If, however, the Endangered Species Act were nullified, if it were found that the reservoir would not adversely affect the fish, or if an exception were granted under the recent amendments to the Endangered Species Act, then designation under the Wild and Scenic Rivers Act would not permit construction of the project. The BLM, under section 7(a) of the Wild and Scenic Rivers Act, would not be able to issue a permit for the construction of the mainstream reservoir due to its adverse affect on the values for which the river had been designated.

The portions of the project which lie upstream from the study area (the diversion of 2,020 cfs or $57.2 \text{ m}^3/\text{s}$ for a thermal generating plant) would probably be unaffected by designation. Although only limited information on the operation of the diversion was available, the study team felt that its consumptive use (20 cfs or $0.57 \text{ m}^3/\text{s}$) would not affect the river's values, and that higher temperatures in the return flow would not significantly affect the river's temperature. If it is later found by the Secretary of the Interior that this portion of the project would unreasonably diminish the values for which the river had been designated, these upstream portions of the project would also be precluded as an impact of the proposal. If this project is precluded, unknown amounts of water and the goods and services produced by applying the water to beneficial use, would not be generated. A definitive statement of these impacts cannot be made until definite project plans are made.

Therefore it seemed probable that preventing the construction of the reservoir is an impact of existing law and management authorities. If conditions change as described above, preventing the construction of the reservoir will be an impact of designation of the Colorado River. As another consequence of designation, the reclamation and powersite withdrawals on the public lands in the corridor would be lifted.

Other existing valid water rights in the corridor will not be affected by the proposal.

Impact on Recreation

Including the Colorado River in the National Wild and Scenic Rivers System is expected to result in a greater increase in recreation use and the associated impacts than that which would occur without designation. With the proposal, the use of the river in 1976 (about 16,550 recreation days) is expected to increase to about 37,750 recreation days by 1990 (see Table VIII-I). Of this total, 4,500 recreation days, an increase of about 13 percent, would be the result of river designation, and 33,250 recreation days would be the expected increase without the publicity attendant on designation. Boating, with associated camping and picnicking, constitutes the sole projected increase.

To accommodate the use expected by 1990 with designation, the BLM has plans to develop boat launching, camping, parking, and sanitation facilities. The expected 13 percent increase in use resulting from designation would require the expansion of the Dewey boat ramp facilities with a 5-unit campground. This will occupy about 1 to 2 acres (0.4-1 ha). Development and use of these five units will have minor impacts on soil, vegetation, wildlife, and water quality. Construction will disturb the soil, vegetation, and small animals on

portions of the land and may result in slight erosion. After construction, continued use of the area would result in some soil compaction, some loss of vegetation, disturbance of wildlife, and water pollution from erosion and human waste disposal. These impacts will be insignificant.

The Loma launch site will also be rehabilitated under the proposal. About 1 to 2 acres (0.4-1 ha) will be affected in this area. Impacts will be similar to those described for the Dewey facility mentioned above, but there will be a very slight improvement in water quality from the installation of a vault toilet.

The 13 percent increase in recreational use of the area will increase the probability of encounters between recreationists. This would decrease the sense of solitude available, possibly replacing recreationists oriented toward solitude with more socially oriented river runners. This is not expected to be a significant impact.

Impact on Economic and Regional Development

Recreationist expenditures will increase \$63,000 above those predicted to occur in 1990 if no action is taken under this study. Recreational facility development under this plan would cost \$38,000, and would necessitate annual costs of \$6,900, of which \$1,500 would be for Annual Operations and Maintenance (AO&M). This plan will increase the costs of extracting the approximately \$134,000 worth of uranium and vanadium in Segment D, near the confluence with the Dolores. It will generate approximately \$40,000 in increased regional income from recreationist expenditure and federal recreation development costs.

Impact on Social Well-being

The availability of recreational opportunities will increase somewhat; the recreation environment will be legally preserved, generally maintaining the quality and diversity of the recreational experience. The 13 percent increase in recreation above that which is predicted to occur without designation will diminish solitude, increase the probability of encounters between recreationists, and consequently repel wilderness-oriented boaters while attracting more socially-oriented recreationists.

The increased regional income will provide about five additional man-years of labor, primarily in the service and construction industries. The social environment will not otherwise be affected by the proposal.

Other Impacts

The 13 percent increase in recreation use will result in proportionate impacts on soils, vegetation, wildlife, water quality, and cultural features. Soils will be compacted in camps and along informal trails; this will interfere with the regeneration of certain types of vegetation, such as cottonwoods, and will cause small increases in erosion.

Dead wood in certain camps will probably be burned in campfires. Slight decreases in water quality due to erosion and irresponsible disposal of human wastes will occur. Recreation developments will mitigate these impacts. In Westwater Canyon these impacts will be negligible, since most of the camps are below the high water mark. In other segments about 10 acres (4 ha) will be involved. Most of these impacts will be caused by increased use regardless of designation; the amount caused by designation will constitute a minor increase.

TABLE VIII-I

IMPACT OF THE PROPOSED ACTION ON PROJECTED VISITATION
(in visitor days)

RIVER	ACTIVITY	PRESENT USE (1976)	PROJECTED USE EXISTING MANAGEMENT	PROJECTED USE WILD RIVER PROPOSAL	IMPACT OF RIVER PROPOSAL
<u>Colorado</u>	Boating	14,800	31,500	36,000	4,500
	Fishing	1,150	1,150	1,150	
	Hunting	600	600	600	
	TOTAL	16,550	33,250	37,750	4,500
<u>Dolores</u>	Boating	500	4,500	7,560	3,060
	Fishing	300	300	300	
	Hunting	200	200	200	
	TOTAL	1,000	5,000	8,060	3,060
	GRAND TOTAL	17,550	38,250	45,800	7,560

Increased use may result in an increase in vandalism of historic and archeologic sites in the corridor. However, features worthy of preservation will be identified and protected according to the provisions of the National Historic Preservation Act of 1966.

One suspected active eyrie of the American peregrine falcon has been identified in the Westwater Canyon vicinity. Increased river use would not pose a threat to this species unless hikers were to get too near the eyrie; this is unlikely. The bald eagle is apparently present year-round, though no eyrie has been found. Most are present in the winter when little recreation takes place, so no impact is expected. The endangered humpback chub and Colorado squawfish will not be affected by increased use.

Routine maintenance of the Denver and Rio Grande Western trackage would not be affected by this plan. Improvements to the line which adversely affect the river's values or impeded its free flow substantially would either not be permitted or would have to be modified to diminish their impacts.

The expected 13 percent increase in recreation use will produce a concomitant increase in auto emissions and fugitive dust from unpaved access roads, above the levels projected for the No Action Plan.

DOLORES RIVER

Including 31 miles (49.9 km) of the Dolores River and the 11,900 acres (4,820 ha) that comprise its immediate environment in the National Wild and Scenic Rivers System will, by affording statutory protection, ensure the river's free flowing and outstanding natural values will be maintained.

The principal impacts of inclusion in the National System will be to preclude federally-licensed and assisted water development projects and other incompatible developments in the corridor and to cause increases in recreation use.

Impact on Mineral Resources

Subject to valid existing claims, designation of the 6-mile (9.6 km) "wild" segment will result in the withdrawal of federal lands within $\frac{1}{4}$ mile (400 m) of the banks from all forms of appropriation under the mining laws and operation under the mineral leasing laws. The actual boundaries of the corridor will be determined during management planning, but the area involved averages one-half mile (0.8 km) in width and includes about 1,900 acres (770 ha). Existing valid claims in the "wild" river area will be subject to regulations to preserve the present river values.

Prospecting and extraction of minerals found in the "scenic" segments will be allowed to continue under regulations that will be developed by the BLM as part of their management planning. These regulations will be designed to allow extraction, while at the same time protecting the river values through reclamation, screening, and other requirements.

These regulations will increase the cost of any mining that takes place and thus make mining in this area less probable. This impact is not expected to be significant since deposits of uranium and vanadium in the Uravan Belt are found primarily on Beaver Mesa, south of the "wild" segment and southeast of the "scenic" segments. The mesa is outside the "wild" river corridor that will be withdrawn from mineral entry, so it will not be affected. Although some placer mining for gold has taken place in the corridor, no other minerals are known to exist in significant quantities along the Dolores River.

Future prospecting and mining of gold will be precluded in the "wild" segment and subject to regulation in the "scenic" segment. The small quantities removed in the past suggest that future prospecting for gold should not either be extensive or very successful; impacts should not be significant.

Gravel mining in the Gateway area may be precluded or require screening.

Impact on Land Use

Land use practices on federal lands in the corridor that would have an adverse effect on river values will not be allowed or will be subject to regulation by the BLM. Grazing and mining are the primary land uses on public lands in the corridor. Designation should have no effect on grazing practices. The impacts on mining were discussed above.

Scenic and/or public use easements may be required on up to 1,640 acres (690 ha) of private land to provide access and to protect the wildlife, geologic, cultural, and scenic values of the corridor. Since this is primarily agricultural land, the easements will not significantly alter present land use. However, they will preclude any future developments that would degrade river values. As with the Colorado River corridor, developments such as homesites, resorts, and junkyards are not likely, so this is not expected to be a significant impact.

Acquisition of about 1 to 2 acres (0.4-1 ha) each at the Gateway and Lake Bottom sites would slightly alter land use patterns in the area.

Impact on Water Resource Development Projects

Federally-licensed or assisted water development projects that would diminish the existing scenic, recreation, fish and wildlife, and other values of the river area will be prohibited by designation. As discussed in chapter III of the report, there are no projects planned within the study corridor, although three--the Dolores Project, San Miguel Project, and Paradox Valley Salinity Control Unit--are under construction or planned upstream. Only development of the Dewey site, discussed in Chapter III, might directly affect the study area; FERC indicates no one has interest in developing the area at present.

If appropriate, the Secretary of the Interior will determine whether any of the planned projects, or their combination, would diminish the values of the study segment. Existing water rights (see table III-1 of the report) will not be affected by the proposal.

Impact on Recreation

Including the Dolores River in the National Wild and Scenic Rivers System will produce a greater increase in recreation and the attendant impacts than that which would occur without designation.

The estimated 1976 use of the river was about 1,000 recreation days (see table VIII-1). With designation, recreation use is expected to increase to about 8,000 recreation days in 1990. This is about 3,000 more than would occur with the no action alternative. Boating and associated picnicking and camping would constitute the total projected increase. To accommodate this use, five additional campground units would be developed at Lake Bottom, and improvements to the Gateway launch area would be made.

These increases in recreational use would diminish solitude and perhaps favor use of the river by more socially-oriented recreationists than at present. The recreation environment would be least degraded under this plan.

Economic and Regional Development Impact

Recreationist expenditures will increase \$43,000 annually (63 percent) by 1990. This plan will cost \$26,000 for recreational developments and \$7,100 annually. Regional income generated from recreationist expenditures and federal recreational development is expected to increase \$28,000 by 1990. The increase in regional income will support an additional four man-years of labor in the region primarily in the service industries.

Impact on Social Well-Being

The availability of recreational opportunities will increase, and the quality and diversity of the recreational experience will be preserved. The social environment will otherwise remain as it is now.

Other Impacts

Increased use will result in an increase in impacts on soils, vegetation, wildlife, and cultural resources.

Impacts on soils and vegetation will be concentrated around the campgrounds, boat ramps, and other stopping points along the river. Since most stopping points are located on gravel bars, they should not be significantly affected. Some soil compaction and

erosion, loss of vegetation, and disturbance of wildlife will occur near the boat ramps and campgrounds, but due to the small area involved (1-2 acres or 0.4-1 ha) at both Gateway and Lake Bottom and the short boating season, regeneration periods will be longer than on the Colorado. Thus these impacts should not be significant.

Increased use will also result in increased vandalism of historic and archeologic sites near the river if these sites are not adequately protected. However, it is expected that features eligible for the National Register will be identified and protected according to provisions of the National Historic Preservation Act of 1966. Even with protection, some impacts to these sites may occur.

Impacts at these sites should be less significant than at those along the Colorado, since the Dolores River sites have less attraction value.

The endangered bald eagle is generally present along the river during the winter months. Recent sightings in the spring and early summer indicate that there may be an active bald eagle nest in the area of the confluence of the Colorado and Dolores Rivers. However, this has not been confirmed. Since little recreation occurs in the winter, the bald eagle would not be affected unless an active nest does exist, and then only if hikers were to get too close to the nest.

The increase in recreation use, about 60 percent more than the no action levels, will cause proportional increases in auto emissions and fugitive dust.

C H A P T E R I X

M I T I G A T I N G M E A S U R E S A N D

U N A V O I D A B L E A D V E R S E I M P A C T S

O F T H E P R O P O S E D A C T I O N

This chapter describes the measures designed to mitigate the adverse impacts resulting from the proposed action, and the residual adverse impacts which cannot be avoided or mitigated. The mitigating measures will be included in the management plans which will be prepared following designation.

MITIGATING MEASURES

1. The plans will provide for monitoring human use of the area, and will either establish, or provide for the eventual establishment of, visitor use levels which are consistent with preserving the outstanding values for which the rivers are designated.
2. New facilities planned for the Dewey boat ramp will be designed and sited so as to produce the least soil compaction, erosion, and disturbance of vegetation and wildlife. Areas disturbed in construction will be reseeded.
3. To reduce land and water pollution, river floaters will be required to use portable toilets or otherwise containerize wastes on trips requiring overnight camping. Vault toilets will be installed at developed areas. A program of "take out what you take in" will be instituted to reduce littering. If this proves ineffective, then cans, bottles, and other non-burnable containers will be prohibited in the river corridor.

4. Protective measures will be implemented to reduce the threat of fire. This will involve limiting the use of open fires, designating specific areas where open fires will be permitted during periods of high fire risk, or requiring the use of stoves. The plans will provide that driftwood, not deadfall, will be used in campfires.
5. Protective steps will be taken involving the habitat of the American peregrine falcon, the bald eagle, and other threatened or endangered species. These protective administrative actions may include, for example, restricting human encroachment on the habitat of such animals during sensitive periods of their lives, such as the nesting seasons of the endangered birds.
6. Historical and archeological sites eligible for the National Register will be provided appropriate protection. This action will be initiated early in the detailed planning process. As master planning progresses to a more specific state, the criteria of "Effect" as stipulated in section 106 of the National Historic Preservation Act will be applied. All activities that affect cultural resources will follow the procedures outlined under section 106 of the National Historic Preservation Act. Some sensitive sites may be closed or their locations kept confidential.
7. Key scenic and geologic sites will be identified so as to provide adequate protection.

UNAVOIDABLE ADVERSE IMPACTS

Even after the mitigating measures stated above, some unavoidable adverse environmental impacts will result from including the Colorado and Dolores Rivers in the system.

Increased numbers of people visiting the Colorado and Dolores Rivers annually will require regulations designed to protect the environmental values of the area. These regulations potentially will limit use and the distribution of use, causing a loss of personal freedom to go where, when, and how a person might otherwise desire.

The increases in litter, pollution of water and air, and noise caused by increased visitation, especially at the developed sites, will not be fully mitigated. These impacts will not be significant.

Substantial future diversions of water within the Colorado and Dolores River corridors, and any future diversions or water projects upstream from the two river areas which require federal licensing or assistance, will be foregone if the Secretary of the Interior determines they will unreasonably diminish existing scenic, recreational, fish, and wildlife values within the proposal area.

Mineral exploration and development within the withdrawn area of the wild river segments of the two rivers would be foregone. Since no mineral reserves are known or estimated in these segments, this is not expected to have a significant impact on national or regional energy development programs.

Losses of ground cover (primarily shrubs and grass), wildlife habitat for small mammals, displacement and loss of some small mammals, birds, reptiles, and amphibians will occur during and after construction of recreation facilities on a portion of the 10-acre (4 ha) development sites at Dewey and Loma launch sites, and Lake Bottom campground. These impacts are not considered to be significant.

The increased threat of wildfires resulting from more people in the proposal areas will not be fully mitigated.

Future federal-aid highway construction which would have an adverse impact upon the wild and scenic rivers would be subject to section 4(f) of the Transportation Act and would be discouraged. Future highway improvement proposals, therefore, might involve less convenient and more expensive routing. At present no future improvements are predicted that would be affected by the proposal.

Although historic and archeologic sites will be protected under existing federal Laws, a limited amount of vandalism and destruction will continue to occur. These impacts will be proportional to the increases in recreation attributed to the proposal--13 percent on the Colorado and 60 percent on the Dolores.

CHAPTER X
RELATIONSHIP BETWEEN SHORT-
TERM USE OF THE ENVIRONMENT
AND LONG-TERM PRODUCTIVITY;
AND
IRREVERSIBLE OR
IRRETRIEVABLE COMMITMENTS
OF RESOURCES INVOLVED IN
THE PROPOSED ACTION

By designating segments of the Colorado and Dolores Rivers as components of the National Wild and Scenic Rivers System, their outstanding values as free-flowing rivers will be preserved. There will be no major physical changes to the environment, and no resources will be irreversibly or irretreably committed (the 5-unit campground proposed in the Dewey Bridge area, the Loma and Gateway launch site improvements, and the access easements at Utah Bottoms, are reversible actions).

The proposed action will devote the natural resources of the area to preservation rather than development; their long-term productivity will remain unimpaired, in case Congress should later find it in the national interest to reverse the designation.

Existing short-term uses of the area will not be affected by the plan. In the wild segments, short-term gains from removing mineral resources that are not covered by valid existing claims will be foregone, but since the geology of these areas makes finding significant minerals very unlikely, the loss of this potential is probably insignificant. The regulations issued by the Secretary of the Interior to safeguard the river corridor in other designated segments may make mineral extraction more expensive and thus lessen short-term gains.

C H A P T E R X I
A N A L Y S I S O F A L T E R N A T I V E S
A N D T H E I R I M P A C T S

In 1971, the Water Resources Council developed and tested a procedure for generating and evaluating alternative plans for water and the related land resources. This procedure was first known as multiple objective planning, since it required planners to create alternative plans for two equally-weighted objectives - national economic development, and environmental quality. The process was published as an Executive Order in the Federal Register¹ under the title "Principles and Standards for Planning Water and Related Land Resources."

Wild and Scenic River designation is subject to these provisions, so Wild and Scenic River studies include a Principles and Standards analysis. This chapter presents a summary of the effects and impacts of four alternative plans for the Colorado River segments and four plans for the Dolores; the fifth plan for each river is the proposed action, and its effects have already been treated.

PLANNING PROCEDURE

Since a detailed description of the Principles and Standards procedure is included in appendix E, only a simplified description is offered here. The process is designed to offer those who make decisions affecting the rivers a basis for comparing different plans

1. "Principles and Standards for Planning Water and Related Land Resources," Federal Register Vol. 38, No. 184, Part III (Sept. 10, 1973).

and their consequences. It does this by producing a series of alternative plans whose effects are calculated or estimated and displayed in a system of four accounts: national economic development, environmental quality, regional development, and social well-being, so that with- and without-plan conditions can be compared.

Plans are made by selecting a resource in the area, and estimating the value of developing, using or preserving it on some selected date in the future. All such sums and the associated costs are totaled to produce the net economic benefit of that plan in the future, a figure which is then discounted using a rate specified each year by the Water Resources Council. Many of the plans have effects which cannot be quantified; preservation of some members of an endangered species is an example. When a table is produced that shows the effects of the various plans, these effects are described verbally.

ALTERNATIVE PLANS

The study team developed five plans for the Colorado segments and five for the Dolores. For each river a "no action plan" was made; these are baseline plans which represent the continuation of present management if no action is taken to implement proposals in this study. For each river a National Economic Development Plan (NED) was drafted which increases the output of selected goods and services, or the efficiency with which they are produced. For each river a series of Environmental Quality Plans (EQ) was generated; these all involve designation under the Wild and Scenic Rivers Act. The variation in these plans involves either (1) classifying one segment at a less restrictive level than it qualifies for, or (2) not designating one or more segments. This exercise is presented primarily to show the possibilities for lessening the impacts on the economics of mining.

TABLE XI-1. Impacts of Alternatives for the Colorado River

Description	No Action Proposal	Proposal	National Economic Development Option	Environmental Quality Option 2	Environmental Quality Option 3
Energy and Mineral Impacts	Present management authorities and actions assumed to continue. Study area used primarily for recreation, with grazing and some potential for mining if economic climate improves. Agricultural use of private land continues. Endangered Species Act probably prevents reservoir construction. Segment A, Gray - Valley Project improves water quality in study segments. Cultural features on or eligible for National Register receive protection. Recreation use doubles, most being in Segments A, C, and D.	River designation: Segment A - Scenic Segment B - Wild Segment C - Scenic Segment D - Recreational. BLM imposes regulations on mining and possibly limits recreational use to preserve river's values. Preservation of river's values becomes primary management goal. Authority to acquire or condemn scenic easements retained, but not exercised unless developments threaten river values.	No river designation - present management continues, but emphasis is on economic rather than environmental values when trade-offs arise. Greater levels of recreational use. Protection of endangered species precludes corridor water development.	River designation: Segment A - Scenic Segment B - Wild Segment C - Recreation al Segment D - Recreation al River values protected by designation and management to preserve them, but discretionary change in classification. Segment C allows less restriction on mining and private development and more recreation use.	River designation: Segment A - Scenic Segment B - Wild Segment C - Recreation al Segment D - Recreation al River values protected by designation and management to preserve them, but discretionary change in classification. Segment C allows less restriction on mining and private development and more recreation use.
Environmental and Land Use Impacts	No interference with mining. Possible extraction of 3,000 pounds U ₃ O ₈ and 8,000 pounds V ₂ O ₅ from Segment D if economic climate improves substantially. Very small likelihood of mining in Segments A and C, none in B.	Wild area (Segment B, Westwater Canyon) withdrawn but no impacts due to lack of resources. Regulations imposed to protect river values in Segments A, C & D raise cost of extracting about \$134,000 of vanadium and uranium, making mining less probable.	No interference with mining. Same as no action option.	Lowered classification and less restrictive environmental protection measures increase probability of mining in Segment C, but probability still is smaller than with no action and NED options.	No designation of Segments C & D produces no interference with mining in that area. Interference with mining unlikely in Segments A and B even with designation.
Water Resources Impacts	BLM requires about 10 acres of land for recreation, land use and ownership otherwise unchanged. Mining and increased recreation may produce undesirable impacts at stopping points and in Segment D.	Present land uses (grazing, recreation, agriculture) unchanged; mining regulated. Scenic and/or public access easements on up to 5,350 acres (2,180 ha) of private land may be necessary to prevent future land use changes that degrade river's values.	Same type of impacts as no action option, but greater by a factor of about 2. BLM installs many more facilities (see below), affecting about 40 acres plus a 6-mile (9.6 km) access road; these concentrate recreation impacts while producing impacts of their own.	Same as proposal, but scenic easements in Segment C, if any are required, are less restrictive than in proposal. Installation of sanitation facilities at Fish Ford disturbs about 1 acre (0.4 ha).	Same as proposal in upper segments, same as no action in lower.
Recreation Impacts	Increase in recreation use from 16,550 recreation days to 33,250 in 1990.	Increase from 1976 use of 16,550 recreation days to 37,750 in 1990.	Increase to 71,750 recreation days in 1990.	Increase to 39,750 recreation days in 1990.	Increase to 36,250 recreation days by 1990.
Recreation Facilities Planned	Improve Westwater boat ramp area and camp. Acquire and improve Rose Ranch boat ramp area. Improve Dewey Bridge boat ramp area, provide parking and sanitation.	Same as no action option but add Loma boat launch improvements and 5-unit camp at Dewey Bridge.	Same as proposal, but add larger developments and 20-unit camp at Loma, 10-unit camp at Blackrocks, 6.9 miles of trail in Segment A, 5 miles trail in Segment B, 10-unit river camp at Little Dolores, 20-unit camp, overlook and road at Skull Rapid, 10-unit camp and road at Fish Ford.	Same as proposal but add sanitation facilities at Fish Ford.	Same as proposal but subtract campground at Dewey Bridge.
Economic and Regional Development:					
Recreation Expenditure, 1990	\$459,200	\$ 522,400	\$899,700	\$ 550,400	\$ 501,300
Possible Easement Cost	0	\$2,140,000	0	\$2,140,000	\$1,676,000
Total Annual Costs, 1990	\$ 59,000	\$ 76,000	\$159,000	\$ 77,800	\$ 72,700
AO&M, 1990	\$ 55,600	\$ 57,100	\$109,000	\$ 58,100	\$ 56,000
Total Non-Annual Costs, 1990	\$159,000	\$ 223,300	\$560,300	\$ 233,300	\$ 196,300
Regional Income Generated, 1990	\$246,000	\$ 280,000	\$561,000	\$ 294,000	\$ 263,000
Social Impacts	Increased recreation opportunities but recreation environment possibly degraded by mining in Segment D. Some loss of solitude attracts more socially oriented recreationists. Social environment otherwise unchanged.	Increased recreation opportunities but recreation environment legally preserved. Diminished solitude may attract more socially oriented boaters. Social environment otherwise unchanged.	Large increase in recreation and possible mining in Segment D degrade recreation environment somewhat. Solitude considerably diminished, more socially oriented boaters replace present user types.	Same as proposal, with slight increase in recreation impacts. Slightly increased probability of mining in Segment C may, if actualized, somewhat degrade recreation environment there.	Same as proposal in upper segments, same as no action in lower.
Man-Years of Labor in 1990	38.7	43.8	87.6	46.2	41.5
Other Impacts	Increased recreation and facility construction produce soil compaction and erosion on about 25 acres (10 ha). Increased use and possible mining produce higher incidence of vandalism or destruction of cultural sites. Some disturbance of wildlife near facilities but no substantial impacts on endangered species. No impact on railroad.	Increased soil compaction and erosion on about 10 acres (4 ha) of stopping areas, boat ramps, attraction sites. Increase in use and vandalism of cultural sites. Routine maintenance of railroad unaffected, but improvements that degrade river's values precluded.	Same as no action option but much higher recreation use, and facility development approve immediately doubles recreation impacts under this option. Same as no action for mining and railroad.	Almost the same as proposal for recreation impacts on soils, wildlife, erosion, and water quality. Disturbance of about 1 acre (0.4 ha) for additional facility. Mining impacts slightly more probable in Segment C than with proposal, slightly less probable than with no action option. Railroad impacts same as proposal.	Same as proposal in Segments A and B; same as no action in Segments C and D.

The following pages describe the series of alternative plans for each river. The no action option is given first, both because it may be chosen at the conclusion of this study, and because it is a baseline against which the effects of other plans are compared. In making such comparisons, some confusion may result since the percentage increases of an activity are those above the levels in the no action plan, which in turn are percentage increases above current levels. For instance, recreation use on the Colorado is expected to increase 125 percent under the no action plan. It is expected, under the national economic development plan, to increase a further 116 percent in the same period. Thus the NED plan actually expects a level of use 4.33 times as great as at present (71,750 recreation days versus 16,500). The impacts of the plans are summarized on tables XI-1 and XI-3.

No Action Plan - Colorado River

This plan is a projection of what will happen in the Colorado River study area if no action is taken as a result of this study. The team assumed that current management authorities and policies will continue, without substantial and unforeseeable changes in direction or focus.

Existing land use and ownership patterns will continue essentially unchanged, barring the small changes in ownership that will result from BLM's proposed acquisition of lands for boat launching and takeout at Rose Ranch, which involves about 5 acres (2 ha). Private lands will continue to be used for crop production, with grazing and mining occurring on public lands.

Recreation use of the river is expected to increase from 16,650 recreation days¹ in 1976 to approximately 33,250 recreation days in 1990. The increase will be almost solely registered in boating and the associated camping and picnicking. To serve this increase, the Bureau of Land Management proposes, in its Management Framework Plan, to develop the following facilities:

Segment A: Westwater Ranger Station - improved boat ramp, camping facilities, ranger station, and access road.

Segment B: No development proposed.

Segment C: Rose Ranch - improved boat ramp with parking.

Segment D: Dewey Boat Ramp - sanitation, parking facilities, and boat ramp.

The extraction of U_3O_8 ² and V_2O_5 ³ ore in the segments C and D of the Colorado River and segment C of the Dolores River has

1. A recreation day is defined as an individual's participation in recreation activities for a reasonable portion of a 24-hour period. All recreation use and values thereof are given for recreation days in this analysis.

Figures for 1976 use are estimated for segments A, C and D; use figures for Westwater Canyon are known accurately due to the permit system used by the BLM.

2. U_3O_8 is an oxide of uranium and is the unit of measure in the uranium industry.

3. V_2O_5 is an oxide of vanadium. Vanadium is used in making some types of steel.

occurred in the past--50 tons (45.4 metric tons) have been mined since 1948. If the economic climate were to become more favorable, extraction could increase and would probably have an adverse effect on the recreation environment.

The endangered species of the area will continue to receive protection under the Endangered Species Act of 1973. For this reason, the mainstem reservoir planned by Industrial Resources, Inc., will probably not be built in segment A, since it is likely that a construction permit will have to be denied due to the impact of the reservoir and its 300 cfs ($8.5 \text{ m}^3/\text{s}$) diversion on the fish (see discussion in chapter VII). Upstream portions of the project may be built, and will probably not have an adverse impact on the endangered fish.

The Grand Valley Project will be completed upstream and will reduce salt loading in the Colorado River by about one-third. If other upstream projects are completed, their impacts on the area will be minimal.

Energy and Mineral Impact. Ore containing 0.15 percent U_3O_8 and 0.42 percent V_2O_5 exists in the visual corridor in segments C and D. Assuming an optimistic selling price of \$42 and \$1 per pound, respectively, as much as 3,000 lb (1,360 kg) U_3O_8 and 8,400 lb (3,810 kg) V_2O_5 could be mined in these segments. At these prices the total potential value of U_3O_8 and V_2O_5 is \$134,000.

Although information on placer gold is very difficult to obtain, placers were actively worked from late in the 19th century until 1942. During this period, total production was approximately 1,500 troy ounces (47.62 kg). Since the gold is very finely divided and shows little tendency to form rich pay streaks, recovery has been difficult and the operations relatively unsuccessful. Therefore, although placer activity will probably continue along the Utah

portions of the Colorado and Dolores Rivers, gold mining is not expected to have a significant adverse effect on the recreation environment of the study area.

Environmental and Land Use Impact. Existing land use trends will continue and will not be significantly affected. The BLM will purchase land near Rose Ranch to develop boat ramps and associated facilities. This purchase, comprising about 5 acres (2 ha), would not significantly impact land use patterns along the river. Preservation of the river environment is expected to improve in the future, due to the increased sanitary facilities and river management activities planned. Preserving the endangered species will also tend to protect the river environment. Increasing production of U_3O_8 and V_2O_5 in the lower corridor will adversely affect the scenery in that area.

Impact on Water Resources. Completion of the Grand Valley Project will have a beneficial effect on the river, especially in the Lower Basin, by reducing the salt concentration in and below the study segment.

Increased recreation use will produce some minor attendant impacts on water quality resulting from soil compaction and erosion and from human waste disposal. These will be most significant at the development sites. However, new or improved boat ramps, campgrounds and sanitation facilities should eliminate or moderate most of these potential impacts.

Mining activity, particularly for uranium and vanadium, near the confluence of the Colorado and Dolores Rivers, will also result in some degradation of water quality. BLM management and existing water quality laws should prevent this from becoming a significant impact.

The effect of Industrial Resources mainstem reservoir in Horsethief Canyon on endangered fish will probably prevent the BLM from issuing a construction permit for the project. Upstream portions of this project and others will probably have minimal effect on the area, if they are constructed.

Impact on Recreation. The 100 percent increase in recreation days, by 1990, when coupled with increased mining activities along the river, could degrade the corridor. BLM is expected to continue to manage the river primarily as a recreation resource and should protect the river corridor from any significant adverse impacts. An increase in the exploration and extraction of uranium and vanadium could result in a significant loss of recreation values near the confluence, and perhaps at the upper end of the corridor. This in turn could repel some users, while attracting a different, more socially-oriented type of recreationist.

Economic and Regional Development Impact. The anticipated increase in recreation use will result in increased on-site recreationist expenditures of approximately \$259,000, more than half the expected total 1990 on-site recreationist expenditures (about \$459,000).

The recreation developments are expected to cost \$159,000. Total annual administration, operation, and management cost (AO&M), including a 25-year sinking fund, are expected to increase by about \$57,200 as a result of increased recreation use. Regional income generated from recreationist expenditures and federal recreation development is expected to increase \$299,000 by 1990. The gross income of outfitters operating on the Colorado River in 1977 was approximately \$250,000. The increased regional income will provide for an additional 39 man-years of labor primarily in the service and construction industries.

Social Impact. Under the no action plan, social, cultural, and recreational opportunities will remain similar to those available at present. The life, health, and safety components of the social well-being account should remain unaffected.

Other Impacts. Increased recreation use will result in an increase in soil compaction and erosion, disturbance of wildlife, and loss of vegetation. Development of new facilities will result in short-term impacts on soils, vegetation, and wildlife on about 25 acres (10 ha). However, the new or improved boat ramps, campgrounds and sanitation facilities will control most such impacts, possibly reducing long-term impacts on the resources. The protection afforded threatened or endangered fish and wildlife species will continue.

Increasing recreational use and mineral prospecting in the area will increase the likelihood of vandalism and removal of artifacts at unprotected historical, archeological and paleontological sites. It is anticipated that cultural features on public lands will be identified and protected according to the National Historic Preservation Act of 1966.

The approximate doubling of recreation use will produce a similar increase in auto emissions and fugitive dust from unpaved access roads, by 1990.

This plan would have no effect on the ability of the Denver and Rio Grande Western Railroad either to maintain its trackage or to make improvements.

National Economic Development Plan - Colorado River

There is little that federal or state governments can do to promote maximum economic growth within the study area beyond that which is already expected under the No Action Plan. Since the greatest economic resource in the visual corridor is the provision of recreation services,⁴ this alternative increases the output and the efficiency of recreation services. It results in diminished environmental values if the environmental values conflict with economically beneficial objectives.

Energy and Mineral Impact. This plan would not interfere with any potential energy or mineral development.

Environmental and Land Use Impact. Although recreation use in the visual corridors of the study rivers will double, facilities and management would minimize most adverse environmental impacts, so most of the high quality recreational environment would be preserved. Land use and environmental impacts will be those described under the No Action Plan, except that species sensitive to human disturbance may withdraw from the vicinity of camps, or even from the visual corridor.

Water Resources Impact. This option will have no effects on upstream water resource development projects; the Endangered Species Act should prevent construction of the dam in Horsethief Canyon.

4. The total, one-time potential value of extracting uranium and vanadium oxides from the corridor is \$134,000, which is less than 30 percent of the projected value of one year's expenditures by recreationists in 1990.

Recreation Impact. This alternative results in an expansion of recreation services to provide for a total of 71,750 recreation days of use, an increase of 38,500 recreation days or 116 percent over that shown in the No Action Option.

Facilities needed to serve this level of recreation use include:

Segment A: Loma - 20-unit campground, sanitation facilities, and upgraded road. Blackrocks--10-unit campground. Rattlesnake Canyon--10-unit campground. Mee Canyon--2 to 3 mile (3-5km) trail. Knowles Canyon--2-3 mile (3-5km) trail.

Segment B: Little Dolores--10-unit campground and a 5-mile (8 km) hiking trail. Canyon overlook at Skull Rapid--10-unit campground with road access.

Segment C: Fish Ford--10-unit campground with access road.

Segment D: Dewey Boat Ramp--5-unit campground with sanitation facilities.

Economic and Regional Development Impact. The anticipated increase in recreation use described under recreation impacts will result in an increase of \$540,000 (118 percent) in on-site recreationist expenditures over current expectations for 1990.

Recreation developments will cost \$431,300. An increase of \$60,400 for annual administration, operation and management costs (AO&M), including a 25-year sinking fund, is also necessary to accommodate the increased recreation use.

Regional income generated from recreationist expenditures and federal recreation development is expected to increase \$315,000 by 1990 as a result of this option. The increased regional income will provide for an additional 54 man-years of labor primarily in the service and construction industries.

Social Impact. The primary effect of this plan on social well-being is an increase in the gross amount of recreation opportunities available in the study area. By decreasing the quality of the environment, attracting more use, and using recreation lands more extensively, the quality of the experience will be somewhat degraded. To a large extent solitude will be lost, along with the opportunity to view shyer wildlife species. Recreationists oriented toward more crowded, social, non-wilderness experience will tend to replace current users.

Other Impact. Increased recreation use will result in an increase in soil compaction and erosion on about 40 acres at new facility sites; these increases will be largest during construction and will taper off afterward. Some wildlife species will be displaced during construction and use of the facilities, and will be partly replaced by more human-tolerant species. Construction of the access road to the canyon overlook at Skull Rapid will disturb soils and vegetation and wildlife throughout its approximate 6-mile (9.6 km) length. Some filling, cutting, and blasting will be required.

Construction of 11 miles (17.7 km) of hiking trails at Mee, Knowles, and Little Dolores Canyons would disturb soils and vegetation. Increased human use of the remote areas up these side canyons would result in disturbance of wildlife, particularly in the spring and summer months.

While endangered species in the area will continue to receive protection, it is possible that the large increases in recreation use will disturb the peregrine falcon and bald eagle.

The postulated increase in recreation under this plan would cause a proportionate increase in vandalism and theft at historical, archaeological, and paleontological sites, although the features eligible for the National Register would be identified and protected under the National Historic Preservation Act of 1966.

The 116 percent above the No Action Plan levels will proportionately increase auto emissions and fugitive dust.

This plan would not effect either maintenance or improvements of the railroad in segment A.

Environmental Quality Plans

Three environmental quality (EQ) alternatives are presented for the Colorado River; all involve some designation of the study area under the Wild and Scenic Rivers Act, and thus offer protection to the outstandingly remarkable values of the river area.

EQ Plan 1 - Colorado River. Plan 1 is the recommended plan for the Colorado River; its effects and impacts have been discussed in chapters VI and VIII.

EQ Plan 2 - Colorado River. Under EQ alternative 2 the Colorado River would receive the following classification:

<u>Segment</u>		<u>Classification</u>
Segment A	27.7 miles (44.3 km)	Scenic
Segment B	13 miles (21 km)	Wild
Segment C	11 miles (16 km)	Recreational
Segment D	4 miles (6.4 km)	Recreational

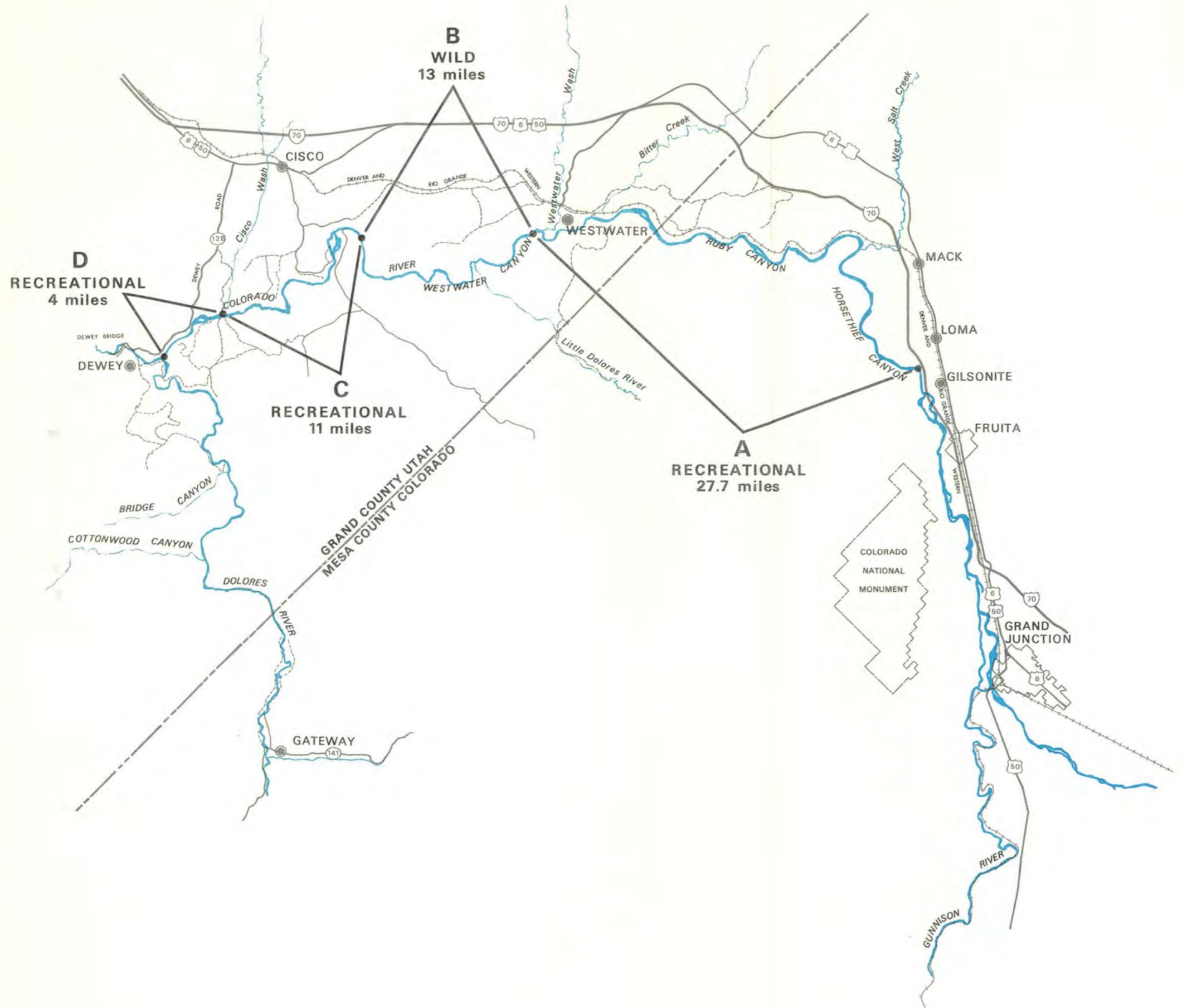
The change in classification from scenic to recreational in the lower segments would have two main results. First, it would place less restriction on mineral exploration and development within these two segments since regulations regarding extraction would presumably be less restrictive. Second, by 1990, recreation use is expected to increase 6,500 recreation days (19 percent) beyond the amount described in the No Action Plan, or about 2,000 more recreation days than in EQ Plan 1, to a total of approximately 39,750 recreation days in 1990.

This use would require a five-unit campground at Dewey boat ramp, rehabilitation of the Loma launch site, and additional sanitation facilities at Fish Ford. By changing the classification of segment C to recreational, this option will allow the river corridor to be degraded slightly more, by recreation and mineral extraction, than EQ Plan I would, while still applying legal protection to the area.

Energy and Mineral Impact--The classification of segment C would presumably allow the Secretary of the Interior to issue less restrictive regulations governing mineral extraction, so long as the outstandingly remarkable values of the area were preserved. This would lower the cost of mining, so there would be a higher potential for it to occur.

Environmental and Land Use Impact--By increasing the potential for mineral extraction and recreation use, but retaining some environmental safeguards, the possibility of deleterious environmental and land use impacts is increased, but the impacts will be similar to those described in chapter VIII for the proposed action.

Water Resources Impact--This alternative would have the same effects on water resource development projects as the proposed action; impoundments in the designated area would be prohibited,



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
PLAN 2 - COLORADO RIVER

— GRAVEL ROAD
- - - JEEP ROAD

1 5 0 1 2 3 4 miles
1 5 0 1 2 3 4 5 kilometers



and upstream developments that unreasonably invaded the area or diminished its values could not receive federal licensing or assistance. The data furnished on upstream projects on the Colorado indicates they would apparently not diminish the river values, so this impact would be insignificant. Like the proposed action, this plan would forbid construction of the dam in Horsethief Canyon if the Endangered Species Act did not.

Impact on Recreation--An increase of 2,000 recreation days of use in segments A and C would necessitate additional sanitation facilities at Fish Ford and an additional five campground units at the Dewey boat ramp. Less restriction on mining activities is likely to cause a degradation of the scenic values and, thereby, adversely affect the recreation environment.

Economic and Regional Development Impact--Recreationist expenditures will increase \$91,000 annually (about 20 percent) by 1990. This option will cost \$41,000 for recreation developments and \$4,500 annually for AO&M. Annual regional income will increase \$48,000. The increase in regional income will support an additional eight man-years employment in the region.

Social Impact--Recreational opportunities will increase while the quality of the recreational environment is slightly decreased. Solitude will diminish.

Other Impacts--Increased recreation use and mineral exploration would cause a proportionate increase in impacts on soils, vegetation, fish and wildlife and cultural features; these will be concentrated in and around the developed sites. About 1 to 2 acres (0.4-1 ha) will be disturbed at Dewey to construct the additional five campground units and less than 1 acre (0.4 ha) at Fish Ford to build the additional sanitation facilities. After temporary increases, these new facilities would reduce the potential for impact

on soils and vegetation. Endangered and threatened fish and wildlife species will continue to be protected.

Any increase in mining activity along segments A and C will also disturb soil, vegetation and wildlife and perhaps lower water quality. Although these activities would be regulated by BLM, some degradation of the river values would probably occur.

Increasing recreational use and mineral extraction will increase the likelihood that historical and archeological sites will be vandalized, even though cultural features eligible for the National Register on public lands will be identified and protected according to the National Historic Preservation Act of 1966.

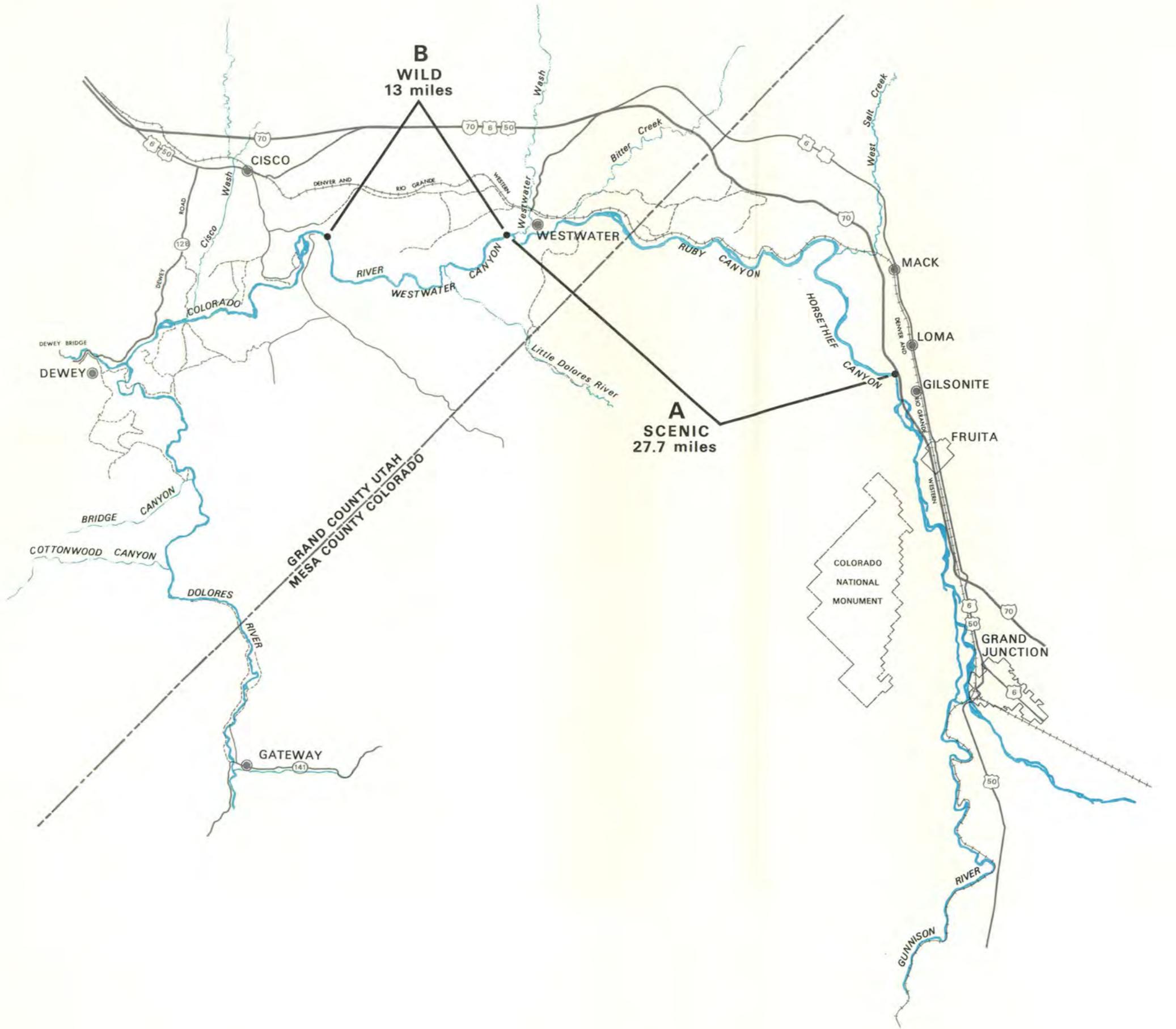
The 19 percent increase in recreation use above No Action levels would cause proportionate increases in auto emissions and fugitive dust from unpaved access roads.

This plan would affect the ability of the Denver and Rio Grande Western Railroad to improve their trackage in segment A, if the improvements adversely affected the values for which the river was designated; it would not affect routine maintenance.

EQ Plan 3 - Colorado River. Under plan 3 the Colorado River would receive the following classification:

<u>Segment</u>		<u>Classification</u>
Segment A	27.7 miles (44.6 km)	Scenic
Segment B	13 miles (21 km)	Wild
Segment C	11 miles (17.7 km)	No Designation
Segment D	4 miles (6.4 km)	No designation

This alternative would not affect mineral exploration and extraction, particularly for uranium and vanadium, in the area of the confluence of the Colorado and Dolores Rivers, since those



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY
PLAN 3 - COLORADO RIVER

— GRAVEL ROAD
- - - JEEP ROAD

N 1 5 0 1 2 3 4 miles
1 5 0 1 2 3 4 5 kilometers

segments would not be designated. The impacts of this alternative would be the same as for the proposed action except for those incurred in segments C and D.

Energy and Mineral Impact--This option is not expected to have any effect on potential energy and mineral developments.

Environmental and Land Use Impact--The loss of 11 miles (17.7 km) of scenic river characteristics and 4 miles (6.4 km) of recreational river characteristics might occur. Areas of natural beauty and environmental qualities will be preserved along 40.7 miles (65.1 km) of river.

Land use and ownership would remain essentially unchanged. Scenic and public use easements may be required on about 4,710 acres (1,900 ha) of private land in segments A and B. These lands are used as cropland or for grazing and the easements will not alter their present use.

Water Resources Impact--Although this plan would designate a shorter reach of river, its effects would be similar to those of the proposed action. This alternative would prevent the construction of the Horsethief Canyon dam planned by Industrial Resources, if it is not precluded by the Endangered Species Act. Since there is no interest at present in developing the Dewey site, discussed in chapter III, no other impacts on corridor development are predicted.

Recreation Impact--Recreation use will increase by 3,000 recreation days under this option; total use would be about 36,250 recreation days in 1990.

The increase would be expected due to the increased notoriety of the area after part of it had been designated. With the possible

TABLE XI-2. Effects of Plans for the Colorado River in 1980

ENVIRONMENTAL QUALITY PLANS													
Amount	Components	No Action Plan		National Economic Development Plan		PLAN 1		PLAN 2		PLAN 3			
		Total ²	NH ³	Total	Net	Total	Net	Total	Net	Total	Net		
NATIONAL ENVIRONMENTAL DEVELOPMENT OPTION	RECREATION USE ⁴	Boating	31,500	14,789	70,000	38,500	35,000	4,500	38,000	8,500	34,500	3,000	
	Fishing	1,164	1,164	0	0	1,164	0	1,164	0	1,164	0	0	
	Hunting	585	585	0	0	585	0	585	0	585	0	0	
	Total Ann.	33,248	16,358	71,749	38,500	37,749	4,500	37,749	8,500	36,749	3,000		
	Annual Recreational Expenditures ⁵	\$459,000	\$259,000	\$929,000	\$540,000	\$522,000	\$63,000	\$550,000	\$91,000	\$501,000	\$42,000		
	Annual Government Expenditures	\$ 69,000 ⁶	\$ 69,000 ⁶	\$ 85,000	\$ 69,000 ⁶	\$ 69,000	\$ 69,000	\$ 85,000	\$ 8,000	\$ 76,000	\$ 7,000		
	Household Income ⁸	\$348,500	\$198,000	\$449,500	\$295,000	\$46,500	\$416,000	\$67,800	\$362,500	\$14,100			
	MATERIALS AND ENERGY	One containing 15% U_3O_8 and 42% V_2O_5 occurs in the lower visual corridor. Since 1948 a total of only 50 tons of ore have been extracted. If the value of U_3O_8 were to increase to \$42/tb, 3,000 lb worth (\$12,000) could be economically extracted under either the No Action Option, National Economic Development Option, or Environmental Quality Option 3. Environmental Quality Options 1 and 2 would increase the cost of or preclude mining in the visual corridor, small amounts of very fine gold also exist in the visual corridor.											
	PRESERVATION OF FREE FLOWING STREAM	None guaranteed	None			13 miles - Wild River 38.2 miles - Scenic River 4 miles - Recreational River 55.7 miles - Preserved		13 miles - Wild River 27.7 miles - Scenic River 15 miles - Recreational River 55.7 miles - Preserved		13 miles - Wild River 27.7 miles - Scenic River No Recreational River Designation 40.2 miles - Preserved			
	PRESERVATION OF AREAS OF NATURAL BEAUTY	None guaranteed. Management priorities may dictate other uses.		Land preserved than under the No Action Option. Economic matters to take first priority under this plan. Some values may be lost.		Area of natural beauty preserved along 6.7 miles of river. Protection extended to 25,000 acres (10,000 ha).		Although areas of natural beauty are preserved along 55.7 miles of river, 11 of these miles which qualify as scenic river will only be preserved at the recreational river level of classification. Some protection extended to 25,000 acres (10,000 ha).		Area of natural beauty preserved along 40.7 miles of river. Loss of area of natural beauty likely along 15 miles of river. Protection extended to 18,300 acres (7410 ha).			
QUALITY	PRESERVATION OF CULTURAL RESOURCES	Federal and state laws protect sites. Some damage could occur to sites on private lands.		Higher levels of recreation use without additional money extended for protection could result in damage to sites.		Higher level of recreation use is offset by additional efforts for protection.		Higher level of recreation use is offset by additional efforts for protection.		Some resources of cultural value may be damaged in non-designated segments.			
	PRESERVATION OF FREEDOM OF CHOICE	Many options preserved.		Economically important options increase; preservation options decrease.		Preservation options increase. Potential for economic development decreases somewhat.		Preservation options increase in two segments. Potential mineral extraction could result in loss of freedom of choice for preservation in the other two segments.		Preservation options increase in two segments. Economic options increase in the other two segments.			
	AVOID IRREVERSIBLE OR IRRETRIEVABLE EFFECTS	Loss of scenic and recreational values possible. Economic values retained.		Greater loss of scenic and recreational values probable. Economic values retained.		Scenic and recreational values preserved. Some potential economic values lost.		Most scenic and recreational values preserved. Lesser loss of potential economic values the EQ Option 1.		Some scenic and recreational values preserved. Most potential economic values retained.			
	REGIONAL INCOME GENERATED ⁷	Net \$	Total \$ ⁸	NH \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	
	Servic Stations	27,000	54,000	27,000	30,000	3,000	32,000	5,000	29,000	2,000			
REGIONAL DEVELOPMENT	Other Retail	37,000	74,000	42,000	42,000	5,000	44,000	7,000	40,000	3,000			
	Eating and Drinking Places	54,000	118,000	65,000	62,000	8,000	65,000	11,000	49,000	5,000			
	Lodging	61,000	125,000	24,000	70,000	9,000	74,000	12,000	67,000	6,000			
	Other Services	7,000	14,000	7,000	8,000	1,000	8,000	1,000	7,400	400			
	Transportation	5,000	12,000	7,000	0,000	1,000	8,000	1,000	5,300	300			
	Contract Construction	55,000	148,000	93,000	82,000	7,000	85,000	10,000	55,300	300			
	Total	248,000	581,000	318,000	280,000	34,000	284,000	48,000	203,000	17,000			
	VALUE ADDED ⁹	Net \$	Total \$ ⁸	NH \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	
	Service Stations	32,000	65,000	33,000	38,000	4,000	37,000	5,000	34,000	2,000			
	Other Retail	51,000	109,000	58,000	58,000	7,000	61,000	10,000	55,000	4,000			
EMPLOYMENT-IMAN-YEARS	Eating and Drinking Places	67,000	148,000	61,000	78,000	9,000	81,000	14,000	73,000	6,000			
	Lodging	82,000	181,000	100,000	80,000	12,000	104,000	18,000	94,000	8,000			
	Other Services	11,000	21,000	10,000	12,000	1,000	13,000	2,000	11,600	600			
	Transportation	8,000	18,000	10,000	8,000	1,000	10,000	1,000	6,500	500			
	Contract Construction	89,000	182,000	114,000	77,000	9,000	81,000	13,000	68,300	300			
	Total	322,300	695,000	411,000	388,000	43,000	386,000	63,000	344,400	21,400			
	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net		
SOCIAL WELL-BEING	EDUCATIONAL, CULTURAL AND RECREATIONAL OPPORTUNITIES	Opportunities remain similar to those now. Protection assured only by management agency policy now.		If defered economically viable opportunities increase. Otherwise, opportunities and/or quality decrease. Probable increases in gross number of opportunities and decrease in quality.		Availability of opportunities increases. Quality of opportunities preserved.		Availability of opportunities increases. Quality of opportunities preserved on segments A & B and lost on the other segments C & D.		Availability of opportunities increases. Quality of opportunities preserved on segments A & B and lost on the other segments C & D.			
	LIFE, HEALTH AND SAFETY	Adverse health effects from potential uranium extraction may occur.		Adverse health effects from potential uranium extraction may occur.		This plan is neutral for this component.		Plan neutral for this component in segments A & B. Adverse health effects from potential uranium extraction may occur in segments C & D.		Plan neutral for this component in segments A & B. Adverse health effects from uranium extraction may occur in segments C & D.			
	INCOME DISTRIBUTION	Income to service, recreational supply, and construction industries increases.		This plan provides the greatest increase to service, recreational supply, and construction industries.		Income to service, recreational supply, and construction industries increases.		Income to service, recreational supply, and construction industries increases.		Income to service and recreational supply industries increase. No increase to construction industry.			

¹All recreational use and values are given in recreation days.²The total column under each option represents total expected recreation use or expenditures which will occur in the study area under that option by 1980.³The net column under each option is the expected net effect of implementing that option. Under the No Action Option, recreation is expected to increase by the year 1980 by the net amounts shown. The net increases represented under option 1-4 are all additional to the net increases shown under the No Action Option.⁴The values used in estimating annual recreation expenditures per recreation day (RD) were: boating - \$14.04/RD, fishing - \$7.90/RD, and hunting - \$15.00/RD.⁵Sources used for these values are: Midterm Interim Economic and Social Impact of Recreation or Reclamation Resources, University of Denver, March 1969; G. Freday, Chyn Phillips, Wyoming's Hunting and Fishing Resources, 1970, Division of Game and Economic Research, University of Wyoming, Laramie, August 1972; 1974 Colorado Big Game Harvest, Colorado Division of Wildlife, Denver, 1975; John Devine, "White-water Boating on the Dolores River - Final Estimates of Effects of Dolores Project on Boating," January 18, 1977 - Memorandum to File, Bureau of Reclamation.⁶Annual government expenses for each option include capital costs annualized over a 50-year period, a 25-year sinking fund, annual administration, operation, and management costs, and administrative costs for segment acquisition.⁷Household income is direct income generated to U.S. citizens from output of alternative actions.⁸Regional income generated is the portion of National Economic Development account expenditures which remain in the region.⁹Value added is the gross regional product.¹⁰Total \$ under each option is the sum of the total \$ for the No Action Option and Net \$ for each option.

loss of the outstanding qualities of the undesignated segments, a smaller increase than in the other options was expected. This relatively small increase could utilize existing recreation facilities with rehabilitation of the Loma launch site. Since 15 miles (24 km) of the Colorado River study area would not be protected by wild and scenic river designation, degradation of the recreational environment might occur.

Economic and Regional Development Impact--The additional 3,000 recreation days under this option would produce \$42,000 in recreationist expenditures. Recreation facilities associated with this use would cost \$18,000 and would necessitate additional AO&M of \$500. An increase of \$17,000 in regional income would be registered; this would support an additional three man-years of employment, primarily in service industries.

Social Impact--Recreational opportunities will increase, diminishing solitude slightly. Possible degradation of the lower two segments may increase crowding in segment A, where similar recreational opportunities exist, very slightly.

Other Impacts--The additional 3,000 recreation days of use in segments A and B attributable to this alternative would result in a proportionate increase in the impacts on soils, vegetation, fish and wildlife, and cultural features. Most impacts on soils, vegetation and wildlife would be near the developed boat ramps and campgrounds.

Threatened or endangered fish and wildlife species within the entire study segment would continue to be protected according to the Endangered Species Act.

Cultural features along the total river area would be identified and protected according to the National Historic Preservation Act of

1966. Mining activity in segments C and D could have some adverse impacts on soils, vegetation, and wildlife, and perhaps on cultural and paleontological resources. The degree of these impacts would depend on the amount of exploration and extraction that takes place.

The approximate 9 percent increase in recreational use above the No Action levels would cause proportionate increases in auto emissions and fugitive dust.

Routine maintenance of the Denver and Rio Grande Western trackage in segment A would not be affected by this plan; improvements to the line would be permitted if they did not diminish the values for which the river was designated.

No Action Plan - Dolores River

Under this alternative the 31-mile (49.9 km) portion of the Dolores River and the 11,900 acres (4,820 ha) in its corridor would not be included in the National Wild and Scenic River System; this alternative is thus a projection of what will happen in the Dolores corridor if no action is taken as a result of this study. The team assumed that current management authority and policy will continue without substantial alteration.

Existing uses of the land will continue--private lands will remain in crop production, and public lands will continue to be used for recreation, grazing, and mining, in the lower corridor.

The Paradox Valley Salinity Control Unit will be completed upstream from the study area, improving its water quality. The Dolores Project will be completed, depleting the annual flows in the study area by about 20 percent. Approximately 1,000 recreation days

TABLE XI-3. Impacts of Alternatives for the Dolores River.

Alternative and Description	No Action Plan: No river designation; present management continues. Study area used for recreation, grazing, agriculture and mining. Dolores Project and Paradox Valley Salinity Control Unit completed upstream. Cultural features eligible for National Register receive protection. Recreation use quintuples.	Proposal: River designation: Segment A - Scenic Segment B - Wild Segment C - Scenic Designation is at the level for which the river now qualifies. Issuance of mining regulations to protect Segment C in particular makes mining in that area less competitive and therefore less probable.	National Economic Development Plan: Similar to present management, but BLM encourages economic development by construction of recreation facilities and relaxing user limits if necessary. If trade-offs between environmental and economic values arise, economic concerns supersede. Greatest levels of recreation use.	Environmental Quality Plan 2: River designation Segment A - Recreation Segment B - Wild Segment C - Recreation Discretionary lowering of classification still protects river legally, but with less restriction on mining and private lands.	Environmental Quality River designation: Segment A - Scenic Segment B - Wild Segment C - No designation Alternative designed to protect upper, more scenic segments while allowing access to mineral rights in Segment C. Though undeveloped, Segment C is covered by river management plan for other segments and managed to assure continuation of desirable boating experience.
Energy and Mineral Impacts	No interference with extraction. Possible mining of 15,000 pounds (6800 kg) of U ₃ O ₈ and 42,000 pounds (19,000 kg) of V ₂ O ₅ . If economic climate improves substantially, Minerals almost wholly located in Segment C of corridor.	Same as proposal, but mining regulations to protect river values in Segment C raise costs of mining in that area, making it less likely to occur.	Same as no action option; no interference with extraction.	Same as proposal, but designation as less restrictive classification of Segment C still renders mining less competitive nationally. Effects about midway between EO1 and proposal in that area.	Cost of mining in scenic segment will be increased and thus become less probable. Designation of "wild" segment will result in the withdrawal of Federal lands within corridor from all forms of appropriation under mining laws and operation under mineral leasing laws. Designated segments lack minerals so impacts insignificant.
Environmental and Land Use Impacts	Existing land use and ownership continues, but BLM acquires about 5 acres (2 ha) at Utah Bottoms. If mining occurs in Segment C, locally severe scenic impacts will attend it. Recreation impacts at camping areas, stopping points, and side canyon trails are mostly insignificant, since areas are periodically flooded. No scenic easement acquisition.	Same as proposal in Segments A and B. Mining becomes less likely in Segment C, and recreation facilities concentrate impacts in all areas. Acquisition of Lake Bottom site impacts about 2 acres (1 ha). Scenic easements may be necessary on 1,640 acres (690 ha).	Same as no action, but provision of more facilities impacts about twice as many acres (about 10 acres or 4 ha) and large increase in recreation impacts, stopping areas more. No scenic easement acquisition.	Lowered classification in Segment A lessens restrictions on private development, which are not probable in any case. Landownership patterns remain about the same. Compared to the proposal, mining impacts on environment lessened. Scenic easements on 1,640 acres (690 ha) possibly necessary.	Designation should have no effect on grazing practices. Mining unaffected in Segment C. Land use patterns largely unchanged except for BLM acquisition of about 5 acres (2 ha) at Gateway. Scenic easements may be necessary on about 920 acres (370 ha) if developments threatening river values arise.
Water Resource Impacts	None.	Same as proposal but corridor protection extended to Segment C	None.	Same as proposal, but corridor protection extended to Segment C.	Federally licensed or assisted water development projects that would diminish river values would be precluded. Possible secretarial finding required on upstream projects now under construction. No interference with existing water rights.
Recreation Impacts	Increase from 1978 use of 1,000 recreation days to about 5,000 in 1990.	Increase to 8,000 recreation days in 1990.	Increase to 12,740 recreation days in 1990.	Increase to 11,120 recreation days in 1990.	Increase to 6,950 recreation days in 1990.
Facilities Planned	Acquire access to Utah Bottoms.	Same as no action but add: Gateway - boat ramp and sanitation. Lake Bottom - 5-unit camp.	Same as no action option but add: Gateway - boat ramp, 10-unit camp, and sanitation. Segment B - 5 miles (9.6 km) trail. Lake Bottom - 10-unit camp.	Same as proposal.	Same as no action option but add: Gateway - boat ramp and sanitation.
Economic and Regional Development/Recreationist expenditures 1990	\$68,300	\$111,200	\$177,000	\$154,200	\$ 98,300
Possible Easement Costs	0	\$856,000	0	\$656,000	\$368,000
Total Annual Costs, 1990	\$ 4,400	\$ 11,500	\$ 24,400	\$ 13,800	\$ 8,400
AD&M, 1990	\$ 4,000	\$ 7,000	\$ 14,100	\$ 8,000	\$ 6,000
Total Non Annual Costs	\$ 4,000	\$ 53,600	\$123,000	\$ 68,600	\$ 28,600
Regional Income Generated, 1990	\$30,700	\$ 52,700	\$113,700	\$ 75,700	\$ 44,700
Social Impacts	Increased recreation and possible mining in Segment C degrade recreation environment somewhat, attracting socially oriented boaters and repelling wilderness oriented recreationists. Social environment otherwise unchanged.	Same as proposal, but designation of Segment C ameliorates recreation and mining impacts in that area.	Some type of impacts as no action option but about 2.5 times greater due to much larger recreation use.	Same as proposal, but designation of Segment C somewhat ameliorates recreation and mining impacts in that area. Lowered classification in Segment A allows more degradation than proposal in that area.	Increased recreation and possible mining in Segment C may degrade recreation environment especially in lower corridor. Altered recreation environment may attract more crowd-tolerant recreationists. Social environment otherwise unchanged.
Man-Years of Labor in 1990	5	8.6	16.1	12.1	7.4
Other Impacts	Increased recreation and possible increased mining result in soil disturbance and erosion loss of vegetation and (at mines) locally degraded scenery. Increased impacts on cultural sites as recreation and mining increase. Possible degradation of water quality from mining, although enforcement of water quality laws limit impact. Endangered species not significantly affected.	Same as proposal except in Segment C where designation and consequent management tend to concentrate and abate recreation impacts, and by regulating mining, moderate its impacts as well.	Same type of impacts as no action, but those from recreation increased by a factor of about 2.5.	Increased recreation use and impacts on soils erosion, vegetation, and wildlife in Segment A as compared with the proposal. Somewhat diminished recreation and mining impacts in Segment C as compared with the proposal.	Increased recreation use will result in a concomitant increase in impacts on soils, vegetation, wildlife, and cultural resources. Soil compaction and erosion, loss of vegetation, and disturbance of wildlife will occur near boat ramps. Increased use may also result in increased vandalism of historic and archeologic sites. Endangered species should not be significantly impacted.

occurred in the 31-mile (49.9 km) visual corridor of the Dolores River study area in 1976. Recreation use is expected to increase to about 5,000 recreation days by 1990. Boating, with associated camping and picnicking, is the sole projected increase.

The Bureau of Land Management proposes to serve this increased use by acquiring access to Utah Bottoms.

Energy and Mineral Impact. As much as 15,000 lb. (6,800 kg) of U_3O_8 worth \$630,000 at \$42 per pound and 42,000 lb. (19,000 kg) of V_2O_5 worth \$42,000 at \$1 per pound could be produced from the lower portion of this river area (segment C) if the economic climate becomes more favorable. The total value of U_3O_8 is \$672,000 at these prices.

Environmental and Land Use Impact. Existing land use and ownership patterns will continue. Acquisition of access to Utah Bottoms will affect a small area of private land along the road and approximately 5 acres (2 ha) at the river shore. Increased mining in the lower corridor, if it takes place, will adversely affect scenery. Increased recreation use is expected to have some adverse effects, localized at camping areas, side canyon trails, and other stopping points. Many of these are subject to periodic flooding, so impacts are expected to be minor.

Water Resources Impact. This plan will have no effect on water resource development projects.

Recreation Impact. The increase in recreation will alter the type of river trip available; crowding will increase, resulting in a more social experience. This may produce an alteration in the type of recreationists using the river. Solitude during the boating season will diminish. Possible degradation of the lower corridor by mining

could also alter the type of recreationist now using the corridor, to a type of person more tolerant of human intrusions.

Economic and Regional Development Impact. The anticipated increase in recreation use discussed under Recreation Impact will result in increased recreationist expenditures of approximately \$56,000 or about 82 percent of the expected total 1990 on-site recreationist expenditures of about \$68,000.

The acquisition of access described in Table XI-3 is expected to cost \$15,000. Total annual administration, operation, and management costs (AO&M), including a 25-year sinking fund, are expected to increase by about \$4,300 as a result of increased recreation use. Regional income generated from recreationist expenditures and federal recreation development is expected to increase \$37,000 by 1990. The increased regional income will support an additional 5.5 man-years labor in the region.

Social Impact. Social impacts, as with the No Action Plan for the Colorado, will be minimal.

Other Impacts. Increased recreational use and mineral extraction will result in an increase in soil disturbance and erosion, loss of vegetation, disturbance of wildlife, and locally degraded scenery. Impacts from mining would be locally severe, but the extent of each mine would probably be limited to 20 acres (8 ha) or less.

Endangered and threatened fish and wildlife species will continue to be protected according to provisions of the Endangered Species Act.

Increased recreational use and mining will increase the likelihood of vandalism of historic and cultural sites. Although features eligible for the National Register on public lands are expected to be

identified and protected according to the National Historic Preservation Act, some adverse impacts are still likely to occur.

Mining activities, particularly for uranium and vanadium near the confluence and on Beaver Mesa, are likely to cause some degradation of water quality. BLM management and existing water quality laws should prevent this from being a significant impact.

The approximate 5-fold increase in recreation predicted to take place by 1990 will cause proportionate increases in fugitive dust and auto emissions.

National Economic Development Plan - Dolores River

As with the Colorado River, there is little that can be done by the federal government to expand economic production or efficiency in the area. Since recreation is the most important economic resource in the study area, this plan provides for the greatest increase in recreation use by encouraging it with facilities and relaxed or non-existent user limits. To support a total of 12,740 recreation days in 1990, the following facilities would be installed;

Segment A, Gateway launch	--	acquire access provide parking, sanitation facilities, and 10-unit campground
Segment B	--	construct 6-mile (9.6 km) hiking trail
Segment C	--	10-unit campground at Lake Bottom

No portion of the Dolores study area would be designated to the National Wild and Scenic River System under this option, and environmental considerations would, within the limits of applicable existing and future regulations, be sacrificed in favor of increased economic production if conflicts between the two arose.

Energy and Mineral Impact. The impacts are the same as for the No Action Plan: no interference with extraction.

Environmental and Land Use Impact. As with the National Economic Development Plan for the Colorado, most of the environment, especially in the upper segments, would be preserved. Except for acquisition of limited areas (about 2 acres or 1 ha each at Gateway and Lake Bottom), landownership would be unchanged. Increased recreational use would degrade limited areas, solitude would be lost, and locally severe environmental degradation in the lower segment would result around individual mines if mining increased.

Water Resources Impact. This plan would have no effect on development of water resources, in the study area or upstream.

Recreation Impact. The expansion of recreation facilities in this option will provide for an increase of 7,740 recreation days (a 155 percent increase) over that expected under the No Action Plan. Total recreation days would be 12,740. Under such conditions, effects would vary with the length of the boating season. Severe crowding would occur at launch areas, attraction sites, rapid-scouting paths, and camps during low water years; years with longer seasons would produce somewhat fewer encounters between recreationists, but they would still be more frequent than at present. Solitude and wilderness values now available from floating the stretch would be in large measure lost. More crowd-tolerant recreationists would probably replace the present users. The recreation environment would be degraded, both by recreational pressures and by mining in the lower corridor, if it occurred.

Economic and Regional Development Impact. An increase of \$108,000 (159 percent) in on-site recreationist expenditures is anticipated to result from this alternative. Recreation developments

will cost \$119,000. Increased annual costs are \$20,000. Regional income will increase by \$98,000. The increased regional income will support an additional 13 man-years of labor in the region.

Other than the above, the expected economic and regional development impacts are those described under the No Action Plan.

Social Impact. The social impacts are very similar to those described for the National Economic Development Plan for the Colorado River.

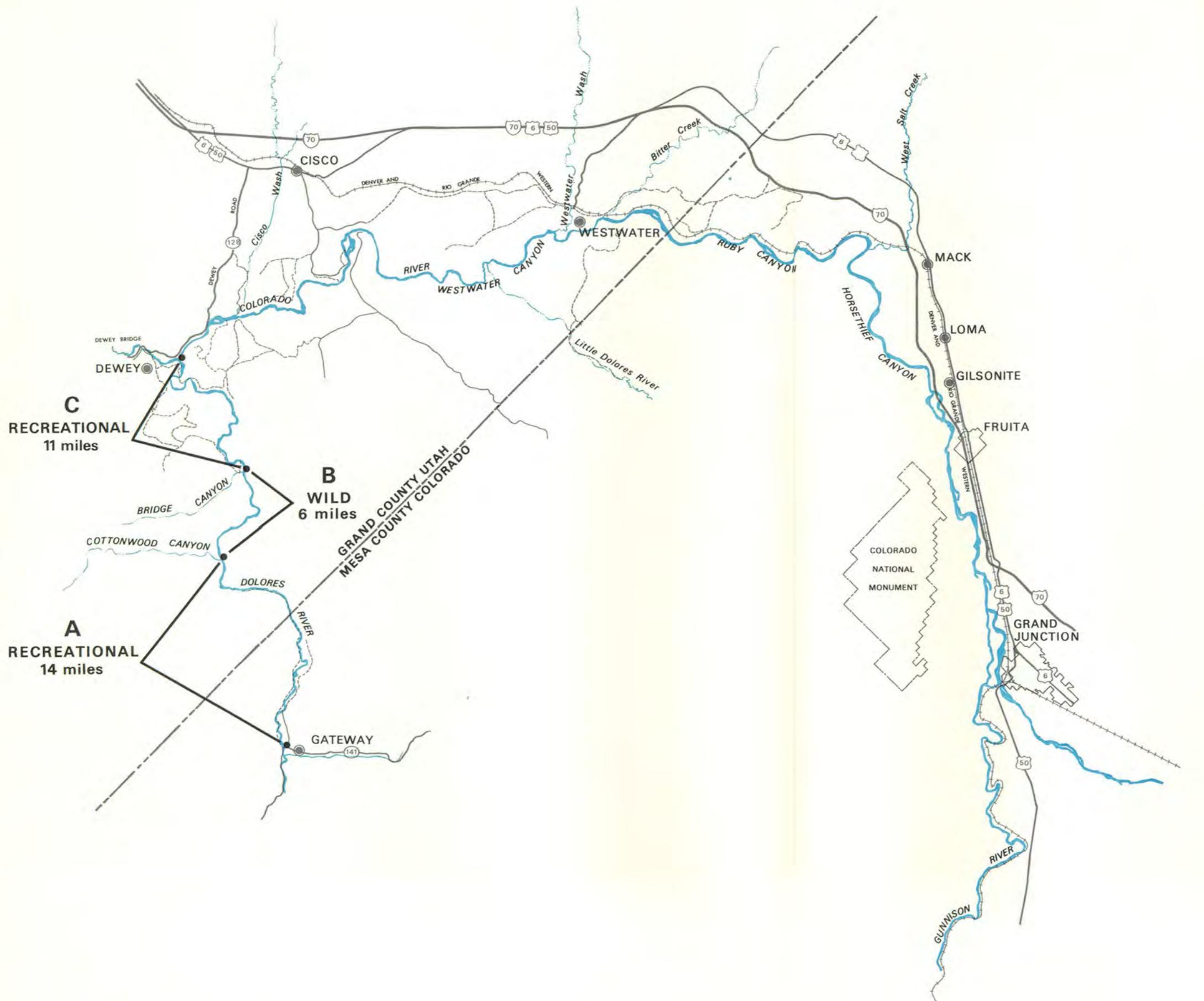
Other Impacts. The other impacts under this plan that are caused by mining would be the same as those described under the No Action Plan. Those caused by recreation would be the same in type, but more severe, since this plan envisions a level of use in 1990 that is 2.55 times as high as is expected to occur under the No Action Plan, and about 12 times as high as present use. In spite of preservation, vandalism of historic and archaeological sites would increase proportionately. Increased impacts on stopping points, even those subject to periodic flooding, would occur.

Auto emissions and fugitive dust would increase in proportion to the increase in recreation use.

Environmental Quality (EQ) Plans

Environmental Quality Plan 1 - Dolores River. Plan 1 is the recommended Plan for the Dolores River; its effects and impacts have been discussed in chapters VI and VIII.

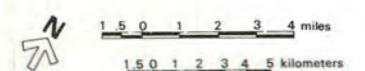
EQ Plan 2 - Dolores River. Under Plan 2, the Dolores River would receive the following classification:



COLORADO / LOWER DOLORES
WILD AND SCENIC RIVER STUDY

PLAN 2 - DOLORES RIVER

— GRAVEL ROAD
- - - JEEP ROAD



<u>Segment</u>	<u>Classification</u>	
Segment A	14 miles (22.5 km)	Recreational
Segment B	6 miles (9.7 km)	Wild
Segment C	11 miles (17.7 km)	Recreational

The change in classification from "scenic" to "recreational" in the upper and lower corridor would place less restriction on mineral exploration and development within these two segments. There would be fewer restrictions on the amount and type of development that could take place on private lands.

The recreation facilities needed to serve this level of use are:

- | | |
|---------------------|---------------------------------|
| Gateway launch area | -- acquire access |
| | -- provide parking and |
| | -- sanitation facilities |
| Utah Bottoms | -- acquire access |
| Lake Bottom | -- construct 10-unit campground |

Energy and Mineral Impact--With the changed classification levels in segments A and C, the regulations issued by the Secretary of the Interior would place less restriction on mining. This would allow less costly access to the \$672,000 worth of uranium and vanadium in the lower corridor, making mines in that segment somewhat more competitive with mines in areas where no such regulations exist, and thus rendering it more probable that mining would take place. The probability that mining would take place would be higher under this alternative than under plan 1, but not so high as in the recommended plan, the No Action Plan, or the NED plan.

Environmental and Land Use Impact--Under this alternative, land use would remain essentially as it is now. Changing the classification levels of the upper and lower segments from "scenic" to "recreational" would permit more alteration of the corridor by

private landowners, but there is apparently no pressure now for the types of developments (second homes and dispersed subdivisions) that would presumably be permitted under this less restrictive classification. Such developments would be most likely in segment A. This impact is not expected to be significant.

Patterns of landownership would remain approximately the same, except for the acquisition by BLM of about 2 acres (1 ha) at Lake Bottom.

Land use on public lands would continue as at present, but with a slight alteration. A recreational classification in segment C would, by the institution of regulations designed to safeguard the values for which the river was designated, somewhat inhibit mining as compared to the present situation.

Water Resources Impact--This plan would have the same impacts as plan I and the recommended plan, described in chapter VIII: corridor developments requiring federal licensing or assistance precluded, no impact on existing water rights, and the possibility that a finding by the Secretary of the Interior would be needed to the effect that upstream water projects not already under construction would not unreasonably diminish the values for which the river was designated.

Recreation Impact--Recreational use under this alternative is expected to increase to 11,100 recreation days by 1990, about 6,600 more than would occur under the no action alternative. Boating, with associated picnicking and camping, would again constitute the total projected increase. To accommodate this use, five additional campground units will be developed at Lake Bottom. Less restriction on mining activities near the confluence is likely to cause some degradation of the recreation atmosphere. With increased use, encounters between boaters will increase and solitude will lessen.

Boaters oriented toward more wilderness-type trips may be replaced by socially-oriented recreationists.

Economic and Regional Development Impact--Recreationist expenditures will increase \$86,000 annually (126 percent) by 1990. This option will cost \$30,000 for recreation developments and require \$4,500 annually for a sinking fund and additional AO&M. It will contribute an additional \$55,000 annually to the regional economy; this will support an additional eight man-years of labor in the region.

Social Impact--The quantity of recreational opportunities will increase, with a consequent decrease in the quality of the recreational environment and degree of solitude available.

Other Impacts--Increased recreation use and mineral exploration would result in proportionately greater impacts on soils, vegetation, fish, wildlife and cultural features. Those from recreation use would be concentrated near the development sites. About 2 acres (1 ha) will be disturbed at Lake Bottom in constructing the five additional camping units. Although construction would result in short-term disturbance, these facilities should reduce potential future disturbance by controlling use. Endangered and threatened species of wildlife will continue to be protected. An increase in mining activity near the confluence will also disturb soils, vegetation, wildlife and cultural features. The BLM management should regulate this use and prevent significant degradation of the river values, although, under the less restrictive classification, more degradation could take place than is permitted in plan I. Increases in recreation use and mining will increase the likelihood of vandalism of unprotected historical and archeological features. Although those sites eligible for the National Register on public lands will be identified and protected according to the National Historic Preservation Act, some adverse impacts to these sites are likely.

The expected 120 percent increase in recreation use predicted for this plan would cause proportionate increases in auto emissions and fugitive dust.

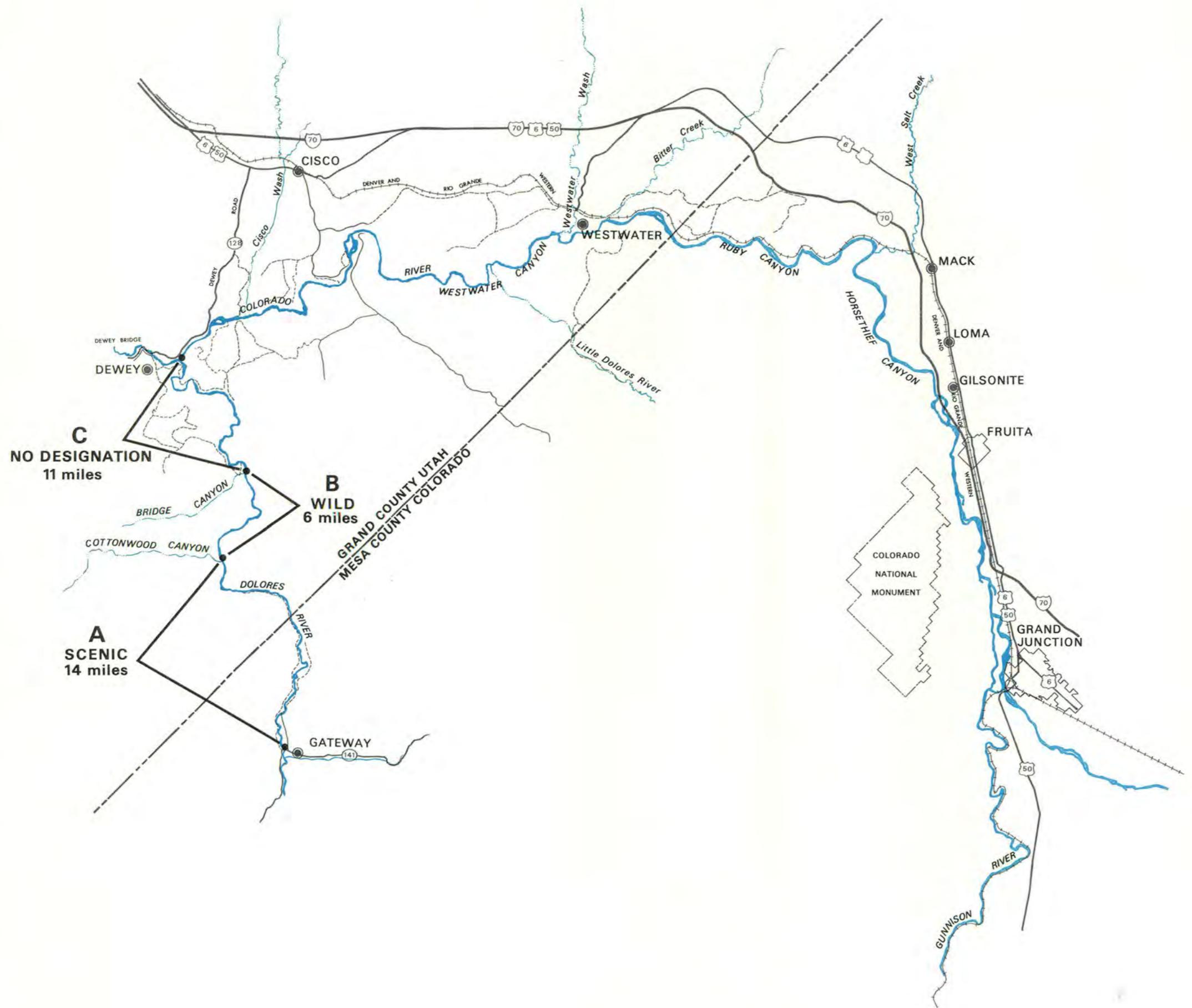
EQ Plan 3 - Dolores River

Plan 3 will designate the upper 20 miles (32.2 km) of the Dolores River study area and 8,000 acres (4,820 ha) at the following classification levels:

<u>Segment</u>		<u>Classification</u>
Segment A	14 miles (22.5 km)	Scenic
Segment B	6 miles (9.6 km)	Wild
Segment C	11 miles (17.7 km)	No designation

The only recreation facilities needed beyond that provided under the No Action Plan are provision of a Gateway launch area. Plan 3 will increase recreation use in the study area. It will provide protection for the outstandingly remarkable qualities of the upper 20 miles (32.2 km) corridor while allowing unhampered access to the minerals of the lower 11 miles (17.7 km).

Energy and Mineral Impacts. Under this alternative, the Secretary of the Interior would issue regulations on mining in the upper 20 miles (32.2 km) of the corridor to safeguard the values which caused the river to be included in the system. However, there are no known deposits of economically mineable minerals except gravel in segments A and B. No effects on mining are predicted in these areas, except that gravel operations might be precluded or require screening. This alternative would not affect mining in Segment C.



Environmental and Land Use Impact. Applying the appropriate level of protection for which the 20 mile (32.2 km) corridor now qualifies would not change private land uses, but would preclude future uses that would harm the values for which the river was designated. This could eventually require scenic easements on 920 acres (370 ha) of private land. Grazing and recreational use of public land would continue. Public lands in the corridor could not be disposed of. Increased mining in segment C could cause degradation of scenic, recreational, and environmental values in the vicinity of the individual mines.

Water Resources Impact. Water resource development projects in the corridor which required federal licensing or assistance would be precluded. No such projects are planned, so this impact probably will be insignificant. This plan would not interfere with existing water rights in the study area. If appropriate, the Secretary of the Interior will determine whether any of the projects planned upstream from the study area, or a combination of these projects, would unreasonably diminish the values for which the rivers were designated.

Recreation Impacts. With designation, use is expected to reach about 6,950 recreation days by 1990, about 40 percent above that which would occur without designation (5,000 recreation days). Boating, with associated camping and picnicking, is the total projected increase in recreation use.

These increases will result in more contacts between recreationists and will diminish solitude. More socially oriented recreationists may consequently replace boaters oriented toward solitude. Campsites will become more crowded.

The BLM proposes to develop a boat ramp with sanitation facilities near Gateway, Colorado, to accomodate the recreation use expected

with designation. This facility should be sufficient to accommodate the increased use resulting from river designation.

Economic and Regional Development Impact. Recreationist expenditures will increase \$28,000 annually above the amounts expected without designation, by 1990. This plan will cost \$11,000 for recreational development and an additional \$2,000 per year for AO&M. It will contribute an additional \$14,000 to the regional economy annually by 1990. Approximately two man-years of labor, primarily in service industries, will be supported by the increased regional income.

Social Impact. The existing quality of recreation opportunities may be degraded in Segment C under this proposal, but will be preserved in the two upper segments. The combination of possible degradation of the recreation environment in the lower corridor and increases in recreation use may alter the type of recreationist, replacing wilderness and solitude-oriented boaters with more crowd-tolerant and intrusion-tolerant recreationists. The social environment will not otherwise be affected by the proposal.

Other Impacts. Increased recreation use will result in a concomitant increase in the impacts on soils, vegetation, wildlife, and cultural resources. Impacts on soils and vegetation will be concentrated around the boat ramps and other stopping points along the river. Since most stopping points are located on gravel bars, they should not be significantly affected. Side canyon hiking may produce informal trails in a few areas. Some soil compaction and erosion, loss of vegetation, and disturbance of wildlife will occur near the boat ramps. Due to the small area involved [1-2 acres (0.4-1 ha) at Gateway] and the short season for boating this river, regeneration periods will be longer than on the Colorado, and these impacts should not be significant.

Increased use may also result in increased vandalism of historic and archeologic sites near the river, even though those features eligible for the National Register will be identified and protected according to provisions of the National Historic Preservation Act of 1966.

The endangered bald eagle, generally present along the river during the winter months, has recently been sighted in the spring and early summer. This indicates there may be an active bald eagle nest in the area of the Colorado and Dolores Rivers, although this has not been confirmed. Since little recreation occurs in the winter, the bald eagle would not be affected unless an active nest does exist, and then only if hikers were to get too close to the nest.

Increases in fugitive dust and auto emissions will occur in proportion to the expected increase in use of the area - about 40 percent.

SUMMARY AND COMPARISON OF EFFECTS OF ALTERNATIVE PLANS

Colorado River

Projected annual recreationist expenditures for the five alternatives range from \$501,000 to \$999,000. The difference in recreationist expenditures between the three EQ plans is small (\$501,000 to \$550,000) when compared to the NED plans (\$999,000).

EQ Plans 1 and 2 would preserve the entire 55.7 mile (89.7 km) portion of the river while EQ Plan 3 would preserve 40.7 miles (65.5 km). The NED Plan would not guarantee preservation of any portion of the river.

TABLE XI-4. Effects of Alternatives for the Dolores River in 1990

Amount	Components	ENVIRONMENTAL QUALITY PLANS																	
		PLAN 1					PLAN 2												
		No Action Plan		National Economic Development Plan			Segment A - Basic		Segment A - Recreational		Segment A - Scenic		Segment B - Wild		Segment B - Wild		Segment C - Recreational		Segment C - Not Designated
		Total ²	Net ³	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net		
NATIONAL ECONOMIC DEVELOPMENT	RECREATION USE ⁴																		
	Boating	4,600	4,000	12,240	7,740	7,560	3,080	10,620	8,120	8,450	1,950								
	Fishing	300	0	300	0	300	0	300	0	300	0								
	Hunting	200	0	200	0	200	0	200	0	200	0								
	Total Annual Recreation Days	5,000	4,000	12,740	7,740	8,060	3,080	11,120	8,120	8,950	1,950								
	ANNUAL RECREATION ⁴																		
	Expenditures	\$68,000	\$58,000	\$177,000	\$109,000	\$111,000	\$43,000	\$154,000	\$98,000	\$98,000	\$29,000								
	Annual Government ⁵																		
	Expenditures	\$ 6,275	\$ 28,275	\$ 23,000	\$ 11,076	\$ 5,800	\$ 13,270	\$ 8,100	\$ 6,125	\$ 2,850	\$ 63,500	\$ 20,500							
	Household Income ⁶	\$43,000	\$16,500	\$166,500	\$75,400	\$75,400	\$118,700	\$75,700	\$75,700	\$75,700									
	MATERIALS AND ENERGY																		
		Data containing 19% U_3O_8 and 42% V_2O_5 occurs in the lower visual corridor. Since 1948 a total of only 50 tons of ore has been extracted. If the value of U_3O_8 were to increase to \$42/lb, 18,000 lbs worth (\$630,000) might be economically extracted under either the No Action Option, National Economic Development Option, or Environmental Quality Option 2. Environmental Quality Options 1 and 2 would probably increase the cost of mineral extraction in the visual corridor. Small amounts of very fine gold also exist in the visual corridor, but significant extraction is unlikely under all options.																	
ENVIRONMENTAL QUALITY	PRESERVATION OF FREE-FLOWING STREAM	None Guaranteed	None	6 miles - Wild River 25 miles - Scenic River 0 miles - Recreational River 31 miles - Preserved		6 miles - Wild River 0 miles - Scenic River 25 miles - Recreational River 31 miles - Preserved		6 miles - Wild River 14 miles - Scenic River 11 miles - Not Recommended for Designation 20 miles - Preserved		6 miles - Wild River 14 miles - Scenic River 11 miles - Not Recommended for Designation 20 miles - Preserved									
	PRESERVATION OF AREAS OF NATURAL BEAUTY	None guaranteed. Management priorities may dictate other uses.	Less protected than under No Action Option. Economic issues to take top priority under this plan. Some values may be lost.	Area of natural beauty preserved along 31 miles of river.		Although area of natural beauty preserved along 31 river miles, 14 of these miles which qualify as scenic river will only be preserved at the recreational river classification level.		Higher level of natural beauty preserved along 20 river miles. Area of natural beauty along 11 miles of river qualifying for scenic river designation not preserved by designation.											
	PRESERVATION OF CULTURAL RESOURCES	Federal and state laws protect sites; some damage could occur to sites on private lands.	Higher level of recreation use without additional money expended for protection results in increased damage to sites.	Higher level of recreation use is offset by additional efforts for protection.		Higher level of recreation use is offset by additional efforts for protection.		Higher level of recreation use is offset by additional efforts for protection.		Higher level of recreation use is offset by additional efforts for protection.		Higher level of recreation use without additional level of protection results in increased damage to sites.							
	PRESERVATION OF FREEDOM OF CHOICE	Many options preserved.	Economically important options increase. Preservation options decrease.	Preservation options increase. Potential for mining decreases.		Preservation options increase. Potential for mining decreases.		Preservation options increase. Potential for mineral development decreases somewhat.		Preservation options increase. Potential for mineral development decreases somewhat.		Economic development options increase. Preservation options also increase somewhat.							
	AVOID IRREVERSIBLE OR IRRETRIEVABLE EFFECTS	Possible loss of scenic and recreational values; irreversible loss of any minerals extracted.	Greatest possibility of loss in scenic and recreational values. Irreversible loss of any minerals extracted.	None. Economic values from mining probably unrealized unless designation is lifted.		None. Slightly greater possibility of mining than in EO1, but economic values from mining probably unrealized unless designation is lifted.		None in Segments A and B. Possible loss of scenic and recreational values in Segment C. Irreversible loss of any minerals extracted in Segment C.		None in Segments A and B. Possible loss of scenic and recreational values in Segment C. Irreversible loss of any minerals extracted in Segment C.									
REGIONAL INCOME GENERATED ⁷		Net \$	Total \$ ⁸	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	Total \$	Net \$	
	Service Stations	4,000	10,000	6,000	8,000	2,000	8,000	4,000	5,300	1,300									
	Other Retail	6,000	15,000	9,000	9,000	3,000	13,000	7,000	7,000	1,000									
	Eating and Drinking Places	8,000	21,000	13,000	13,000	5,000	18,000	10,000	11,200	3,200									
	Lodging	9,000	24,000	15,000	18,000	6,000	21,000	12,000	12,800	3,600									
	Other Services	1,000	3,000	2,000	1,500	500	2,000	1,000	1,300	300									
	Transportation	700	2,700	2,000	1,200	500	1,700	1,000	1,000	300									
	Contract Construction	7,000	38,000	36,000	27,000	5,000	32,000	10,000	5,200	3,200									
	Total	39,700	113,700	83,900	92,700	32,000	78,700	45,000	44,700	14,000									
REGIONAL VALUE ADDED ⁸																			
	Service Stations	5,000	12,000	7,000	8,000	3,000	10,000	6,000	6,900	1,900									
	Other Retail	8,000	20,000	12,000	12,000	5,000	17,000	9,000	11,200	3,200									
	Eating and Drinking Places	10,000	28,000	16,000	16,000	8,000	23,000	13,000	13,800	3,800									
	Lodging	12,000	33,000	21,000	20,000	8,000	29,000	17,000	17,000	5,000									
	Other Services	2,000	4,000	2,000	2,800	800	4,000	2,000	3,500	300									
	Transportation	1,000	4,000	3,000	1,700	700	2,000	1,000	1,450	450									
	Contract Construction	3,000	47,000	44,000	8,000	5,000	16,000	13,000	6,200	3,200									
	Total	41,000	148,000	105,000	69,500	28,500	101,000	60,000	89,050	13,650									
EMPLOYMENT (MAN-YEARS)		Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	Total	Net	
	Service Stations	.8	1.3	.7	.9	.3	1.1	.5	1.1	.5	.8	2							
	Other Retail	.7	1.8	1.1	1.1	.4	1.6	.9	1.6	.9	.9	2							
	Eating and Drinking Places	1.7	4.6	2.9	2.9	1.2	4.0	2.3	2.3	2.3	2.3	8							
	Lodging	1.3	3.6	2.2	2.2	.9	3.1	1.8	2.0	2.0	2.0	.7							
	Other Services	.2	.7	.4	.4	.1	.5	.2	.5	.2	.2	.1							
	Transportation	.1	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1							
	Contract Construction	.3	.5	.4	.6	.7	.7	.4	.7	.4	.7	.4							
	Total	5.01	18.1	12.1	18.1	3.7	12.1	7.2	12.1	7.2	12.1	2.5							
SOCIAL WELL-BEING	EDUCATIONAL, CULTURAL AND RECREATIONAL OPPORTUNITIES	Opportunities remain similar to those now. Protection assured only by management agency policy now.	If deemed economically valuable opportunities increase. Otherwise, opportunities and/or quality decrease. Predicted increase in gross number of recreationists combined with decrease in quality of experience.	Availability of opportunities increases. Quality of experience is preserved.		Availability of opportunities increases. Quality of experience preserved in segment B.		Availability of opportunities increases somewhat. Quality of experience in Segment C is degraded.											
	LIFE, HEALTH AND SAFETY	Adverse health effects from potential uranium extraction may occur.	This plan would decrease potential for adverse health effects from uranium extraction.	Adverse health effects from potential for adverse health effects from uranium extraction could occur.		Adverse health effects from potential uranium extraction could occur.		Adverse health effects from potential uranium extraction could occur.		Adverse health effects from potential uranium extraction could occur.		Adverse health effects from potential uranium extraction could occur.							
	INCOME DISTRIBUTION	Income to service, recreational supply, and construction industry increases.	This plan provides the greatest increase in service, recreational supply, and construction industries.	Income to service, recreational supply, and construction industries increases.		Income to service, recreational supply, and construction industries increases.		Income to service, recreational supply, and construction industries increases.		Income to service, recreational supply, and construction industries increases.		Income to service, recreational supply, and construction industries increases.							

¹All recreational use and values are given in recreation days.²The total column under each option represents total expected recreation use or expenditures which will occur in the study area under that option by 1990.³The net column under each option is the expected net effect of implementing that option. Under the No Action Option, recreation is expected to increase by the year 1990 by the net amounts shown. The net increases represented under option 1-4 are all additional to the net increases shown under the No Action Option.⁴The values used in estimating on-site recreation expenditures per recreation day (RD) were: boating - \$14.04/RD, fishing - \$7.00/RD, and hunting - \$15.00/RD.

Sources used for these values are: "Million and New, Economic and Social Impact of Recreation at Recreational Reservoirs, University of Denver, March 1963; Dell, G. Fred and Glenn Phillips, Wyoming's Hunting and Fishing Resources, 1970, Division of Business and Economic Research, University of Wyoming, Laramie, August 1972; 1974 Colorado Big Game Harvest, Colorado Division of Wildlife, Denver, 1975; John Devore, "White-water Boating on the Dolores River - Final Estimate of Effects of Dolores Project on Boating," January 18, 1977 - Memorandum to File, Bureau of Reclamation.

⁵Annual government expenses for each option include capital outlay annualized over a 50-year period, a 25-year sinking fund, annual administration, operation, and management costs, and administrative costs for equipment acquisition.⁶Household income is direct income generated to U.S. citizens from output of alternative actions.⁷Regional income generated is the portion of National Economic Development account expenditures which remain in the region.⁸Value added is the gross regional product.⁹Total \$ under each option is the sum of the total \$ for the No Action Option and Net \$ for each option.

The NED Plan would provide for the greatest amount of use, but it would not guarantee protection and could cause degradation of the existing river values as a result of overuse.

EQ Plan 3 would not provide protection for 15 miles (24 km) of the Colorado River which was found eligible for inclusion in the national system. It would permit potential mineral extraction without the possibly expensive environmental regulations attendant on designation to the system, but the total dollar value of uranium and vanadium that could be extracted from the corridor is very small--about one-fourth of annual recreation expenditures under EQ Plan 1.

EQ Plan 2 would preserve 11 miles (17.7 km) of the river at a less restrictive classification than it is eligible for, without substantial monetary benefits.

EQ Plan 1 would guarantee preservation of the outstanding values of the Colorado River at the classifications for which each segment is eligible, without having significant effects on mineral extraction, the regional economy, or government expenditures.

Dolores River

As with the Colorado River, recreationist expenditures are the most important economic factor in the study area. Under the various plans, these are projected to vary between \$96,000 and \$177,000 annually by 1990.

The NED Plan, which is predicated on maximum recreation use, attains the greatest recreationist expenditure and requires annual government expenditures more than twice as large as any other

plan. Since this plan does not guarantee preservation of the river values, it could result in degradation by overuse and mining, imperiling the qualities which attract the recreationists whose expenditures create its benefits.

Each of the three EQ plans involves some designation under the Wild and Scenic Rivers Act. EQ Plan 2, though resulting in the highest recreationist expenditures of the three, would protect 25 miles (40.3 km) of river at a level less protective than they qualify for. EQ Plan 1 protects all 31 miles (49.9 km) of river at the level of classification for which each segment qualifies, and results in the second-highest level of recreationist expenditures.

None of the three EQ plans precludes mineral development, but plans 1 and 2 may increase the costs of any development that may take place. EQ Plan 3, which was favored by the Utah BLM and the Department of Natural Resources of the State of Utah during the study process, will not increase the costs of mineral extraction because it does not protect the 11 miles of river in which minerals occur. Of the EQ plans, it generates the smallest recreationist expenditures, the smallest contribution to household income, the smallest contribution to regional income, and the smallest amount of added employment. It does provide the most encouragement for mineral extraction, while protecting 20 miles (32.2 km) of river values.

Selected Plans

EQ Plan 1 for the Colorado River offered a chance to preserve the outstanding values of the area for future generations, with very little impact on mineral extraction, and substantial benefits to the region from recreationist expenditures. For those reasons it was selected as the recommended alternative.

EQ Plan 1 for the Dolores River was chosen because it protected the 31 miles (49.9 km) of the study area, without particularly hampering mineral extraction in the less scenic lower 11 miles (17.7 km). Access to the minerals in this lower reach, and possible improved access to the Dolores Triangle area, would be slightly impeded but not precluded by a scenic classification for this reach, but designation would offer protection to the outstanding values of the area.

C H A P T E R X I I
C O N S U L T A T I O N A N D C O O R D I N A T I O N
I N T H E D E V E L O P M E N T O F T H E
P R O P O S A L A N D E N V I R O N M E N T A L
S T A T E M E N T

An interagency study team was formed in June 1976 to conduct the study and prepare a report and environmental statement. Study team agencies consisted of the Heritage Conservation and Recreation Service (formerly the Bureau of Outdoor Recreation), Colorado Department of Natural Resources (represented by the Colorado Water Conservation Board), Utah Department of Natural Resources (represented by the Utah Outdoor Recreation Agency) and the Bureau of Land Management (Colorado and Utah).

Numerous other Federal and State agencies with special expertise in various subjects also participated in the study. These study participants included:

Federal Agencies

Energy Research and Development Administration (now the Department of Energy)
Bureau of Reclamation
National Park Service
U.S. Fish and Wildlife Service
Soil Conservation Service

State Agencies

Colorado State Historical Society
Colorado Division of Wildlife
Colorado Division of Planning
Utah State Historical Society
Utah Division of Wildlife Resources

A number of individuals also participated in the study process.

These were:

John Williams
Doug Treadway
Richard Smith
Verne Huser
Ginger Gheen
Al Gunter
George Morehouse
Chris Jouflas

Two series of public meetings were conducted to obtain citizen input to the study. The Colorado meetings were held in Denver and Grand Junction; the Utah meetings, in Salt Lake City and Moab. The oral and written comments solicited at these meetings were used to aid the study team in making its decisions and recommendations.

The first series of public meetings were held July 6-13, 1976, their purpose being to inform the public about the study including its purpose, scope, and organization. Those attending selected the individuals above to represent the public throughout the study process. A second series of public meetings was held May 2-9, 1977, to present various management alternatives for the rivers, including national designation of the rivers. A final meeting was held July 10, 1979, in Gateway, Colorado, to discuss scenic easements and landowner concerns.

Field reconnaissance of the Colorado River was conducted in August 1976, and in June 1977 for the Dolores River. In addition to the study team, participating agencies and individuals were invited to join in these field inspections so that they would also be familiar with the values of the area.

On July 5, 1978, responsibility for the study of the Colorado and lower Dolores Rivers was transferred to the National Park Service by the Heritage Conservation and Recreation Service. After the transfer, a draft of the report and environmental statement was edited and revised, and discussions were held to select recommended alternatives for the rivers. The National Park Service then prepared the graphics, printed, and distributed the draft report and environmental statement. Following formal review and appropriate revisions, this document was printed.

PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL
STATEMENT AND RESPONSES

COMMENTS



State of Colorado

EXECUTIVE CHAMBERS

136 State Capitol
Denver
80203

RICHARD D. LAMM
Governor

August 3, 1979

Cecil D. Andrus
Secretary of the Interior
Interior Building
C Street between 18th & 19th, N.W.
Washington, D.C. 20240

264

Dear *Glen T. Bean*

We have reviewed the Colorado and Lower Dolores Wild and Scenic River Study and Draft Environmental Statement. It is noted that the documents were prepared in cooperation with the State Department of Natural Resources. The conclusions and recommendations for the Colorado portion of the study area have our full support.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard D. Lamm".

Richard D. Lamm
Governor

cc: Glen T. Bean, Regional Director, National Park Service, Denver

COMMENTS



SCOTT M. MATHESON
GOVERNOR
STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY

84114

July 18, 1979

Mr. Benjamin J. Zerbey
Utah State Director
National Park Service
125 South State
Salt Lake City, Utah 84111

Dear Mr. Zerbey:

The State of Utah commends the National Park Service for a well written and descriptive draft of the Wild and Scenic River Study and Environmental Statement for the Colorado and Lower Dolores Rivers. Utah was represented on the study team. I strongly endorse this working relationship between the State and the National Park Service.

285

We were given the opportunity to review the initial draft last December and to provide comments. The comments submitted at that time are essentially applicable to the final draft now under review.

Utah supports the preservation of some of our more outstanding areas (including rivers) for future generations to enjoy. However, the question that must be answered is how much should be preserved? Accordingly, I have asked the State Wilderness Committee to develop a statewide rivers plan similar in scope to the statewide wilderness plan. The purpose of such a plan would be to provide an overall perspective for all rivers to determine which ones should be preserved and which ones should not.

That Committee is presently working on this plan, and I am confident that it will develop a plan and recommendations that will serve as a basis for evaluating all wild and scenic river studies and proposals. Until that work is completed, Utah is not supporting designation of any of the Colorado or Dolores Rivers under study for designation under the Wild and Scenic Rivers Act.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott M. Matheson". Below the signature, the word "Governor" is printed in a smaller, sans-serif font.

SMM:kb

COMMENTS

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250



RESPONSES

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

This is in response to your May 22, 1979, letter requesting our views on your draft report and environmental impact statement on a study of the Colorado and Lower Dolores Rivers. The document is a comprehensive effort that deals with a wide variety of interests and subject matters. Although we do not object to the proposal, we believe there is further opportunity to provide added information in the report to assist in the decisionmaking process.

- 266
- 1 With about 20 percent of the proposed corridor in private agricultural ownership, it seems that the views of these interests are important to the final decision. However, it is not apparent in the report that local agricultural interests or organizations were consulted during the study process.
 - 2 In the discussion of impacts of the Colorado River proposal, the effects on future water resource developments are discussed but there is no discussion of the impacts on existing water rights. In view of the critical importance of water rights, there should be a positive statement about the proposal on such rights. Since such a statement is made on page 201 regarding the Dolores River proposal, it could be inferred that water rights on the Colorado River segment will be affected if the river is designated.
 - 3 Finally, we believe that the Principles and Standards planning procedures and evaluations could be strengthened with regard to the potential of two identified reservoir sites. The fact that there is no interest at present in developing one site and the possible preclusion of the other site because of the presence of an endangered species are not valid reasons for dismissing the sites as potential alternative plans. It is noted on page 277, that increased or more efficient water resource development was identified in the second level specification of component needs for the national economic development plan. However, this identified need was dropped from consideration during the analysis and evaluation of the various plans. We believe that the identification and quantification, where possible, of all potential land and water resource uses would give the study report better balance.

We appreciate the opportunity to review the report and offer our views for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Bergland".

Bob Bergland
Secretary

- 1 The public involvement process is described on pages 12-13. Agricultural interests were invited to participate, and corridor landowners were requested by letter to comment on the study. Their opinions, as expressed at public meetings, were considered in the study; their letters of response are printed in this document.
- 2 We have added a statement that valid existing rights on the Colorado will not be affected. See page 200. The study does not expect any impacts on upstream rights.
- 3 Alternative plans must be based on the authorities available to managers at the time the report is written, and, in some cases, on information furnished by project proponents. In the instant cases, there being no proponent of development for the Dewey site, there could be no alternative plan for it; and in the case of the Ruby-Horsethief Canyon Reservoir, the proponent furnished insufficient information to base a plan on the project. Second, it was not possible to assume the Endangered Species Act would be abrogated, so no realistic alternative could be produced which was based on the abrogation of that Act, as these would have to be,

COMMENTS



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
COLORADO STATE OFFICE
ROOM 700, COLORADO STATE BANK BUILDING
1600 BROADWAY
DENVER, COLORADO 80202

AUG 8 1979

MEMORANDUM

TO: Regional Director, Rocky Mountain Region, National Park Service
FROM: State Director, Colorado
SUBJECT: Review of Draft Wild and Scenic River Report and Environmental Statement for the Colorado-Lower Dolores Rivers Study--DES 79-27

The Bureau of Land Management offices in Colorado and in Utah have reviewed this document. We concur with the recommendations but have comments that should be considered in preparation of the final statement.

This draft study report and ES, overall, has been prepared in a clear and concise manner, and the principal author should be congratulated.

Our specific comments follow:

- 1 The recreational use pattern on the Dolores River requires that users float through the lower 11-mile segment after coming through the upper 14 miles of qualifying Scenic and 6 miles of qualifying Wild River. Recommendation 3 on page 5, states that the management plan for the Dolores should include the lower 11 miles even though the segment is not recommended for designation. We support this recommendation and intend to develop such a management plan.
- 2 Page 1, point 3: After October 1979, the BLM will have (as required by FLPMA) information on file regarding mining claims. Claims not recorded with BLM will be considered null and void. Therefore, the word "almost" is not definitive enough.
- 3 Page 2, point 2, line 1: Between from and Gateway, add "the vicinity of."
- 4 Add another recommendation at the end of page 5 and page 162: During the management planning period the BLM should investigate the possibility of providing public access on public lands, since convenient sites exist and this could minimize interference with private property rights.

RESPONSES

IN REPLY REFER TO

CO-922
1793

- 1 We have altered the recommendation to include designating the lower 11 miles (14.7 km) of the Dolores.
- 2 We have revised the sentence in question, but cannot be more definitive until BLM has recorded those claims, which will be after the deadline for completion of this study.
- 3 This change has been made.
- 4 We have made these changes on pages 5 and 161 (page numbers in Draft Report/EIS).

COMMENTS

- 5** Page 5, point 5: The notice requirement is not fully understood by BLM managers, and at this point we are unsure whether this course of action is viable for the Bureau. Other options should remain open, such as exchange of lands or purchase of a scenic easement.
 Reference should be made to Chapter 5 where the more detailed findings and recommendations are located.
- 6** Page 13, Conclusions and Recommendations: This paragraph could be deleted if the findings and recommendations summarized at the beginning of the report referenced the more detailed presentation in Chapter 5.
- 6** Chapter 2, page 20, second paragraph: The word "fullness" is not appropriate and should be altered.
- 7** Page 22, Physiography and Geomorphology, top of the page: We suggest rewording as follows--The alternating sandstone, shales and conglomerates of the Mesozoic system are of particular note for their scenic and scientific value and for . . .
- 8** Page 22, Minerals: First paragraph should also mention that the Green River Formation is a source of vertebrate fossils. Other minerals which should be mentioned include the Cisco oil and gas field, gold, and coal.
- 9** In line of second paragraph after Morrison Formation add: and in the basal member of the Chinle Formation. How wide is the corridor that is being described here?
- 10** Page 23, Mineral Resource Map: The Book Cliffs coal fields north of I-70 should be shown.
- 11** Page 25, fourth paragraph, line 3: After Delta add: Carbon and Emery Counties.
- 12** Page 31, Climate, first and third paragraphs, both line 3: Change 6 inches to 8 inches.
 Vegetation and Wildlife: 27.50M should be 2750M.
- 13** Pages 34 and 35: Wildlife not mentioned in this section of the report include the endangered fishes, bald and golden eagles, hawks and peregrine falcons. The Antelope-jackrabbit is a Sonoran species. Although these may be mentioned elsewhere in the report, we suggest they be at least referenced in this section.
- 14** Page 36, Archeology: From a regional perspective, there should be some recognition of the Anasazi presence along the Colorado and Dolores Rivers, consistent with the documentation elsewhere.
- 15** Page 36, first paragraph, line 4: The word commonly may be more appropriate than popularly.
- 16** Line 5: Add, "and Anasazi" after Fremont and before cultures.
Line 6: Add, "human" after way of and before adaptation.
- 17** Page 37: There is doubt whether or not those pictographs are Fremont. Those on the left appear to be made by relatively recent visitors.

RESPONSES

- 5** We have clarified this on page 160 and added references to it here. Other options such as scenic easements and exchanges of land are open.
- 6** "Fullness" in the sentence means the sequence of rocks is freer of the lacunae, unconformities, temporal hiatuses, and diastems, than the rock column in most other regions of the United States. We cannot find another way to say it as briefly or as well.
- 7** We made this change.
- 8** We made this change, but in the paragraph above. Oil, gas and gold are mentioned on pages 87-88 since they are of more importance in the river corridor; coal is mentioned on page 26.
- 9** We made this change. We are describing the region here, not the river corridor, which is defined on page 53.
- 10** We have modified the map.
 This change was made.
- 11** These changes were made.
- 12** These species are mentioned in the corridor description, pages 102-107; we see no need for duplicating the reference to them. We have corrected "antelope jackrabbit."
- 13** This change was made.
- 14** This change was made.
- 15** This change was made.
- 16** This change was made.
- 17** We have modified the caption to reveal the doubt.

COMMENTS

- 18 Page 38, top of the page and third line: Should be southwestern Utah and southeastern Nevada. The Virgin Branch origin of Fremond in eastern Utah is extremely tenuous, and is more likely the Mesa Verde Branch.
- 19 Page 38: We suggest revising the last paragraph under archeology to read as follows:

The Fremond culture disappeared for uncertain reasons about A.D. 1150 and no distinctive sites have been found dating after A.D. 1200. It is suspected that the Fremont peoples, no longer able to cultivate food on the drought-diminished surrounding land, rejoined the Desert Archaic's foraging subsistence style, and were known to the first Euroamericans as the Southern Paiutes and Utes.
- Page 38, History, line 6 of the first paragraph: . . . but they did leave their mark on the land.
- Page 39, sixth paragraph: Add, "in the mid 1850s" before collapsed and the word "the" before 1870s.
- Page 40, first paragraph: It is not clear who established the town--ranchers or Mormons?
- Pages 40 and 41, Water Resources, first and second paragraphs: Time units are not shown here. Flow is expressed in volume/time units (hour, month, or year).
- 20 Page 44: The 1970 population figures are outdated--the 1978-1979 estimated population figures are available.
- 21 Page 46, Land Ownership and Use: The first line refers to public ownership. A better term would be federal lands or federally-administered lands. "Public lands" is a term used to denote BLM-administered lands and may cause confusion if applied here to include USFS and NPS-administered lands as well.
- 22 Chapter 3, Colorado River, page 53, second paragraph: The word "drives" should be changed.
- 23 Fourth paragraph: The Kayenta Formation and the Wingate Sandstone are not Jurassic, but are implied to be in this statement.
- 24 Page 84, Minerals, third paragraph, line 1: The cost of uranium, \$30 per pound, needs to be updated.
- 25 Page 85, second paragraph: Resurfacing of I-70 has been completed. Sand and gravel is needed for the new section of I-70, from Green River to Flow Wash.
- Page 86, Coal, last sentence: The direction should be clarified to either northeast or northwest.
- 26 Page 98, Threatened or Endangered Flora: The nature and specific investigations that generated this data should be referenced in the narrative, including their date of completion.

RESPONSES

- 18 We have deleted reference to the Fremont Culture's origin.
- 19 We have clarified the points.
- 20 We have obtained and inserted the updated population figures.
- 21 The paragraph deals with lands under federal, state, county, and municipal control. If we call BLM lands public in this section, we are left with no term for the others. This change was not made.
- 22 This change was made.
- 23 This change was made.
- 24 ERDA furnished information to update the tables on page 25, but not these figures. Inflationary price changes do not alter the amounts estimated to be present.
- 25 These changes were made.
- 26 We have put this material in a footnote.

COMMENTS

RESPONSES

- 27 Page 99-100, Fish and Wildlife: The following native fish, not threatened nor endangered, should be added to the four species of native fish already listed in the text:

roundtail chub--*Gila robusta*
speckled dace--*Rhinichthys osculus*
flannelmouth sucker--*Catostomus latipinnis*
bluehead sucker--*Pantosteus delphinus*

- 28 Page 100, second paragraph: Reference might be made to page 115. Pollution sources or factors affecting the fish should be addressed in the same manner as they were for the Dolores River to be consistent. For example, sewage wastes from human habitation, livestock pollution, and land erosion.

- 29 Page 101, Pictures: The humpback chub and humpback sucker are labeled incorrectly; they were reversed.

- 30 Page 103: The Colorado River cutthroat trout was the native trout in the Dolores and Colorado River tributaries and could be within the study corridor.

- 31 Page 104, Wildlife, first paragraph: Bighorn sheep are being reintroduced in Westwater Canyon.

Page 104, third paragraph, line 6: Add swallows and rock doves before ducks.

Page 115, second paragraph: The reference to shale oil deposits in the Bookcliffs is incorrect. The Bookcliffs are in the Mesa Verde formation and contain coal deposits. The shale oil deposits are in the Roan Cliffs just behind the Book Cliffs.

- 32 Page 119, Archeology, second paragraph: Archeologic and historic sites are discussed, but paleontologic sites are only mentioned, with no discussion as to type or scientific value. Perhaps this apparent deficiency could be resolved by referencing the specific nature of the surveys used for data sources, dates of completion, etc.

Identification of the type or intensity of the archeological inventories in the narrative would be helpful in providing a more complete description of these values. BLM's existing inventories were completed for Bureau planning efforts and not specifically for the Wild and Scenic Rivers study, though they were available for the study.

- 33 Page 119, second paragraph, line 14: Fremont should be changed to Anasazi.

- 34 Page 120, first paragraph: Information and emphasis on Westwater Community and the D&RGW Railroad is not in the report.

- 35 Page 120, second paragraph, Land Use Ownership: The reference to FLPMA is not correct. The lands were classified pursuant to the Classification and Multiple Use Act of 1964.

- 27 They are listed in appendix C; we felt that listing them in the narrative would distract attention from the endangered and threatened species.

- 28 This change was made.

- 29 We switched the captions.

- 30 The Colorado River cutthroat trout was not found during the studies on which we based our narrative.

- 31 These changes were made.

- 32 We have expanded the discussion and referenced the survey.

- 33 The sources we examined indicated these sites were probably Fremont, with possible Anasazi influence. We have removed reference to the culture name, since the matter is not settled.

- 34 We found no information in checking with the Denver and Rio Grande Western, in the standard regional history, and in the material furnished by BLM. In our opinion, the necessary research is beyond the province of this study.

- 35 In his review of an earlier draft (Nov. 30, 1978), the Associate State Director of the Utah office of the BLM substituted FLPMA in this sentence. Thus, we made this change.

COMMENTS

36 Page 125, first paragraph, line 2: Hiking is also another form of recreation, which should be included.

Chapter 3 should contain a reference to the wilderness inventory now being conducted. The Black Ridge Canyons Unit (CO-070-113) borders the Colorado River, and the Palisade (CO-070-132) and Granite Creek (CO-070-132A) units border the Dolores River. All three areas have been recommended for intensive wilderness inventory, based upon their suspected values.

37 Chapter 4, Page 134, Geologic Values, first paragraph: The word, "fullness," is not appropriate as stated, and the word, "or," should be "of."

38 Page 137, first paragraph, Fish and Wildlife Values: Summer sightings of bald eagles have been documented.

39 Page 146: Segment A-1 should include a discussion of the Rock Quarry that lies immediately downstream from the Loma Launch site. The quarry is on private land.

40 Page 169, Developments: The discussion of developments for both rivers does not include needed or potential access acquisition. The Loma Launch site is located on Colorado Division of Wildlife property and few problems are anticipated in developing a cooperative agreement. However, the DOW property is small, and present use levels result in congestion and confusion. The report should note that DOW is now requiring that commercial outfitters acquire a State Permit to launch at the Loma Launch site. In all probability, the site will not be able to accommodate any increased use. This could result in one or two options. First, the launch site may require expansion. This could affect adjacent private property, especially as the suitability of this site for intensive development is rather limited. Secondly, the primary launch site may require relocation, either upstream or downstream to an appropriate spot, either on public or private property.

The major ingress point, presently used, at Gateway is on private property. If this site is to be developed as a launch area, acquisition will be required. Another option would be to move the launch site downstream on public lands.

The draft study report and environmental statement do not discuss the above point. While the final solution to these problems must be identified in the management plan, the potential for access acquisition and/or land acquisition must be identified in the final study report and environmental statement.

41 Chapter 8, Environmental Impacts of the Proposed Action, page 194, first paragraph: This paragraph is not clear and needs to be revised. It could begin with "under section 7(a)..."

RESPONSES

36 These changes have been made.

37 These changes were made.

38 The change was made.

39 We have inserted mention of the quarry.

40 We have altered the report to indicate the potential necessity for such acquisition.

41 We revised the paragraph in question.

COMMENTS

- 42 Pages 195-197, Recreation and Economic Benefits: Primary recreation benefits are not addressed, and benefits to the local economies are only secondary.

The primary benefits to the recreationists measure the primary economic benefits to the Nation from providing the Westwater as a recreational resource.

In 1977, the BLM Moab District Economist estimated these primary recreation benefits for PRIVATE TRIPS down Westwater and concluded that this value was \$15,500 in 1972. This is \$6.20 per user day (UD). This figure is a measure of the primary economic benefits contributed to the national income from private floatboating down the Westwater.

If the \$6.20 per user day is applied to commercial passengers, the primary economic benefits are \$24,800, with the total primary economic benefits being \$40,300.

In terms of impacts, this \$6.20 per UD would translate the additional 4,500 UD that results from designation into an additional \$27,900 of recreational benefits.

This figure should be added to National Economic Development (Table E-1), page 281, under Recreation Use, Boating.

These benefits should also be entered in Table E-2 to balance development of facilities costs.

- 43 Pages 196-197 and 203, Social Well Being: There appears to be too much focus on existing users. Solitude should exist if management objectives are set to provide for it (various physical, social, and managerial settings can be altered to accomplish this).

- 44 Page 202, Impact on Economic and Regional Development: The last sentence is not consistent with page 200, third paragraph, first sentence.

- 45 Chapter 9, page 207, Unavoidable Adverse Impacts, fourth paragraph: This is not a correct assumption. Although no mineral reserves are presently known or estimated, it does not mean that there are no valuable minerals. This could cause a significant impact if withdrawn. An example of this is the Bell Creek oil field in southeast Montana. It has produced thousands of barrels of oil but was designated as a non-mineral area by geologists, prior to its discovery.

- 46 Chapter 10, page 209, first paragraph: The second sentence is not necessarily correct. If, at a future date, a valuable mineral is discovered underlying the withdrawn area, and subsequent mining takes place adjacent to that area, the minerals left behind in the withdrawn area may not constitute a logical mining unit, and would be irretrievably committed (lost).

- 47 Chapter 10, page 209, second paragraph: This statement is not necessarily correct for the same reasons given above.

RESPONSES

- 42 We have added these benefits in a footnote to the tables E-1. Table E-2 contains cost estimates and cannot accommodate the figures.

- 43 The estimates of future use were predicated in part on BLM's estimate of future management under the various plans. The increased numbers of people envisioned in some of these projections of management will decrease one another's solitude.

- 44 We have revised this material to gain consistency.

- 45 Impacts are, and obviously must be, stated on the basis of the information available to the study team at the time an EIS is prepared. On that basis, this is a correct assumption. No changes were made.

- 46 In the case outlined by a string of hypotheses, the valuable mineral will still be present, awaiting the advances in price or technology which will allow its extraction. Therefore, it is not "irretrievably committed (lost)." No changes made.

- 47 No change made for the reasons cited in response #46.

COMMENTS

- 48 Chapter 10, page 209, third paragraph, second sentence: This is not a correct assumption. Same comments given for page 207, fourth paragraph, applies here.
- 49 Chapter 11, page 251, Water Resources Impact: This paragraph is difficult to understand and should be clarified.
- 50 Endangered Species Act (ESA): Although the recommendations will have a positive effect for the protection of native flora and fauna, including endangered fish and wildlife species, a biological opinion is needed from the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. This request for an opinion should be initiated to the Regional Director, USF&WS, Denver, to comply with the ESA. The biological opinion will enhance the Wild and Scenic Rivers proposal.

We appreciate this opportunity to provide comments on the draft environmental statement and hope that these comments will be useful in preparation of the final document.

RESPONSES

- 48 We have made a change to indicate less certitude.
- 49 We have introduced some revisions for clarity.
- 50 A biological opinion is needed if this agency expects positive or negative effects on endangered species from the proposal. Since the effects are neutral--the species, like the river corridor, will be maintained in status quo--no biological opinion is needed. The Fish and Wildlife Service concurs in this position.

*Jack A. Lorts
Acting*

cc: Grand Junction DO
WO-220
BLM-Utah SO, Attn: Jim Biggins
Resources-Colorado SO, Attn: Don Bruns

COMMENTS

RESPONSES



IN REPLY REFER TO

United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW
WASHINGTON, D.C. 20411

July 2, 1979

DES 79-27

Memorandum

To: Chief, Office of Park Planning and Environmental Quality, National Park Service

From: Chief, Office of Environmental Coordination

Subject: Draft wild and scenic river study and draft environmental statement, National Park Service, Colorado and Lower Dolores Rivers, Colorado/Utah

The Bureau of Mines has reviewed the subject report concerning designation of segments of the Colorado and the Dolores Rivers upstream from their confluence to Loma and to Gateway, respectively, as wild, scenic, or recreational components of the National Wild and Scenic Rivers System.

Although we have not made a detailed field investigation of mineral resources or mining activities in the study corridors, these resources and activities appear to be described adequately in the report.

It is difficult to precisely assess the impact of the proposal on development of mineral resources in the affected areas because (1) regulations concerning such activities are not yet written, (2) the final corridor boundary is not yet drawn, and (3) only known or identified mineral resources are considered. Nevertheless, subject to these limitations, the report correctly describes the impact of the proposal on minerals in general terms: activities of the private minerals-related sector of the economy would become more restricted and expensive than at present on about 33,000 acres of corridor lands along the two rivers.

- 1 Moreover, we note that the lower 11-mile segment of the Dolores River is not recommended for classification as a Wild and Scenic River owing to uranium and vanadium resources and associated mineral resource exploration and development activities along that reach of the river. We concur with this finding and have no objections or suggested revisions to the study or the draft environmental statement.

Herman Sheffer

- 1 We are now recommending designation of that reach, and expect minimal impacts on mineral exploration and development.

COMMENTS



United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY TO: 720
REFERRED TO:
121.

JUN 28 1979

Memorandum.

To: Director, National Park Service
Acting Assistant
From: Commissioner, Bureau of Reclamation
Subject: Review of Colorado and Dolores Wild and Scenic River
Study and Draft Environmental Statement

By copy of the Department of the Interior's May 22, 1979, letter to the Honorable Douglas M. Costle, Administrator, Environmental Protection Agency, we became aware of the subject study and draft environmental statement.

We concur in comments which were provided by memorandum of April 17, 1979, to the Regional Director, Rocky Mountain Region, National Park Service, Denver, Colorado, from our Regional Director, Salt Lake City, Utah. In order to assure your awareness of these prior comments, we are enclosing a copy of the April 17 memorandum.

Aldon V. Niles

Enclosure

COMMENTS**RESPONSES**

United States Department of the Interior

APR 20 1979

BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

DRAFT
720 UC-452

APR 17 1979

Memorandum

To: Regional Director, Rocky Mountain Region, National Park Service, P.O. Box 252, Denver, Colorado 80225

From: Regional Director
Bureau of Reclamation

Subject: Review of Colorado and Dolores Wild and Scenic River Study and Draft Environmental Statement

This office has reviewed the above documents for the Bureau of Reclamation and has the following comments:

276

General:

Overall we find the report well done and reflective of the best interests of the Bureau of Reclamation and the general public. However, it would have been more desirable if maps and photographs had been furnished in the river study to help orient the reader. It appears that the study group has undertaken a thorough analysis of the site and we concur with the majority of their findings.

Specific Comments:

1. Rather than to exercise good faith in the landowners' interest to maintain the land in its present state, it may be more advantageous to acquire scenic easements at the beginning of the project rather than to have to negotiate at a later date. (See page 5 - No. 5.)
2. The process for acquiring private land is mentioned three different times in the study (pages 5, 159-5, and 168). Is this necessary?
2. How can we manage segments of the lower 11 miles of the Dolores River if they are privately owned? (See page 159-4.)
3. Should the designation of these lands under the National Wild and Scenic Rivers System provide for the continuation of current land uses such as mining? (See page 162.)

1. The process by which the land can be managed without easements and without detriment has been clarified.
2. We have clarified this point; see page 162.
3. The Wild and Scenic Rivers Act specifically provides for continuation of existing uses.

COMMENTS

RESPONSES

5. Water Quality - pages 114-118

- 4 Page 114, last paragraph states the TDS load is 720 milligrams per liter. Milligrams per liter is a concentration, while the loads are stated as tons/day in the next sentence. Also, the locations that this salinity data applies to, the time range, and source of the salinity data are not stated.

The recently completed study, Quality of Water, Colorado River Basin, Progress Report No. 9, January 1979, Department of the Interior, shows the 1941-76 flow weighted average TDS of the Colorado River near Cisco is 609 mg/l. The salinity data in the report appears to be on the high side, which might indicate that the averages are unweighted. A copy of this report is available at the Upper Colorado Region office, Bureau of Reclamation, Salt Lake City, Utah.

Page 118, paragraph 4, states the TDS discharge by the Dolores River into the Colorado each year is 600,000 tons. Again, the Quality of Water, Colorado River Basin reports the 1941-76 TDS load as 478,000 tons/year. Because the dissolved salts and sediment loads of the Colorado River vary so much with each wet and dry hydrologic year, the average can be greatly skewed by short time ranges and unweighted statistical averages.

- 5 6. The addition is incorrect under Dolores River Costs. It should read \$379,000.

We appreciate the opportunity to review and comment on this study.



Commissioner, Attention: 150

COMMENTS

RESPONSES



United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/ES

JUL - 6 1979

Memorandum

To: Director, National Park Service
Associate
From: Director, Fish and Wildlife Service

Subject: Colorado and Lower Dolores Rivers (Colorado/Utah) Wild
and Scenic River Study--Comment on Draft Departmental
Report and Environmental Statement (DES 79-27)

278

In response to Secretary Andrus' letter of May 22, we have reviewed the subject document.

Fish and Wildlife resources appear to be treated adequately in the report-environmental statement.

1 As a reading aid, we suggest inclusion of lists of maps and tables in the Table of Contents.

1 We have inserted these lists.

COMMENTS

RESPONSES



IN REPLY REFER TO

United States Department of the Interior

GEOLOGICAL SURVEY

Box 25046

Denver Federal Center

Denver, Colorado 80225

Mail Stop #415

Water Resources Division
Colorado District

July 12, 1979

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

Dear Sir:

We have reviewed the Draft Wild and Scenic River Study and Draft Environmental Statement for the Colorado - Lower Dolores River, dated February 1979. We offer the following comments which pertain only to the water resources parts in the draft report and environmental statement.

- 622
- 1 Page 40, para. 4 - The annual virgin flow of the Colorado River at the Colorado-Utah border is given as about 6.7 million acre feet which appears to be too high. Using the 614,000 acre feet exported from the basin and the 1,000,000 acre feet used consumptively as reported in this paragraph, then add the 24-year average annual gaged flow near the Colorado-Utah border of 4.2 million acre feet, the annual flow would be about 5.8 million. The expected annual flow would lie in the range of 3.5 to 4.5 million acre feet.
 - 2 Page 105, line 25 -The lowest average monthly flow for June is 3,481 instead of 6,000 cfs when using table B-1 on page 263.
 - 3 Page 107, par. 2 - All the data shown in this paragraph were taken from records collected at Colorado River near Cisco, Utah instead of "at the state line station" given in the text.

1 We have revised the paragraph.

2 We made this change.

3 We corrected the error.

COMMENTS

- 4 Page 109, sentence 2 - This sentence states that the Dolores River annual flows ranged between 1,086,000 and 164,000 acre feet for two successive years, 1951-52 and 1958-59. According to the Dolores River records shown on page 264, the range in annual flows that occurred during both two-year periods was 1,016,000 and 169,300 acre feet.
- 5 Page 110, on figure - The maximum mean-monthly flow for May for the period of record on the Dolores River is about 8,900 cfs instead of about 6,000 cfs shown on the figure.
- 6 Page 112, lines 4 to 6 - The number of water rights on the Dolores River and the total flow rights on the Dolores and Colorado River reported on these lines are not in agreement with those shown in table III-1 on page 113.
- 7 Page 277, component 4 - The elimination of the evaluation of this component, "increased or more efficient water-resource development," is overlooking one of the most valuable resources in the study area. We understand that designation of these river reaches as part of the Wild and Scenic River System would preclude further consideration of water-resource development. If so, it would seem appropriate to include in the report a complete evaluation of this component.

RESPONSES

- 4 We made this change.
- 5 We made this change.
- 6 We corrected the figures.
- 7 An evaluation cannot be made if sufficient information is not furnished by project proponents, or if there are no projects.

We hope you find our comments helpful in preparation of the final report and environmental statement.

Sincerely yours,

J. F. Blakey
District Chief

cc: Regional Hydrologist, WRD, Central Region
Chief Hydrologist for R&TC, WRD, Reston, VA MS 414

COMMENTS



RESPONSES

IN REPLY REFER TO MC 300
DES 79-27

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
MID-CONTINENT REGION
DENVER, COLORADO 80225

JUL 12 '79

MAILING ADDRESSES:

Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

JUL 10 1979

Memorandum

To: Regional Director, Rocky Mountain Region, National Park Service

From: Assistant Regional Director, Land Use Coordination

Subject: Colorado and Lower Dolores Wild and Scenic Rivers Draft Study Report and Environmental Statement

Thank you for the opportunity to review the draft study report and environmental statement for the Colorado and Lower Dolores Wild and Scenic River Study. Our comments on the preliminary report and environmental statement have been adequately assessed with one exception.

1 The "notice requirement" discussed under land acquisition does not appear to provide any real protection to the river corridor. We agree that the current landowners have been good stewards of the land. However, there is no guarantee that this situation will continue in the future, nor any assurance that the landowners will be willing to submit the required notice to the Bureau of Land Management. We support your efforts to keep the acquisition costs and intervention with individual landowner rights at a minimum. However, with 21 and 11 percent of the shoreline in private ownership on the Colorado and Dolores Rivers respectively, it is important that adequate protection measures be provided.

Our agency has developed considerable expertise in alternative methods of land acquisition. Methods such as donations, bargain sales, and sale and lease back are not only cost effective but also provide attractive benefits to the landowner. We would enjoy the opportunity to explore some of these alternatives with you as a means of providing positive protection to the river corridor. Please contact us if you desire additional information.

We hope these comments are helpful in preparing the final report and environmental statement for the Colorado and Lower Dolores Wild and Scenic River Study.

JUL

Robert H. Johnson

Robert J. Arkin

1 We have clarified the "notice requirement" and believe that, with standby authority to condemn easements, it will provide adequate protection to the values of the area, while minimizing costs and interference with private landowner rights. See page 162.

COMMENTS



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, DC 20240

12 JUL 1979

RESPONSES

Pear Mr. Secretary:

I am responding to your recent request for Department of Army comments on the draft report and draft environmental impact statement of the wild and scenic river study for Colorado and Dolores Rivers in Colorado and Utah.

The draft report concludes that a 55.7-mile reach of the Colorado River, extending from its confluence with the Dolores River upstream to the vicinity of Loma, Colorado, and the Dolores River from its confluence with the Colorado upstream 31 miles to the vicinity of Gateway, Colorado, are eligible for inclusion in the National Wild and Scenic River System. The report recommends specific stream reaches for scenic, wild, or recreation classification.

1 There are no projects or anticipated water resource developments of the Department of the Army in the area which would be affected by the recommended classifications of these river segments. However, the Colorado River from Grand Junction, Colorado, to the vicinity of the Colorado-Utah border is a navigable water of the United States. The Corps of Engineers exercises regulatory jurisdiction in this reach under Section 10 of the River and Harbor Act of 1899 (33 USC 403). The Corps also has regulatory jurisdiction over the Colorado and Dolores Rivers under Section 404 of the Clean Water Act (33 USC 1344). Designation of these rivers under the Wild and Scenic Rivers Act should not impact upon our regulatory mission.

Honorable Cecil D. Andrus

We have no comments on the draft environmental statement.

I appreciate this opportunity to comment on the draft report and draft environmental statement.

Sincerely,

Michael Blumenfeld
Assistant Secretary of the Army
(Civil Works)

1 We have inserted this information.

COMMENTS

Department of Energy
P. O. Box 2567
Grand Junction, CO 81501

July 16, 1979

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

Dear Sir:

The Resource Division of the Grand Junction Office has reviewed the draft wild and scenic river report and the environmental statement for the Colorado-Lower Dolores River Study.

Z83

- 1 We have found that some of the data we provided to you in 1976 have been omitted in the report. The table on page 25 lists only the vanadium resources; however, the text refers to uranium resources, which are not included in the table. Attached is a copy of our 1976 resource estimates at \$30 per pound forward costs that were previously sent to you. We have reviewed these estimates and they are still valid as of January 1, 1979. Recently, we began to estimate uranium resources in a \$50 per pound forward-cost category and are including a table of these estimates, as of January 1, 1979, for your information.

The Preliminary NURE report noted on page 84 is an important uranium resource document and should be included in the Bibliography as follows:

- 2 Energy Research and Development Administration. National Uranium Resource Evaluation, Preliminary Report. USERDA, Grand Junction, Colorado (1976).
- 3 It should be clarified in the text that any reference to vanadium production, reserves, and resources (pages 22, 25, 84, and 216) by ERDA (now DOE) is vanadium that is associated with uranium as a co-product. Except for the omission mentioned, the report accurately states our 1976 estimates of uranium and vanadium resources that occur in the study area.

Sincerely,

Donald L. Everhart
Manager

Attachments:
As stated

RESPONSES

- 1 We have revised the table in question using your 1979 estimates.
- 2 This source has been added to the bibliography.
- 3 This change has been made.

COMMENTS

ERDA January 1, 1976 estimates of potential uranium resources that occur within Mesa County, Colorado and Grand County, Utah, are as follows:

Class	Pounds U ₃ O ₈	Area
Probable	20,300,000	Gateway, InterRiver, Thompson, and Green River
Possible	13,100,000	Gateway, Moab, Inter-River, and Thompson
Speculative	None estimated	—

ERDA January 1, 1976 estimates of the potential vanadium resources associated with the uranium in Mesa County, Colorado, and Grand County, Utah, are as follows:

Class	Pounds V ₂ O ₅	Area
Probable	36,000,000	Gateway, Thompson, and Green River
Possible	36,600,000	Gateway, Moab, and Thompson

These potential estimates are those in the \$30 per pound forward production cost category.

DOE January 1, 1979 estimates of potential uranium resources that occur within Mesa County, Colorado, and Grand County, Utah, are as follows:

Class	Pounds U ₃ O ₈	Area
Probable	29,700,000	Gateway, InterRiver, Thompson, and Green River
Possible	20,800,000	Gateway, Moab, Inter-River, and Thompson
Speculative	None estimated	—

DOE January 1, 1979 estimates of the potential vanadium resources associated with the uranium in Mesa County, Colorado, and Grand County, Utah, are as follows:

Class	Pounds V ₂ O ₅	Area
Probable	53,000,000	Gateway, Thompson, and Green River
Possible	58,000,000	Gateway, Moab, and Thompson

These potential estimates are those in the \$50 per pound forward-cost category.

COMMENTS

RESPONSES



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1160 LINCOLN STREET
DENVER, COLORADO 80215

AUG 1 1979

Ref: BW-EE

Mr. Glen T. Bean
Regional Director
Rocky Mountain Region
National Park Service
655 Parfet St.
P.O. Box 25287
Denver, Colorado 80225

Dear Mr. Bean:

EPA has reviewed the draft EIS on the Wild and Scenic Study for the Lower Dolores and Colorado Rivers and has the following comments.

582
1 EPA supports the recommendations to include segments of the Colorado and Lower Dolores rivers in the National Wild and Scenic Rivers System. Based on the information presented in the study and EIS, EPA prefers environmental quality option 1 for the Dolores River. This option would designate the lower 11-mile segment of the Dolores River as "scenic." Under the proposed alternative this segment would receive no designation and Federal management of the area would continue under a multiple-use concept. It appears that the mineral claims in this segment are marginal at best and very speculative based on future economic conditions. In our view, protecting the natural values of the river corridor and uniting the Upper Dolores segments with the Colorado segments outweighs the mineral considerations.

In accordance with our criteria for rating EIS's, this document has been categorized as ER-1. Briefly, this means that we have environmental reservations concerning the selected alternative and that the information presented is adequate. Please send five copies of the final EIS as soon as it is available.

Sincerely yours,

Alan Merson
Regional Administrator

- 1 We now recommend designation for the full 31-mile (49.9-km) study reach of the Dolores.

COMMENTS



THE SECRETARY OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410

July 27, 1979

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

Thank you for providing us with an opportunity to review your Department's report and draft environmental impact statement on the Colorado and Lower Dolores Rivers. Although it is not directly related to HUD's mission of providing a decent home and suitable living environment for every American family, your proposal for including portions of these rivers in the National Wild and Scenic River System is one which we support. Such an inclusion acknowledges America's rustic past and preserves a living environment for future generations to appreciate.

286

Sincerely yours,
Patricia Roberts Harris
Patricia Roberts Harris

COMMENTS



OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

This is in response to your request for our review and comment on your report and draft environmental impact statement on the Colorado and West Dolores Rivers as potential components of the National Wild and Scenic Rivers System.

We are forwarding these reports to the Secretary's Regional Representative in Denver. That office will provide their comments, if any, directly to you.

Thank you for the opportunity to review these reports.

Sincerely,

A handwritten signature in black ink, appearing to read "McConville" or "Convisser".

Martin Convisser, Director
Office of Environment and Safety
Office of the Assistant Secretary for
Policy and International Affairs

COMMENTS**RESPONSES****FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426**

Honorable Cecil D. Andrus
Secretary of the Interior
Washington, D.C. 20240

JUN 29 1978

Dear Mr. Secretary:

This is in response to your letter of May 22, 1979, to the Secretary of Energy, requesting comments pursuant to the provisions of the Wild and Scenic Rivers Act (P.L. 90-542), on your Department's draft wild and scenic river study and draft environmental statement on the Colorado and Lower Dolores Rivers. These comments represent the views of the Federal Energy Regulatory Commission staff.

The amendment of January 3, 1975 (P.L. 93-621), to the Wild and Scenic Rivers Act required the study of the Colorado River from a point 19.5 miles above the Colorado-Utah border to the confluence with the Dolores River in Utah. However, in the present study the Utah portion of the Dolores River was included at the request of the Governor of Utah and supported by the Governor of Colorado.

According to the material furnished, the Department of the Interior proposes that 55.7 miles of the Colorado River, 20 miles of the Dolores River, and approximately 33,000 acres of associated lands be designated as components of the National Wild and Scenic Rivers System. Of the total 55.7 miles of the Colorado River, 13 miles are recommended for designation as "wild," 38.7 miles as "scenic," and 4 miles as "recreational." Of the total 20 miles of the Dolores River, 6 miles are recommended for designation as "wild" and 14 miles as "scenic."

288

We have reviewed the materials furnished to determine the effects of the proposals on the Commission's responsibilities. Such responsibilities relate to the development of hydroelectric power under the Federal Power Act and the construction and operation of natural gas pipelines under the Natural Gas Act.

Our review indicates that there are no existing hydroelectric projects within the river segments proposed for inclusion in the National Wild and Scenic Rivers System. However, as mentioned in your report, there is a site with hydroelectric power potential located approximately 2 miles downstream from the confluence of the Colorado and Dolores Rivers. If constructed, this project would back water into the Colorado River study area and more than halfway up the Dolores River study area. The potential project identified as Dewey Site could provide 180,000 kilowatts of capacity and would be capable of generating approximately 800 million kilowatt-hours annually. There are no known plans to develop this site at present.

1 We have inserted these power output figures in the report.

COMMENTS

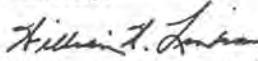
-2-

Most of the Federal lands along the study reaches of the Colorado and Dolores Rivers are withdrawn for power purposes. However, the staff review indicates that there are no active FERC projects within the area.

Our review also indicates that there are no natural gas pipelines located within the 33,000 acres proposed for wild and scenic river designation. Some small scattered gas producing fields are located in the northern and northwestern sections of Mesa County. The Cisco oil and gas field is located 1 to 2 miles west of the Colorado River in Grand County. However, because of the narrow corridor involved in the proposal and because oil and gas reserves are found in limited quantities in the area, the proposal is expected to have limited effect on oil and gas extraction.

Based on its consideration of your Department's wild and scenic river study and draft environmental impact statement, the staff concludes that the designation of these portions of the Colorado River basin as components of the National Wild and Scenic Rivers System would preclude further consideration of development of the Dewey site. Although we are not aware of any plans to develop the site at this time, the power benefits foregone from this large renewable resource should be carefully considered before making a decision to include the river segment in the National Wild and Scenic Rivers System.

Sincerely,



William W. Lindsay, Director
Office of Electric Power Regulation

COMMENTS



**Department of Local Affairs
Colorado Division of Planning**

Philip H. Schmuck, Director



Richard D. Lamm, Governor

July 5, 1979

Ms. Karen L. Green
Office of Communications and Public Affairs
National Park Service
Rocky Mountain Region
P. O. Box 25287
Denver, Colorado 80225

290

SUBJECT: Wild and Scenic River Study and
Environmental Statement for the
Colorado and Lower Dolores Rivers

Dear Ms. Green:

The Colorado Clearinghouse has received the above-referenced proposal
and has distributed it to interested state agencies. Comments received
from the Division of Water Resources, Department of Health and the
State Historic Preservation Officer are enclosed for your information.

Thank you for the opportunity to review this matter.

Sincerely,

SE/Ellis/mk
Stephen O. Ellis
Chief Planner

SE/MK/vt
Enclosure

cc: Office of the Governor
Department of Natural Resources
Department of Health
State Historical Society
Colorado West Area Council of Governments

520 State Centennial Building, 1313 Sherman Street, Denver, Colorado 80203 (303) 892-2351

COMMENTS

RESPONSES



COLORADO DEPARTMENT OF HEALTH

4210 EAST 11TH AVENUE • DENVER, COLORADO 80220 • PHONE 320-8333
Frank Traylor, M.D., Executive Director

DATE: June 18, 1979

SUBJECT: NON-STATE ASSISTANCE

REVIEW AND COMMENTS

TO: Mr. Stephen O. Ellis
Colorado Clearinghouse
Division of Planning

PROJECT TITLE: Wild & Scenic River Study & Environmental Statement for
the Colorado and Lower Dolores River
STATE IDENTIFIER:

COMMENTS: Water Quality Control

COMMENTS DUE: July 2, 1979

The Water Quality Control Division supports the Wild and Scenic River designation. Both the Colorado and Dolores Rivers would seem to benefit quality-wise from the designation. Of the five alternatives mentioned in the Draft E.I.S., the proposed alternative would seem to offer the most protection and provide the greatest recreation potential for the Rivers.

Air Pollution Control

- 1 No discussion is made of the air quality impact associated with a 13% increase in the use of the area. The major air quality impact would probably be in the area of vehicle emissions from traffic on unpaved roads. This impact may indeed be minimal but no mention is made whatsoever. No discussion is made concerning any recommendations for air quality classification of this area under the prevention of significant deterioration (PSI) provision of the Federal Clean Air Act or the Colorado Air Pollution Control Act of 1970 (revision per H.B. 1109 pending as of June 1979). Study of Baseline air quality, especially visibility, should be considered.
- 2

- 1 We have revised the report to include estimates of the air pollution caused by the increased use projected for the area. See pages 204, 209 and the "Other Impacts" sections of Chapter XI.
- 2 Such studies and recommendations cannot be made under the authority of the Wild and Scenic Rivers Act, and therefore cannot be made in this document.

Micki Barnes
Name, Title
Micki Barnes, Program Administrator

COMMENTS**RESPONSES**

RICHARD D. LAMM
Governor

**DIVISION OF WATER RESOURCES**

Department of Natural Resources
1313 Sherman Street - Room 818
Denver, Colorado 80203
Administration (303) 839-3581
Ground Water (303) 839-3587

July 2, 1979

MEMORANDUM

TO: STEPHEN O. ELLIS, STATE CLEARINGHOUSE
FROM: DR. JERIS A. DANIELSON, DEPUTY STATE ENGINEER
SUBJECT: WILD AND SCENIC RIVER STUDY AND ENVIRONMENTAL STATEMENT
FOR THE COLORADO AND LOWER DELORES RIVERS

202

This is to acknowledge receipt of your request for review of the above referenced report. The findings of the study and the resultant recommendations as presented in the report should not injure any of the existing water right holders along the Colorado and lower Delores Rivers. We, therefore, have no objections to the proposed river designations as presented in the report as long as the management of this reach of the Piedra River will not prohibit the State of Colorado from enforcing all applicable state statutes related to water rights.

- 1 It should be noted that the tabulation of water rights, as described in table III-1, is no longer correct. A new tabulation of water rights in the State of Colorado was made during the latter part of 1978 which indicates additional water rights in the study area. These additional water rights are in the reach of the Colorado River that is to be designated as a scenic river. If new decreed water rights information is required by the United States Department of Interior/National Park Service for their report, they can contact us and we will furnish a list to them.

- 1 We have revised the table in question using your records.

A handwritten signature in black ink that reads "Jeris A. Danielson". Below the signature, the name "Jeris A. Danielson" is printed in a smaller, sans-serif font.

JAD/RLS:mvf

COMMENTS



COLORADO
HISTORICAL
SOCIETY

The Colorado Heritage Center 1300 Broadway Denver, Colorado 80203
June 15, 1979

Stephen O. Ellis
Colorado Clearinghouse
520 State Centennial Building
Denver, CO 80203

JUN 19 1979

U.S. GOVERNMENT

Dear Mr. Ellis,

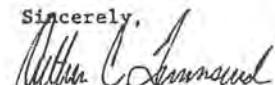
This is to acknowledge receipt of the Draft Environmental Statement for the Colorado and Lower Dolores Rivers Wild and Scenic River Study, National Park Service.
DATE RECEIVED June 6, 1979 DATE DUE July 2, 1979

We find Cultural Resources have been adequately considered and meet the goals and objectives of the National Historic Preservation Act et alia and those of this Office.

Thank you for the opportunity to comment on the proposed project.

If this Office can be of further assistance, please do not hesitate to call upon ES Reviewer Betty LeFree (Office of the State Archaeologist) at 839-3391.

Sincerely,



Arthur C. Townsend
State Historic Preservation Officer

cc: Dr. Bruce Rippey; State Archaeologist
Mr. James Hartmann; Coordinator, Historic Preservation

COMMENTS**RESPONSES**

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WILDLIFE

Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)



July 5, 1979

TO: Steve Ellis,
Colorado Clearinghouse

FROM: Don Smith,
Division of Wildlife

SUBJECT: Wild and Scenic River Study and Environmental Statement
for the Colorado and Lower Dolores Rivers.

294

- 1 The Division of Wildlife has reviewed the subject document and is disappointed that the lower 11-mile segment of the Dolores River is not recommended for inclusion in the National Wild and Scenic Rivers system. We believe the entire study area on the Colorado and Dolores Rivers needs the protection of The Wild and Scenic Rivers Act and should be included in the system.
- 2 The report adequately addresses the fish and wildlife resources and the appended lists appear to be correct. A minor error occurs on page 101 - the photographs of the humpback chub and humpback sucker are reversed. We agree with the conclusion that the entire study area possess outstandingly remarkable fish and wildlife values and that these values should be preserved for future generations. The authors are to be complimented on a well written report.

DGS:jb
cc: Harris Sherman
Larry Morrill
Bob Shields
Bob Evans
Perry Olson

JUL 05 1979

VIC J...
...P...

- 1 The recommendation has been altered to include the 11-mile reach in the system.
- 2 We have corrected this error.

COMMENTS



July 12, 1979

Glen T. Bean
Regional Director
National Park Service
655 Parfet Street, Box 25287
Denver, CO 80225

Dear Mr. Bean,

We at the Aspen Wilderness Workshop support the proposal
to designate the Colorado River in Ruby, Horsethief and West-
water Canyons, and the lower Dolores River from Gateway to
Fisher Creek, as wild and scenic rivers.

By the "wild and scenic river" classifications, the
endangered species of fish and wildlife can be protected,
which is extremely important. These areas also are of special
interest to large numbers of recreation oriented people
throughout the west, especially kayakers and rafters.

We would also like to recommend that the last eleven
miles of the Dolores River should be included under the "scenic"
designation.

Please include this letter as a part of the record on
the draft EIS.

Thank you.

Sincerely,

Jay M. Caudill

COMMENTS

Atlantic Richfield Company
555 Seventeenth Street
Denver, Colorado 80217
Telephone 303 575 7577

J. R. Mitchell
Public Lands Coordinator

July 12, 1979

Regional Director
Rocky Mountain Regional
National Park Service
655 Parfet Street
P.O. Box 25287
Denver, CO 80225

RE: Draft Environmental Statement and
Draft Wild & Scenic River Study
Colorado and Lower Dolores Rivers

Dear Sir:

Atlantic Richfield Company appreciates the opportunity to present comments to the National Park Service pertaining to the Draft Environmental Statement and Draft Wild and Scenic River Study on the Colorado and Lower Dolores rivers in Colorado and Utah.

We are becoming increasingly concerned about the escalation in the rate at which federal lands are being withdrawn from public multiple use. Such withdrawals limit federal acreage accessible for potential energy and mineral exploration and development. Besides protecting the wilderness, the federal government should consider the development of energy and mineral resources and reconcile these and other public lands use needs in a manner which ultimately serves the best interest of the nation. Continued and accelerated land withdrawals could have long-term negative consequences on the availability of energy and mineral resources in the United States, since much of the nation's resource potential is on federal land.

Following are comments pertaining to interests held by the Anaconda Copper Company, a subsidiary of Atlantic Richfield Company, in certain segments within the River Study area.

URANIUM

The affected segments of the Dolores and Colorado rivers have shown little uranium potential to date with the exception of Segment D, which is discussed

COMMENTS

Regional Director
Page 2
July 12, 1979

below. This lack of potential, however, could be due, in part, to the ruggedness and inaccessibility which limit exploration. Future activities could possibly uncover uranium deposits in known hosts, such as Salt Wash and Chinle, or in totally new units.

Colorado River (Utah)

We support the Park Service's recommendation to designate Segment D, Section 29-T22S-R24E, as "recreational river". This segment cuts down through Cretaceous units and at its west end Morrison Salt Wash is exposed. The potential for uranium in this area is excellent due to the fact that Salt Wash uranium mines are located at the end of this segment. A "recreational river" designation will leave this segment open to exploration for, and development of, this important resource.

METALS

To date, the affected segments of the Colorado and Dolores rivers have shown a minimal potential for metals. This may be caused, however, by the same problems faced in other segments located in this region. Segment B does show potential for placer gold deposits as discussed below.

297

Colorado River (Colorado and Utah)

We are concerned that the Park Service has recommended a "wild" designation for Segment B, Westwater Canyon to Rose Ranch, of the Colorado River. This area shows potential for Precambrian gold occurrences and gold placer deposits derived from Precambrian terrain. We feel that the Park Service should consider the need for this valuable resource and allow prudent exploration and development of the mineral occurrences in this segment.

Atlantic Richfield Company endorses the concept of multiple use of public lands. The public interest is best served when ecologically and economically prudent exploration and production activities are allowed to coexist with other land uses. Exploration for, and development of, energy and mineral resources will expand our domestic energy supply, improve local and national economies, increase employment, and help reduce U.S. dependence on foreign energy sources.

Again, we appreciate the opportunity to submit our comments to the National Park Service on the Colorado and Lower Dolores Rivers Wild and Scenic Rivers Study and DES. If additional information is required, please contact us.

Sincerely,

J. R. Mitchell

J. R. Mitchell

JRM/gmd

COMMENTS

AMERICAN WILDERNESS ALLIANCE
4260 East Evans Avenue • Denver, Colorado • 80221
(303) 735-5818

July 12, 1979



Mr. Glen T. Bean, Regional Director
National Park Service
655 Parfet Street, Box 25287
Denver, Colorado 80225

Dear Mr. Bean:

This is to ask that you include the following comments in the official record on the National Park Service's environmental statement and proposal to establish the Colorado and Dolores Rivers as National Wild and Scenic Rivers.

The American Wilderness Alliance strongly supports the proposal of the National Park Service to classify parts of the Colorado and the Dolores as Wild and Scenic Rivers.

The Alliance is a Colorado-based national non-profit conservation organization dedicated to gaining lasting protection for wilderness, wildlife habitat and wild river resources.

298

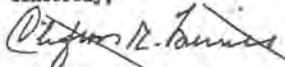
Each year, the American Wilderness Alliance sponsors a number of educational Wilderness Adventures into potential wilderness areas and wild and scenic rivers. Included are trips on the segment of the Colorado River proposed for wild and scenic status. In addition, many of our members, staff and cooperators use the Colorado and Dolores for float trips and nature study. As a result, we are well acquainted with these reaches of the rivers.

There is no question of the outstanding scenic and recreational qualities of these proposed rivers. Threatened and endangered species in the river areas include peregrine falcon, bald eagle, Colorado squawfish, bonytail chub, humpback chub and razorback sucker, as well as other wildlife. All these species would benefit from protective wild and scenic river status. Whitewater boating and camping are important recreational pursuits. Westwater Canyon is famed nationwide for its whitewater experiences. These natural attributes fully deserve wild and scenic river protection.

Moreover, we urge that the last eleven miles of the Dolores be designated as "scenic". This is also an outstanding natural reach of the river deserving protection. The small mine and several uranium and vanadium ore claims should not prevent such classification. In fact, a scenic designation will provide authority to control development, so that it does not needlessly destroy important natural and recreational values of this Dolores segment.

Thank you for the opportunity to comment on this matter.

Sincerely,



Clifton R. Merritt
Executive Director

cc--Representative Jim Johnson
Representative Ray Kogovock
Senator Gary Hart
Senator Bill Armstrong

COMMENTS



The Colorado Mountain Club

GROUPS: ASPEN • BOULDER • BOULDER JUNIOR • DENVER • DENVER JUNIOR • EL PUEBLO • FRONT RANGE
LONGS PEAK • PIKES PEAK • SAN JUAN • WESTERN SLOPES

TELEPHONE
922-8315

2530 W. Alameda Ave.
DENVER, COLORADO 80219

OFFICE HOURS MONDAY THRU FRIDAY 9 A.M. TO 2 P.M. AND THURSDAY AND THURSDAY EVENINGS UNTIL 5 P.M.

Mr. Glen T. Bean
Regional Director
National Park Service
655 Parfet Street Box 25287
Denver, Colorado 80225

July 11, 1977

Dear Sir:

The Colorado Mountain Club (CMC) wishes to comment on the proposal for the Colorado and Dolores Wild and Scenic Rivers. The CMC is one of the state's largest outdoor organizations. Within the Club are hundreds of members whose prime activity is river-running and SW canyon exploration. In fact, the CMC has sponsored numerous trips within the designated areas of these two rivers.

682

The Colorado Mountain Club considers the entire Dolores River area and near-by Colorado River area as one of the most outstanding river canyon areas of the world. Because of this and the fact that Colorado still does not have any of its great rivers preserved as Wild or Scenic, The CMC strongly supports the Wild and Scenic proposal for the Dolores and Colorado river segments. We wish to thank the National Park Service and the Colorado and Utah Departments of Natural Resources for putting together this proposal and we ask for quick implementation of such.

The CMC wishes to point out that the upper 11 mile stretch in question of the Dolores River be designated as "Scenic". This is an outstanding section of the River and should be preserved as is. Any uranium potential can just as easily be taken from outside the Wild and Scenic boundaries. Also by not designating this 11 mile portion as "Scenic" would allow the type of activities to exist in the River area that would distinctly deteriorate the quality of the protected area and also could negatively affect river-running trips along the River.

Again we support your proposal and ask for even more thorough protection of these two fine river areas.

Mr. Fred Ruckhaus, President
Colorado Mountain Club

COMMENTS



Grand Junction, Colorado 81502

June 29, 1979

Mr. G.T. Bean
Regional Director
Colorado National Monument
Fruita, CO 81521

Dear Sir:

We feel that we must advise you of our feelings about the proposal to make the Wild & Scenic Designation of the Dolores and Colorado Rivers in Western Colorado and Eastern Utah during this period allowed for public input.

River rafters, outfitters, and kayakers will benefit immensely from permit use of these areas because they will take time to apply for the required permits. Permit usage will discourage families, hunters, and fishermen from using these areas as they tend to plan many of their outings on much shorter notice. We feel a Wild & Scenic River Designation caters to a small percentage of the public.

In order for these areas to be officially improved for general public recreation, funding would probably come from our National & State Parks Departments. The restrictions which would need to be imposed to maintain and protect these new improvements would again hinder more than benefit the general weekend recreational enthusiast.

These areas are presently being utilized by all who wish to use them. We feel that limited facilities in these areas will discourage the heavy traffic which normally accompanies thoughtless vandalism by a small percent of the public.

Therefore it is our intent that these areas be left as they are and not added to the National Wild & Scenic Rivers or improved beyond their present state.

Sincerely,
Colorado River Skippers
P.O. Box 2451
Grand Junction, Colo. 81502

SIGNATURES OF ENDORSEMENT

See next page

Gladys Gailey

COMMENTS

W.M. Hartman 3007 1/2 E Rd. Grand Jct., Co.
Jane Hartung 3007 1/2 E Rd Grand Jct., Co.
Lorraine Smith 515 N 7th Grand Jct., Co.
Donald Savel 559 2nd Ave. Grand Jct., Co.
Rich Hartung 3007 Eastgate Rd. Grand Jct., Co.
James G. Sauer 2132 1/2 2nd Ave. Grand Jct., Co.
James P. Smith 515 N 7th Grand Jct., Co.
Jeff Thomsen 515 N 7th Grand Jct., Co.
Lorraine Sowell 2650 2nd Ave. Grand Jct., Co.
Donald Johnson 8-1237 Grand Jct., Co.
Betty Johnson 2011 Linda Lane Grand Junction, Co.
Virginia Herbert 154 3rd St. C.J.C. Co.
Don Dawson 577 Bomber Rd. Gr. Jct., Co. 81501
Audrey Swanson 2011 Linda Lane 2n Jet Col 81501
Bill Herbert 3352 Butterfield 2n " " 81501
Davy Hall 577 Bomber Rd GR. JCT 81501
as child

COMMENTS

RESPONSES

COLORADO WHITE WATER ASSOCIATION

Mr. Glen T. Bean
Regional Director
National Park Service
5655 Parfet
Denver Colorado 80225

Dear Sir,

We have inadvertently allowed the deadline for comments on the Colorado and Lower Dolores Draft Wild and Scenic River Study to pass. We hope you will realize that this is not an indication of a lack of interest on our part but rather a result of the volunteer nature of this organization's efforts.

We are both pleased and distressed by this report. Chapter IV, Eligibility and Classification, is one of the best we have seen. It was a great defect of the old Dolores study, that if simply announced what was and what was not outstandingly remarkable, without revealing the criteria used. Probably since they would not bear examination, that study having overlooked the outstanding recreation available along the Dolores. This study, however, has been up front with its justifications and explanations; we trust this trend will continue. We particularly commend the spirit shown in finding Ruby Canyon Scenic; it appears you decided a questionable case in the river's favor, for once. This is a refreshing change from the old Dolores study, which not only decided everything against the river, but went out of its way to manufacture cases it could then decide against the river.

Having commended you, rightly, for chapter IV, we are quite irritated by your work in chapter V, Findings and Recommendations. Your recommendation against including the lower 11 miles of the Dolores River in the National System is petty, and wrong. And it is marred by the kind of hinting doubletalk you properly avoided in the last chapter. Why don't you come out and tell us which members of the study team wanted to recommend inclusion and which didn't-- and why. You have told us the area has marginal scenic values; we, who have run the river, disagree. You fall back on the potential to extract 15,000 pounds of Uranium, worth, by your estimation, less than half a million dollars. You would need to move about 2000 cubic meters of ore to recover it. These amounts are so small, considered against the nationally important values of that river, that we are surprised at the greed involved; it is such a small, sad excuse for failing to protect this river. We are startled you dared to offer it. Finally, as you point out several places in the report, Only Wild designation precludes mining; others only place limitations

4260 East Evans
Denver Colorado
July 18, 1974

202

- 1 We have altered the recommendation to include designation of the lower 11 miles (17.7 km).

COMMUNES

Mitch Hall 3060 1/2 E Rd. Grand Tr. Co.
Jean Fonteyn 3000 1/2 E Rd Grand Jet. Co.
Lorraine Smith 575 N 7th Grand Jet. Co.
Donald Donaldson 559 2nd Ave. Grand Jet. Co.

Mark Galt 322 East 10th
Janie & Glenn 2130 N. 2nd St. Grand Jet. Co.
Janice Smith 515 N 2nd Grand Jet. Co.
Jeff Smith 515 N 2nd Grand Jet. Co.

Donald Johnson 2600 Grand St. Grand Jet. Co.
Felix Johnson B-2-237 Grand Jet. Co.
Virginia Herbert 2011 Linda Lane Grand Junction, Co
Don Donner 154 3rd St. Cl. Sh. Co.

Audrey Welch 577 Bomber Rd. Gr. Tr. Co. 8/501
Bill Harbit 2011 Linda Lane 2n Jet Co 8/501
Dewy Hall 3352 Northridge Dr. " " "
Ed Shill 577 Rotenback Rd GR. Tr. Co. 8/503

COMMENTS

RESPONSES

COLORADO WHITE WATER ASSOCIATION

Mr. Glen T. Bean
Regional Director
National Park Service
5655 Parfet
Denver Colorado 80225

Dear Sir,

We have inadvertently allowed the deadline for comments on the Colorado and Lower Dolores Draft Wild and Scenic River Study to pass. We hope you will realize that this is not an indication of a lack of interest on our part but rather a result of the volunteer nature of this organization's efforts.

We are both pleased and distressed by this report. Chapter IV, Eligibility and Classification, is one of the best we have seen. It was a great defect of the old Dolores study, that if simply announced what was and what was not outstandingly remarkable, without revealing the criteria used. Probably since they would not bear examination, that study having overlooked the outstanding recreation available along the Dolores. This study, however, has been up front with its justifications and explanations; we trust this trend will continue. We particularly commend the spirit shown in finding Ruby Canyon Scenic; it appears you decided a questionable case in the river's favor, for once. This is a refreshing change from the old Dolores study, which not only decided everything against the river, but went out of its way to manufacture cases it could then decide against the river.

Having commended you, rightly, for chapter IV, we are quite irritated by your work in chapter V, Findings and Recommendations. Your recommendation against including the lower 11 miles of the Dolores River in the National System is petty, and wrong. And it is marred by the kind of hinting doublespeak you properly avoided in the last chapter. Why don't you come out and tell us which members of the study team wanted to recommend inclusion and which didn't-- and why. You have told us the area has marginal scenic values; we, who have run the river, disagree. You fall back on the potential to extract 15,000 pounds of Uranium, worth, by your estimation, less than half a million dollars. You would need to move about 2000 cubic meters of ore to recover it. These amounts are so small, considered against the nationally important values of that river, that we are surprised at the greed involved; it is such a small, sad excuse for failing to protect this river. We are startled you dared to offer it. Finally, as you point out several places in the report, only Wild designation precludes mining; others only place limitations

4260 East Evans
Denver Colorado
July 18, 1978

302

1 We have altered the recommendation to include designation of the lower 11 miles (17.7 km).

COMMENTS

on it. Perhaps this will make recovery of Uranium from the Dolores corridor more expensive and thus less probable. Perhaps that is as it should be, given that Uranium is relatively much more abundant than beautiful rivers.

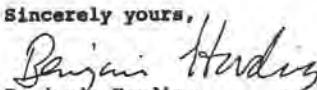
- The other assumption implicit in your negative recommendation is
- 2 that you are making a study for the National Wild and Scenic Segments Act; when you behave like this, snipping rivers up into pieces, we begin to expect you to nominate certain rapids to the System, while excluding the pools below. Taken from the headwaters to confluence with the Colorado, the Dolores is one of the great rivers of the West. Offered a chance to protect nearly all of it, the first Dolores study team messed up. In failing to recommend this section, you follow them. Let us make a prediction to you. This report contains plans to put in a takeout at Bridge Canyon, near the Shura Ranch, 11 miles above the mouth. Now this is a foolish plan, of course, since no one will particularly care to jounce over an hour of dirt road to avoid 2 hours of floating. But the main reason no one will use it is that they will want to run the whole river.
 - 3

The Dolores is, all in all, a great stream, with sections of surpassing beauty and sections, as your report has it, "which appeal to a different taste." We would have thought, from reading the beginning of this report, that you had enough sensitivity to have looked at the river as it is--one river, one entity, one being. Apparently the idea of total basin planning has somehow not traversed the distance from the Bureau of Reclamation to you. We hope the Secretary of the Interior will cancel your parochialism, and take a statesmanlike view of the national values of that river, since the planners and the study team did not.

We support the inclusion of the Colorado River in the National Wild and Scenic Rivers System at the Classification levels for which it now qualifies. We support the inclusion of the study segment of the Dolores at the classification levels for which it qualifies, and hope the study's unfortunate failure to recommend the lower 11 miles to the system will be corrected in the final report and environmental statement. We recommend that you follow the new CEQ guidelines and indicate in more detail why, if you are to continue not to recommend that lower portion of the Dolores, you have not chosen the environmentally preferable alternative. Finally, we urge the study team to help rectify the error of its predecessors, and work for the inclusion of the reach of the Dolores from the confluence with the San Miguel to Gateway. This would provide an example of river protection truly in keeping with the provisions and the spirit of the Act.

RESPONSES

- 2 Termini for river segments were determined on the basis of physiography, access, convenience in management, and amounts of human development.
- 3 Access to the Bridge Canyon area is planned under existing management of the BLM, to whom we have communicated your views.

Sincerely yours,

Benjamin Harding
Conservation Chairman
Colorado White Water Association

COMMENTS



E. H. WARING
CHIEF ENGINEER

P. O. BOX 5482

DENVER, COLORADO 80217

June 14, 1979
File 370

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet St.
Box 25287
Denver, Colorado 80225

304

Dear Sir:

This will refer to your letter of June 1, 1979 which accompanied draft environmental impact statement for Colorado - Lower Dolores Rivers study.

The Railroad Company supports the No Action Option for Segment A of the Colorado Wild and Scenic River study as being least restrictive to its future activities in Ruby Canyon, for the reasons outlined in our letter of May 10, 1977 and the Public Response Packet which accompanied same.

We have no objection to any of the remaining alternative options for either the Colorado river or the Dolores river, as incorporated in the study.

Very truly yours,

A handwritten signature in cursive ink that appears to read "E. H. Waring".

COMMENTS



FORUM NEWSPAPERS, INC.

807 MAIN ST., BOX 9 • NUCLA, COLORADO 81424 • 303-864-7425

June 5, 1979

Regional Director, Rocky Mt. Region
Nat'l. Park Service
665 Parfer St.
Box 25287
Denver, Colorado 80225

Dear Sirs:

I strongly urge that the National Park Service designate the rivers, the Colorado and Dolores River sections now under study, to be managed for maximum recreation use, and to designate them at classification levels that would permit somewhat increased mining and recreation use.

Thank you,

A handwritten signature in black ink, appearing to read "Roger Culver".

Roger Culver
Forum Newspaper Publisher

RC/hrh

COMMENTS

RESPONSES

FRIENDS OF THE EARTH FOUNDATION

124 SPEAR SAN FRANCISCO CALIFORNIA 94105

(415) 495-4770

Colorado Springs, Colorado
July 13, 1979

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street, Box 25297
Denver, Colorado 80225

Dear Sir:

In response to your request of June 1st, The Colorado Plateau office of Friends of the Earth would like to submit the following comments regarding the draft Wild and Scenic River Report and Environmental Statement for the Colorado-Lower Dolores River Study.

Friends of the Earth generally supports the recommendations of the study with the following alterations:

1. 1. The 8.7 mile section of Horse Thief Canyon between the Loma Launch site to the intersection with the D&RG Railroad (Segment A-1) should be classified as "Wild" since the shoreline developments do not restrict the corridor's wild character.
2. 2. The 11 mile Bridge Canyon to Colorado River section of the Dolores River should be classified as "Scenic". This section is well suited to Scenic classification according to the findings of the study summarized by the chart on page 145. The recommendation of members of the study team to leave this 11-mile stretch of the Dolores River out of the wild & scenic rivers system creates an unnecessary gap in the protection and management of this scenic river resource. The potential of the area for mineral extraction should not be considered as an overriding concern when weighted against the known scenic river recreational values of this 11-mile section.

We would also like to compliment the members of the study team which prepared the report for their efforts.

We hope these comments will be taken into consideration and incorporated in the final environmental statement.

Sincerely,
Gordon Anderson
Gordon Anderson
Colorado Plateau Representative
Friends of the Earth
Box 939, Moab, Utah 84532
701-291-7052

1 The area does not qualify for a wild designation due to the developments described in chapter II and enumerated in chapter 4. See pages 60 and 149-151.

2 We have altered the recommendation to include designation of the lower 11 miles (17.7 km).

COMMENTS

New Mexico

WILDERNESS STUDY COMMITTEE



Allen T. Bean, Regional Director
National Park Service
655 Park St.
Box 252875
Denver Co., 80225

Dear Sir:

I strongly support the Park Service proposal to classify the Colorado and Dolores Rivers as National Wild and Scenic Rivers. Also include the last eleven miles of the Dolores as a Scenic River.

Sincerely,
Mildred M. Conrad
Past Director NWSC
Take care
P.S. Please excuse the delay. The news just reached here yesterday.

COMMENTS

June 14, 1979

Mr. Glen T. Bean
Rocky Mountain Region
National Park Service
655 Parfet St.
P O Box 25287
Denver, CO 80225

Dear Mr. Bean,

The news release regarding the Colorado-Lower
Delores Wild and Scenic River statement just
came to our attention.

We are writing to strongly support the recommendation that that section of the Colorado and of
the Delores Rivers be added to the National
Wild and Scenic River system. We feel that the
scenery, archeology, and wild life along these
rivers make it a unique area worth preserving
in its present condition for future generations.

Sincerely,
Fred Wessels
Fred Wessels, Chairman
Louise Waid
Louise Waid, Secretary

Grand Junction Group
Rocky Mountain Chapter
Sierra Club

COMMENTS

RESPONSES



Sierra Club

Rocky Mountain Chapter

"...TO EXPLORE, ENJOY AND PRESERVE THE NATION'S FORESTS, WATERS, WILDLIFE AND WILDERNESS..."

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

July 9, 1979

Dear Sir:

On behalf of the more than 3000 members of the Sierra Club who live in Colorado and comprise the Rocky Mountain Chapter, I am pleased to support the proposals for Wild and Scenic River designations for portions of the Colorado and lower Dolores Rivers addressed in the recent National Park Service study. We fully support the protection that would be offered through such designations and will actively seek Congressional approval of your recommendations.

¹ However, I do urge reconsideration of the decision to recommend no protection for the lowest 11 miles of the Dolores. It seems illogical to end protection for a river at an arbitrary location. Certainly recreational use of the river does not and would not acknowledge such a boundary; no river float trip would end there, for instance. In addition, the study has recognized the recreational importance of the river segment by supporting management to preserve recreational experiences. It seems evident that protection could best, and perhaps only, be offered through designation along with adjacent river segments. We urge that you recommend "scenic" designation for the lowest 11 mile portion of the Dolores River.

Respectfully,

Connally Mears

Connally Mears
Wilderness Coordinator
Rocky Mountain Chapter
of the Sierra Club

¹ We altered the recommendation to include designation of the lower 11 miles (17.7 km).

COMMENTS



Jim Beloy
Colo Council
1740 High Street
Denver Colo 80218
(303) 392-0218

Mr. Glen Bean
NRS Regional Director
Denver, Colo.
UNLIMITED

Dear Mr. Bean

I wish to express the support of
the Colo Council of Trout Unlimited for the
Bait Service proposal to designate ~~as~~
National Wild & Scenic Rivers both Colorado
and Colorado reaches above their assistance.
While neither of these reaches possess
outstanding history qualities, they are blessed with
a myriad of exceptional values that ought to be
protected in the national interest.

To repeat what this letter be included
in the record.

Sincerely Jim Beloy
Colo Council
Sec. Director

COMMENTS

UNITED SPORTSMAN'S COUNCIL OF COLORADO

4155 E. Jewell Ave., Suite 1102 — Denver, Colorado 80222 — (303) 756-8127

OFFICERS

July 11, 1979

John M. Schooley
President
Ronald A. Karron
1st Vice President
Jerry Mallett
2nd Vice President
Thomas V. Jacobson
Secretary-Treasurer

Mr. Glen Bean
Regional Director
National Park Service
455 Parfet St.
Box 25287
Denver, Co. 80225

DIRECTORS

Term Expire 1980

Thomas V. Jacobson
Joe P. Jones, Jr.
Ronald A. Karron

Term Expire 1981

G. Christian Crosby
Jack A. Harlan
Jerry Mallett

Term Expire 1982

Clinton Burgess
Marvin D. Miller
John M. Schooley

Dear Mr. Bean:

Upon review of the draft of the Colorado-Dolores, we would like to offer the following comments regarding possible designation under the Wild and Scenic River System. The report prepared by your agency and the Department of Natural Resources for the state is excellent in its recommendations.

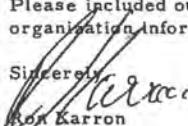
We do feel the last 11 miles of the Dolores qualifies for scenic designation and should be so considered.

REGIONAL DIRECTORS

Alan Baier (N.W.)
W. E. Blackburn (N.E.)
Larry Ehardt (S.W.)
Hes Salsbury (S.E.)

Please include our comments in the record and keep our organization informed regarding this issue.

Sincerely,


Ron Karron

EX-OFFICIO MEMBERS

Cliff Malmquist
Douglas E. Miller
James T. Smith
Peter Van Gordenbeck

cc:

Governor Richard Lamm
Senator Wm. Armstrong
Senator Gary Hart
Representative Jim Johnson
Director of Natural Resources Harris Sherman

COMMENTS

Regional Director
Rocky Mountain Division
National Park Service
655 Broadway
P.O. Box 25287
Denver, Colo. 80225

"Salting the wild and scenic river front on the
Colorado and Dolores River has in Grand County
Utah.

"First off, I object to desalting our river
The Colorado Canyon as a wild river by the very fact
it is.

"The lower part of this study has lots of private
land and should not be placed on any Colorado
I for one have heard land on the Colorado river
and I think any classification around it, & also
will not compare to any Colorado downstream
my use of land.

"I object to the environmental group that made
this study, Mr. Thaddeus is a member of

"The Friends of the earth and I know he does not
make a fair study."

"This is state land on river beds and should be
so based by state on use of our land
minerals on both rivers are more important to
our state than a wild river - we must try to open

D. J. Dillitt
Chairman Water and Land Users
5 North Main
Moab, Utah. 84532

COMMENTS

WILLIAM M. BOWER
2372 DENNISON LANE BOULDER COLORADO 80303 12 July 1979
(303) 498-0877

Dear Mr. Baam

I support your professional
to develop the Colorado and Dolores
Rivers as National Wild & Scenic
Rivers.

For 11 miles stretchy the
Dolores descended to me as the
last 11 miles descended down
the mountain.

Colorado River must be protected
under National Wild & Scenic Rivers
System. Hand to Dolores DJ in the
ten or more years since the River as
was passed off we demand regard on the
Colorado River. We turn to you
Please make the Dolores in the Gunnison
River on the project

Sincerely
William Bower

COMMENTS

RESPONSES

Richard W. Cozza
P.O. Box 88
1022 North Third Street
Grand Junction CO 81501

July 10, 1979

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street
Box 25287
Denver, CO 80225

Re: L5815 (RMR) PC

In response to your June 1, 1979 letter, I submit the following:

Since 1954 I have used the Colorado River from Loma Launch to Westwater Canyon for hunting, fishing and general recreation. Access has been by jet power boat.

314

I now own (leasehold interest) 280 acres of riverfront property in Horsethief and Ruby Canyons. Future plans for use of this property will be consistent with the past 25 years, i.e. non-commercial recreational fishing, hunting and general recreation with power boat access.

I would strongly oppose any plan to restrict or control this access or use. The landowner's right to use his property should not be legislated. The public access to the river recreation should not be legislated.

1 Commercial use by rafts and float trips will solve itself. When use becomes too heavy it will no longer have the appeal and use will decline. No more bureaucracy, and rules that cost far more to enforce than the good that is done.

Sincerely,

Richard W. Cozza
Richard W. Cozza

RWC:as

1 Certain eastern rivers, such as the Youghiogheny in Pennsylvania, which has recorded boating use by 5,000-9,000 people on one weekend, have not shown any decline in use due to crowding and the perception that they no longer have appeal. Most research indicates that more sensitive users will gradually seek other rivers as their favorites get crowded, but they are more than replaced by less crowd-sensitive users whose expectations were initially formed on crowded rivers.

COMMENTS

RESPONSES

Mr. Glen Brown
National Park Region Director
Santa Fe, Colo.

Dear Mr. Brown

OSC-back

I am interested in the regulations proposed on motor boats on the Colo River from Loma to Westwater.

We have run our motor boats up and down the river for years, hunting and fishing.

- 1 We think it is not right to limit our motor boat rights on the river by passing the Wild and Scenic river act.
- 2 It will not qualify on account of the railroad.

Please help us protect our rights on the river. Would like to hear from you.

Thank You
Lawrence Cudler
Loma, Colo.

81524

1 The Wild and Scenic Rivers Act does not address motorboat use, and no plans were made or suggested during this study that would affect motorboat usage in Ruby and Horsethief Canyon.

2 The presence of the railroad does not disqualify the reach in question.

COMMENTS

Dear Sirs
I have just read of the proposal for wild and
scenic river status for the Dolores and Colorado
Rivers. As I understand the deadline for comments
is past - but I hope this is incorrect and that
I would like to express my full support for
the proposals and also say that I believe the rest
of the Dolores should be protected also. If
public support is what counts - I know many people
who would be in favor of preserving these rivers,
and none who would not. Please do your best
to help save these irreplaceable areas and others
for all present and future people - Thank you.

Truly Yours

John Caputo

Box #48B
Great Divide R.R.
Craig, Co. 81625

Also, would not Dinosaur Nat. Monument be under your
concern? If so, I feel the Park Service should not
allow any thing that threatens to disrupt or alter part
of Dinosaur, mainly the Yampa River. The proposed dams
at either Cross Mountain or Juniper Mountain, or both would
do just that. They would destroy the character of the Yampa,
heart of the monument. As you ~~do~~ do doubt realize, with a dam
so close, the river would never freeze over in the frozen
winter. Also, the

COMMENTS

River would never warm up in the summer like it does now - there by bringing the life in the river (ie. certain species of fish, etc., and plants) also not being pleasant to swim in, as it is now in summer and fall - Also - a close stream channel would seriously affect the rafting and kayaking, for which there is already more demand than river - why allow the situation to worsen? It is for these reasons I feel the park service has a responsibility to help Permanently stop these dams at Cross and Juniper Mountains. Another effect on the River would be the demolishing of the sand bars - as water out of a Dam is mostly clear, not siltly as is the Yampa in spring.

Cross Mountain canyon is short, but still extremely beautiful. Juniper Mountain is an amazing place with all types of wild life (otter, bobcats, etc. have even been seen several occupied eagle nests there) a dam with the construction and the steady amount of people in the area would destroy this habitat, as well as flood Juniper hot springs, and much valuable farmland - as well as the medicinal effect on Dioxosar - if in your power I feel the Yampa should also be designated under the wild and scenic rivers acts. Thanks very much for taking the time to read this - I would greatly enjoy your comments - if you can spare any more of your time -

COMMENTS

Mr. Glen T. Bean, Regional Director
National Park Service
Box 25287
Denver, CO 80225

P.C. Eiselt
1345 N. Wahsatch
Colorado Springs, Co
July 12, 1974
80903

Dear Mr. Bean:

As a concerned citizen I would like to present a few views on designating sections of the Colorado and Dolores Rivers for Wild and Scenic River Status. Preserving the natural state of these rare large rivers in the arid Southwest is important from an ecological as well as personal enjoyment standpoint. Still so little is

known about some of the ecosystems that these rivers complete or share in, that it is important to keep them. Opening them to more use or adjacent activity won't help solve any long term resource or recreation problems anyway, in my mind.

I would recommend the Park Service proposals to classify the Dolores and Colorado Rivers as Wild and Scenic especially the Westwater Canyon section.

I would also encourage the Park Service to include the last 11 miles of the Dolores River to the confluence as "Scenic."

I appreciate your consideration

Sincerely,

Peter C. Eiselt

COMMENTS

GORE LIVESTOCK, INC.
Glade Park, Colorado 81523

July 11, 1979

Regional Director
Rocky Mountain Region
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

Re: I5815(RMR)PC

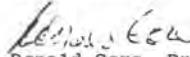
Gentlemen:

In reference to your letter of June 1, 1979, I submit the following:

We have owned approximately 6 miles of riverfront property between the Loma Launch and Westwater Canyon for the past 50 years. It serves as Winter and Spring range for our livestock operation. There has been placer mine activity, some underground mineral exploration, and recreation use.

This river property, along with several thousand acres in the higher country, is vital to our continuing operation. As landowners, we are so closely restricted by existing laws that operation is difficult. We feel the use and development of our private land is our right as owners. Further governmental controls only increase costs and restricts our rights to free enterprise. We oppose any additional controls.

Respectfully yours,


Donald Gore, President
Gore Livestock, Inc.

DGP:aa

COMMENTS

July 10, 1979
Dewey T. Barn, Regional Director
Federal Lands Division
655 Gold St., Box 25287
Denver, Colo. 80225

Dear Mr. Barn:

This letter is my statement of opposition to the Park Service proposal to extend the Old Spanish Trail through the Colorado and Dolores Rivers. Specifically, I oppose the 5.5, 7 miles of the Colorado River, beginning at Hwy. 145 east of the Hardscrab Canyon and the upper 2 miles of the Dolores River, starting to the Bridge Canyon.

I concur with the "scenic and cultural" designation recommended by the National Park Service in their proposal. The proposed trail and bridge crossing along the foot of the Dolores River would impact the Colorado River. It is due that Native Americans two rivers, notably the Colorado River, have significant natural, cultural, social, as well as historical and original features and recreational possibilities. I know there are eagles & porcupine along there.

Please include this letter with the public comments on the proposal of the Park Service.

Sincerely yours,

Dorothy P. Klemmer

Mrs. Dorothy Klemmer
614 Credit Lane
Glenwood Springs
Colorado 81601

Glen T. Bear, Regional Director
National Park Service
655 Parfet Street
Denver, Colo. 81611

Dear Mr. Bear:

We surely like rafting on the Dolores River, and are happy for the wild and scenic river proposals. From Slick Rock, beyond Bradon, to Dewey Bridge — all tremendous natural landscapes, with many places of historic interest along the way. (Like the old flume).

Yours truly,
Mrs. & Marge Hollingshead,
4410 S. Aspen St., Aspen, Colo.

COMMENTS

3695 F Road
Palisade, Co 81526
July 12, 1979

Mr Glen T Bean, REgional Director
National Park Service
655 Parfet St
Box 2527
Denver, CO 80225

Dear Mr Bean:

I am writing this letter to express my support for the National Park Service's proposal to provide Wild and Scenic River Classification for the lower stretches of the Colorado River and Delores River in Colorado and Utah. I would, however, like to see additional protection for the lower 11 mile reach of the Delores.

As a resident of WEstern Colorado, I believe it is essential to provide protection for the few remaining wild and scenic river stretches that remain in this area. This is particularly true in view of the proposed energy developments that will put increased development pressure on all the free running rivers and streams in western Colorado.

Although I am a professional engineer in the civil consulting field, I do not wholesale development of western water resources as necessary or justifiable. On the contrary, a little moderation and conservation on every ones part (including mine) will do wonders in solving our water and energy needs.

Sincerely
Wm D Hamann
William D Hamann, P.E.

COMMENTS

WILLIAMS, TURNER & HOLMES

ANTHONY W. WILLIAMS
BERNARD C. HOLMES
CHARLES HOLMES
IVAN P. KLADEK
J. O. RHOOGRAAF
BERNARD A. BUESCHER

EDWARD L. MANN
DONALD E. JORDAN

ATTORNEYS AT LAW
COURTHOUSE PLACE BUILDING - 200 N. 16TH STREET
P.O. BOX 338
GRAND JUNCTION, COLORADO 81501
TEL: 749-4952

CHARLES SMITH (1888-1964)
CHARLES HOLMES (1887-1967)

July 20, 1979

Regional Director
Rocky Mountain Region National
Park Service
655 Parfet Street
P. O. Box 25287
Denver, Colorado 80225

Gentlemen:

We represent Charles M. Nystrom, whose present address is
P. O. Box 86, Loma, Colorado. Mr. Nystrom owns approximately
500 acres bordering the North bank of the Colorado River,
having 1.75 miles of river frontage and approximately 3/4s
of a mile downstream from the Loma Boat Launch.

Mr. Nystrom has owned this property for approximately four
years, during which time he has constructed a personal
residence, engaged in mining operations, agricultural oper-
ations, and is presently actively engaged in the development
of that property for a residential subdivision. Mr. Nystrom
has invested a great deal of time and money in this project,
and is greatly concerned that your considerations involving
a wild or scenic river may disrupt or frustrate his activities
insofar as this property is concerned.

323

Mr. Nystrom is in possession of your notice and summary of
findings and recommendations with respect to this part of the
Colorado River. However, Mr. Nystrom did not receive this
notification until approximately July 14 of this year. Due
to circumstances beyond his control, he was deprived of this
communication until that date; therefore, he is late in res-
ponding to your request for comments on or before July 13,
1979.

Mr. Nystrom takes the position that a decision of the magnitude
implied by your notification deserves considerably more thought
and consideration than Mr. Nystrom has been afforded to date.
He therefore would state that this letter is merely intended
to be a preliminary notification to you that he objects, stren-
uously, to any designation which would be incompatible with Mr.
Nystrom's planned use of his property. He intends to diligently
study your proposals, and to make further inquiries with
respect to the entire subject and will respond to you in
greater detail as soon as he has a reasonable opportunity
to acquaint himself with the various ramifications of your
project.

Your cooperation in acknowledging Mr. Nystrom's concerns
will certainly be appreciated.

Yours very truly,

WILLIAMS, TURNER & HOLMES

Bernard C. Holmes
Bernard C. Holmes

BCH:ju
cc: Charles Nystrom
cc: Regional Director,
Bureau of Land Management
Grand Junction District

COMMENTS

July 11, 1979

Mr. Glen Bean
Regional Director, Parks Service
Box 25287, Denver Federal Center
Denver, CO 80225

Dear Mr. Bean:

- 1 I am writing this letter in regards to the concideration of bleeing the lower Dolores River in the wild and scenic river designation. It is my opinion that the Dolores River is not suited to the requirements for a wild and scenic river due to the fact that the river only is suitable for rafting approximately two weeks out of the average year. It looks to me like the government would be spending a great deal of all the peoples money to provide recreation for a very few people. At the present time the land owners have allowed these people to use our private land with out any kind of harassment and we expect the same consideration from them although it has not always been that way. It is my feeling that if the river is put into the wild and scenic river system, private property that has been previously open to the use of those seeking recreation will be closed to them.

The people in this community are a tough breed who have worked all their lives for the right to own this land and do with it as they see fit. All of our neighbors love this part of the country and mak a great deal of sacrifices to live here. I know of no-one who is out to deface its natural beauty, in fact we go out of our way to preserve it as much as possible. Many of the things that are done on theriver to keep it from eatting away the agriculture land actually improve its quality by preventing the dump-ing of huge amounts of silt into the river during high-water in the spring. If the agricultural people are prevented from doing this, that silt will be carried on to Lake Powell. As for the preventing of building of homes etc., within the proposed 1/3 mile visual corridor most of us think in terms of structures which are in harmony with the natural feeling of the land and want our homes to relate to that feeling rather than detract from it.

- 2 It is nice to consider the feelings of those people who are seeking recreational sights but please concider the feelings of the people who have to live in this community year round and who have worked hard to make it what it is. I don't know if you will be told this by your employees or not but the people in Gateway were not even notified that this was going to take place until approximately a week ago which certainly did not give us adquate time to prepare a statement on this. We are a very isolated community and would appreciate an improvement in communication from the various departments of the government. We had to ask for a meeting to be held here in Gateway, why weren't the original meetings held here when it is of such vital importance to this community. It appears to the people here that this was an attempt to railroad this thing through in hopes that we would not know about it until it was done and the people are angry about it. I don't know if that was the idea or not but in the future such things should be brought to the attention of the people whom it concerns the most in regards to private property and economic impact. Thank you for your time in considering my letter.

Sincerely,

Jeanne P. Hubbard
Jeanne P. Hubbard
Box 242
Gateway, CO 81522

RESPONSES

- 1 Protection is recommended for all the outstanding qualities of the Dolores River corridor, not just its recreation. The floating season on this segment of the river is, in an average year, 60 to 80 days.
- 2 We regret that notices of the earlier series of four meetings were not seen by residents of the Gateway area, and that a meeting was not held in Gateway itself in that initial series. However, a summary of comments expressed at the July 10, 1979, Gateway public meeting will be included in the final report. In addition, any future river planning will include at least one public meeting in Gateway.

COMMENTS

Mr. Scott Packer
Bureau of Land Management
Moab, Utah 84532

RE: LE815 (RMR) PC

Gentlemen:

I am against any more Wild and Scenic River Systems anywhere. I feel that the United States Department of the Interior is trying to take over all of the Western States to the extent that everyone will be working for the government. I fear also that we will not be allowed to go any where in the state without having a permit to do so.

Public land is just that- for the public. It is not to be locked up so that just a hand full of people can use it.

As for the Delores River, a lot of the time it doesn't have enough water in it to float an innertube much less a boat. This area is also a mineralized zone that I don't think the government has any right to lock up. If the "Energy Crisis" is real it is unreasonable to me that the government would lock up the areas with so much mineral potential.

325

Vion L. Johnston
Vion L. Johnston

COMMENTS

2640 Kohler Drive
Boulder, Colorado 80303

July 12, 1979

Mr. Glen T. Bean
Regional Director,
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

Dear Mr. Bean:

I strongly support the Park Service in its proposal to classify segments of the Colorado and Dolores Rivers as National Wild and Scenic Rivers.

I am especially concerned about the possibility of rare and endangered plant species being found in the proposed areas. According to Dr. William A. Weber, University of Colorado Museum, all signs would indicate that important floral elements may exist there. We must preserve these areas for long-term study.

Please add my statement to the official records on this matter. Thank you.

Sincerely,

ER Kohler
Elaine R. Kohler

326

ADDENDUM OF IMPORT:

I also urge the inclusion of the remaining eleven miles of the Dolores to the proposal as "scenic." The mine tailings have not significantly altered the free-flowing nature of the river on that stretch, and future generations may even consider such disturbances for their historic value.

ERK
E.R.K.

COMMENTS

Box 87
Cortaro, AZ 85230
Aug. 8, 1979

Glen Bean, Regional Director, National Park Service
655 Parfet Street
Box 25287
Denver, Colo. 80225

Dear Mr. Bean:

I support the park service proposals to classify the Colorado and Dolores Rivers as National Wild and Scenic Rivers except that I believe the last eleven miles of the Dolores should be included as "Scenic". I rafted the Dolores this past spring and feel that this section qualifies for inclusion.

327

Sincerely,

Thoron Lane

Thoron Lane

COMMENTS

Glen T. Deem, Reg. Dir.
National Park Service
less Route 4
Box 25281
Denver, Co. 80225

Dear Sir:

I wish to suggest the designation
the SS. 1 mile segment of the Colorado
River is Rudy Hough's and that it would
be fitting if the conference of the
Colorado and Delaware River Com.
added to the Colorado River
as a separate river.

The Colorado is a river to please
the mining state. It has
got left and
done some
over. I
hope you
will
and thank
you.

Truly yours,

Glen T. Deem
Reg. Dir.
National Park Service
Denver, Co.

COMMENTS

Jerry Mallett
8550 E. Davies Pl.
Englewood, CO 80110

July 13, 1979

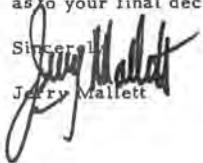
Mr. Glen Bean
Regional Director
National Park Service
655 Parfet St.
Box 25287
Denver, CO 80225

Dear Mr. Bean:

This letter is in support of the designation of some 56 miles of the Colorado and lower Dolores Rivers under the National Wild and Scenic Rivers System. I have read the draft proposal released by the Park Service and support its recommendations.

I have run each river a number of times and am aware of their outstanding natural values. I also endorse the last 11 miles of the Dolores as scenic classification. This is a very fine section of river and deserves protection.

Please include my letter in the record and keep me informed as to your final decision.

Sincerely,

Jerry Mallett

COMMENTS

625 Concord Avenue
Boulder, Colorado, 80302
20 July 1979

Glen T. Bean,
Regional Director
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado, 80225

Dear Mr. Bean:

I wish to go on record in support of the NPS proposals to classify the 55.7-mile segment of the Colorado River in Ruby, Horsethief, and Westwater Canyons as part of the National Wild and Scenic Rivers System. I also support the recommendation that the upper twenty miles of the Dolores River from Gateway, Colorado, to Bridge Canyon be added to the System.

330

I would request that the lower 11 miles of the Dolores River, from Bridge Canyon down to its confluence with the Colorado River, be proposed for designation as a Scenic River. Preservation of these magnificent river stretches, including the lower Dolores, are too important for their contributions to our valuable natural heritage to be sacrificed to competing mining interests at the present time.

Sincerely,

Franz Mohling

Franz Mohling

COMMENTS

RESPONSES

July 12, 1970

Reg. Div. of National Parks Service
Attn: Glenn Baen
Denver Federal Center
Denver, Co. 80225

Dear Sir:

Only last night while visiting with friends we found out there had been meeting held in Gateway the evening before on making the Dolores River thru and below Gateway a wild and Scenic river and that any objections needed to be in your office by July 15th. We are very upset about this, we did not even know such plans were in the making. We had heard about a portion of the river below the town of Dolores being planned, but had not heard of Gateway. We still have only the hearsay information on this, but were told that if it is made a wild and scenic river the land owners would be required to give easements of one-fourth mile on each side of the river and if they don't the land would be condemned anyway and taken. This would affect land we own and some we lease.

We see no reason for infringement on lands or rights of the private land thru Gateway. These groups of rafters use this river usually only in April, May, and June. It should not hurt there eyes the few miles to see some peaceful hay fields, cattle, a home or so or even a non-polluting business. They are soon past this area and into the wild area which only a few have seen.

This river is by itself already a wild river and possibly the only way to make it anything else would to be build the dam we have always heard was planned at Dewey. This makes more sense if Gateway must be changed, at least a dam would supply energy (We are told in every newspaper their is a shortage), the rafters could still raft but also the boaters, water skiers, swimmers, and fishermen would be able to enjoy it also.

Would appreciate it if you could send any information you have available on this river and its plans, and what choices we as citizens have in the answers.

Sincerely,
Mr. and Mrs. Vernon Moore
Mr. and Mrs. Vernon Moore
Star Rt. #4
Gateway, Colo. 81522

Scenic easements on lands along this portion of the Dolores would not affect present land uses, and no land could be condemned in fee title. While easements can be condemned, it is hoped they will not have to be. If the river is designated by Congress, a river management plan will be prepared by the Bureau of Land Management. The need for scenic easements will be determined during management planning; we are hopeful BLM will be able to implement our recommendation for signing agreements with landowners that will provide for notification by landowners of proposed changes in land use. If landowner cooperation is secured and this can be implemented, scenic easements will be obtained only as a last resort; in any case existing uses will continue, as the Wild and Scenic Rivers Act provides.

COMMENTS

R.E. Johnson
P.O. Box 3522
Datney, Colorado
80322

Mr. Dan Bean
Regional Director
National Park Service (Rocky Mt. Region)
Box 25587
Denver Federal Center
Denver, Colorado 80225

RESPONSES

Dear Sirs.

We are writing in regard to the Wild & Scenic River Designation of the Roaring River. Opposition to this designation is almost unanimous in the Town of Datney. Also, we would think opposition would be strong anywhere there is private land, grazing leases, or mineral leases near, or on the river.

1 Private property rights could be greatly reduced by this designation. There could be no new construction of any kind in the 30 mile corridor at least not without long suspension, and time consuming applications for various permits from the BLM (if the permits were even granted!).

2 Grazing and mineral leases could be reduced, or curtailed. These mineral leases are for uranium and these possible contaminants could come when our country is already facing an energy crunch.

3 The economy of the area and the very livelihood of many individuals is dependent on agriculture. This in the form of cattle ranching and irrigated farms using water from the river. Also there are many BLM grazing leases along the river and these could be affected by the designation of the river.

- 1 The proposal will not affect construction if it does not affect adversely the values for which the river was designated.
- 2 Grazing will not be affected by the proposal. Mineral extraction may be covered by regulations that safeguard the river's values; under a scenic designation, mineral leasing will not be affected.
- 3 Present agricultural uses, grazing leases, and water rights will not be affected by the proposal.

COMMENTS

- 4 Concerning the river itself there is one controversy between the Great Valley & the Colorado River. This is the fact that the flow of this river is completely dependent on snowmelt. The natural season (Colorado River High Water) is slightly variable. This year it will be earlier. But as you know we had an excellent snowfall in the past winter. There have been (as in most of the years we have been in this area) between this latter season last and this. The designation of the river caused problems on the surrounding lands. Years record. This is a group which the people that live and own property ~~in~~ ~~near~~ near the river can record.
- Concerning the history nothing more has ever been done than to put them all off river way. Let them go about their business. As before. Also let the people to along the river go on about their business as before, without any further restrictions. There is already enough government control of federal land in this area. The river and its adjoining lands are adequately protected by laws and regulations already in effect. We realize there are much problems being put on the D.C.R. and B.D.R. since by now they

RESPONSES

- 4 Recreation is only one of the values which make the Dolores eligible for the National Wild and Scenic Rivers System; all the river's values would receive year-round protection by designation.

COMMENTS

and environment. Of course, O'Hearn
has time to come for these
agendas to more clearly defining
these groups and their demands.
Instead of having to have everybody,
the BLM, itself, clearly does not give
as much thought some of the
current and issues of the livestock
and mining interests. Don't you all
over a whole nation, how become so
recreation minded that making
a living and contributing something
to our national and global economies
has been forced into the back seat.
It's like when I was growing up that
to this never fit as a business
concerned. That is now after the
conference with the Indians (and)
that they could be more effectively
placed by a committee in on houses
for an amount of time. This is related
to a more name of Indians to the
problem. The rest of the Indians will
see very little development (in
our local economy) because of the
lack of access to fresh water.
But it is with much of the local
and federal property a recent
mark of an attempt to
out number the Indians.

Respectfully,

Mark O'Hearn
Secretary, BLM

COMMENTS

2640 Kohler Drive
Boulder, Colorado 80303

July 12, 1979

Mr. Glen T. Bean
Regional Director,
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado 80225

Dear Mr. Bean:

My continued support for the addition of the Colorado and Dolores Rivers to the National Wild and Scenic Rivers System has been further reinforced by the Park Service's recent proposal. Moreover, I urge you to add the remaining eleven miles of the Dolores to your proposal and thus to recommend that reach of the study area as "Scenic." It is my view that the values present there do qualify for that designation and that the remaining wildlife habitats must be protected from further destruction.

I am especially encouraged by the proposal's acknowledgement that threatened and endangered species in the study area, such as bald eagle, peregrin falcon, Colorado squawfish, bonytail chub, humpback chub, and razorback sucker, will need the wild and scenic classification to protect their habitats. This helps preserve the natural diversity of life, and I applaud the Park Service's proper role in this.

Please consider this statement of support in making your final report and include it in the official record on the matter. Thank you.

Sincerely,

John Roberts

COMMENTS

July 12, 1979

Glen T. Bean
Regional Director
National Park Service
655 Parfet Street
Box 25287
Denver, Colorado
80225

Dear Mr. Bean:

This letter is to inform you that I support the Park Service proposals to classify the Colorado and Dolores Rivers as National Wild and Scenic Rivers.

I ask that the last eleven miles of the Dolores also be included as "scenic."

335

These rivers possess outstanding wildlife and recreational values, and homes for many threatened and endangered species.

Please include my letter in the Agency Record. Thank you for your attention.

Sincerely,



Bobbie L. Ruth

COMMENTS

7/25

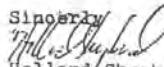
Glen T. Bean, Regional Director
National Park Service
655 Parfet Street
Box 25287
Denver

Dear Mr. Bean,

I have heard that the Park Service and Colo. Utah Depts. of Natural Resources are proposing to classify parts of the Colorado and Dolores Rivers as Wild and Scenic Rivers. I would like to add my support to these proposals hoping that it is not too late. These particular areas are very important to me in that they provide excellent opportunity for quiet escape and refuge for threatened and endangered species. The geology of the areas is also something worth preserving.

Thankyou for your effort and time.

337

Sincerely,

Holland Shepherd
2370 So. Franklin
Denver, Colo. 80210

P.S. I would also like to request that the last 11 miles of the Dolores also be included as scenic, from Bridge Canyon to the Colorado.

COMMENTS

June 14, 1979

Mr. Glen T. Bean
Regional Director
Rocky Mountain Region
National Park Service
655 17th Street
Denver, CO 80225

Dear Mr. Bean,

I have recently reviewed a file copy of the draft of the study of wild and scenic river and environment, February 1979.

I am writing to support this recommendation concerning the Colorado and lower portion of the Dolores. I know these sections well as I canoe and raft on them frequently.

Sincerely,

Louise Waid

Louise Waid
Interested Private Citizen

1620 N. 18th St.
Grand Junction, CO 81501

COMMENTS

James R. Walker
P.O. Box 3501
Manti, Utah 84552

Int. EXP. 703

July 12-1979

Regional Director
Rocky Mountain Region
National Park Service
655 Park Street
Denver CO 80202

National Wild & Scenic Rivers
Systems

I would like to make a few comments
on your Study
of an Region calling this section
of the Colorado River to the National Wild
& Scenic Rivers System
I feel that the State of Utah
and its Centers could handle all the
necessary management of this River
and its responsibilities to them and
not to the BLM.

Sincerely,
James R. Walker

COMMENTS

National Park Service _____
Ellen Loomis, Regional Director _____
July 11, 1939

Dear Sir,
Last night I attended a meeting here in Gateway about your proposal for the Dolores River here at Gateway. We have lived in Gateway all my life. I was born in 1931. I have not, but I don't seem to own any ground right on the river so I do not receive any letters or any other information about the river study or the proposed. There were about 60 people present at the meeting last night, all Gateway residents and there wasn't one in favor of the proposal. Gateway is a small community and we do not like the way this river study and proposal has been handled and we do not like what it implies, the loss of some of our basic freedom of enterprise.

The man representing the Park Service and the B.L.M. all freely admitted there has never yet been an incidence where people were not free to go rafting or what ever you the River so why change it?

Our very lives depend on water and we don't want Government control in any form with just decent work! Our government really represents the people. Then please, drop this proposal, 90% of the people living in Gateway do not want it. Only those few who feel they could commercialize on it want it and believe me there are more important things than money!

Sincerely, Mrs. Ted Warham

COMMENTS

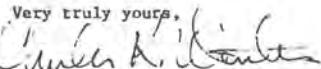
July 12, 1979

Mr. Glen T. Bean
National Park Service
655 Parfet St., Box 25387
Denver, CO 80225

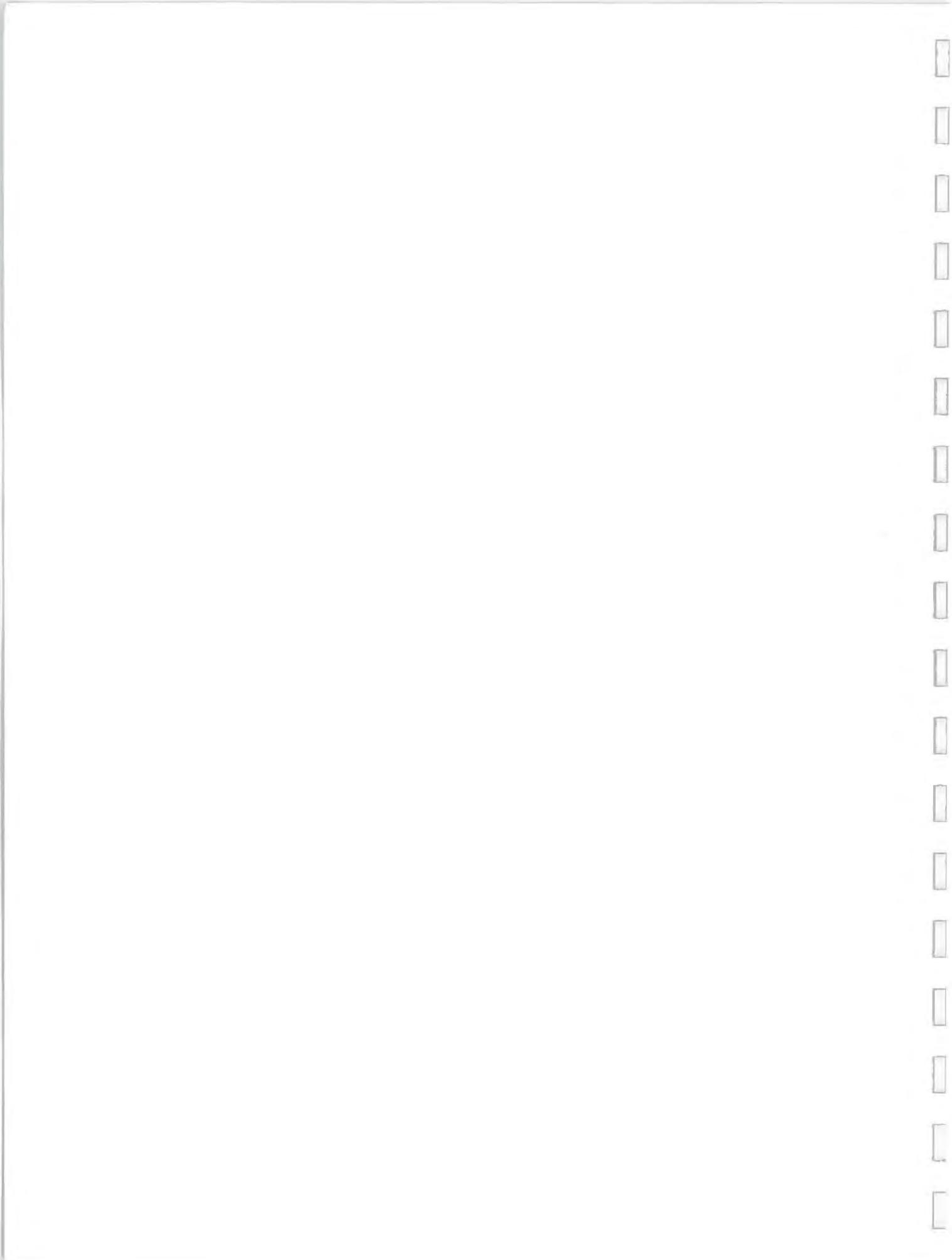
Dear Mr. Bean:

I write to add my full personal support to the
Park Service proposals relative to classification of sections
of the Colorado River and the Dolores River as National Wild
and Scenic Rivers. I urge that these proposals be fully
implemented.

I further request that this letter be made part of
the official record.

Very truly yours,


Charles K. Winter
370 E. 11th Ave. #105
Denver, CO 80203



APPENDIX A

APPENDIX A

make certain that your audience can understand what you say.
and what they expect you to say.

and when you speak, you must be clear, simple,
and direct. You must also be able to speak clearly
and distinctly so that your audience can understand you.

and when you speak, you must be clear,
and direct. You must also be able to speak clearly
and distinctly so that your audience can understand you.

and when you speak, you must be clear,
and direct. You must also be able to speak clearly
and distinctly so that your audience can understand you.

and when you speak, you must be clear,
and direct. You must also be able to speak clearly
and distinctly so that your audience can understand you.

A P P E N D I X A

Rock Formations of The Colorado and Dolores River Study Area

Quaternary

Light red, wind and stream deposited alluvium, stream deposits, terrace gravels, landslide deposits, and talus. Can reach a thickness of up to 300 feet.

Unconformity

Upper Cretaceous

Mancos Shale--dark gray to black, soft, fossiliferous, fissile, marine shale with thin beds of sandstone near base. Thickness is approximately 4,000 feet. Only basal 400 feet exposed in area. Forms low, rounded hills.

Upper and Lower Cretaceous

Dakota Sandstone--yellowish-brown to gray, quartzitic, fluvial sandstone and conglomeratic sandstone in thick beds with thin, lenticular beds of gray claystone, impure coal, and carbonaceous shale. Thickness of formation varies from 20 to 150 feet. Sandstone forms ledges and cliffs.

Unconformity

Lower Cretaceous

Burro Canyon Formation--lenticular, light-brown, fluvial quartzose sandstone and conglomerate, with brown to green siltstone, shale, and mudstone. Formation varies in thickness from 50 to 120 feet. Forms cliffs where largely sandstone.

Upper Jurassic

Morrison Formation--Brushy Basin Member--Red, green, brown, purple, and gray-white fluvial and lacustrine siltstone and mudstone with lenticular beds of white to brown sandstone and gray limestone. Contains dinosaur remains. Thickness of member varies from 260 to 350 feet. Forms slopes.

Morrison Formation--Salt Wash Member--yellowish-brown to gray fluvial sandstone beds with interbedded grayish-green and reddish-brown mudstone, some thin beds of gray limestone. Member varies in thickness from 190 to 350 feet. Forms ledges and cliffs where largely sandstone. Sandstones contain small deposits of uranium and vanadium in the area of the confluence of the Dolores and Colorado Rivers.

Summerville Formation--thin-bedded, red, green, gray, purple, and brown mudstone and siltstone, 40 to 60 feet thick. Deposited in shallow water of possible marine origin. Forms steep slopes.

Entrada Sandstone-Moab Member--White to gray, evenly bedded, fine-grained sandstone that varies in thickness from 45 to 90 feet. Deposited in shallow water. Forms steps.

Entrada Sandstone--Slick Rock Member--Orange, buff, and white, fine-grained, cross-bedded, eolian sandstone, containing scattered grains of medium- to coarse- grained sandstone. Member varies in thickness from 100 to 230 feet. Forms cliffs, locally called the "Slick Rim."

Entrada Sandstone--Dewey Bridge Member--reddish-brown to buff siltstone, sandy siltstone and silty sandstone that vary in thickness from 0 to 50 feet. Member becomes increasingly sandy eastward and is not recognized near Fruita, Colorado. Deposited in a littoral environment. Forms rounded ledges and "hoodoos."

Unconformity

Jurassic and Triassic (?)

Navajo Sandstone--Buff and gray, fine-grained, massive cross-bedded eolian sandstone. Thickness varies from 0 to 200 feet. Thins to a featheredge northeast of Colorado River's confluence with Coates Creek and east of Gateway. Not generally visible on Colorado. Forms cliffs.

Triassic (?)

Kayenta Formation--gray, purplish-gray, red and maroon, irregularly bedded, fluvial, fine- to coarse-grained, sandstone and siltstone with some mudstone, conglomerate, and limestone. Formation thins eastward and thickness varies from 80 to 320 feet. Forms benches and ledges.

Triassic

Wingate Sandstone--reddish-brown to buff, fine-grained, massive, thick-bedded, cross-bedded, eolian sandstone. Formation averages 300 feet thick, but varies from 275 to 400 feet. Forms cliffs; many cliff faces are coated with desert varnish.

Chinle Formation--red to orange-red siltstone with interbedded lenses of red sandstone, mudstone, and limestone-pebble and clay-pellet conglomerate. Lenses of quartz-pebble conglomerate and grit at base of formation. It is terrestrial in origin. Thickness of the formation varies from 100 to 300 feet on the Dolores, 80-120 along the Colorado. Forms a steep slope below the Wingate Sandstone.

Moenkopi Formation--chocolate-brown, ripple-bedded shale, brick-red sandy mudstone, reddish-brown and chocolate-brown sandstone, and purple and reddish-brown arkosic conglomerate. Local gypsum beds. The formation is of terrestrial origin and varies in thickness from zero to 400 feet, thinning to the east. Not present on the Colorado. Forms steep slopes.

Permian

Cutler Formation--maroon, red, mottled light red, and purple conglomerate, arkose, arkosic sandstone. Thin beds of sandy mudstone. Formation varies in thickness from zero to 7,800 feet in the Gateway area, thinning abruptly to the northeast. Rocks were deposited as an fanglomerate on the southwest flank of the Uncompahgre uplift. Not present on Colorado. Forms slopes and ledges.

GREAT UNCONFORMITY

Precambrian

Gneiss, schist, granite and pegmatite. Not visible in Dolores corridor but exposed in the Uncompahgre uplift northeast of the Gateway and along the Colorado.

APPENDIX B

TABLE B-1
Colorado River near Colorado - Utah State Line
WATER FLOW DATA - YEARLY SUMMARY

Drainage: 17,900 square miles. Average Discharge 5,815 cfs/4,200,000 acre-feet per year.

Maximum: 56,800 cfs (9 June 1957)
Minimum: 960 cfs (7 September 1956)

Water Year AC-FT/YR.	YEAR MEAN	YEAR MAX.	YEAR MIN.	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YR.
6,851,000	9,437	30,200	2,000	2,830	2,431	2,810	11,290	12,340	19,960	8,661	3,616	2,278	2,726	2,967	2,832	51
3,747,000	5,175	37,300	1,880	2,799	2,514	2,802	3,557	8,905	22,051	5,341	5,451	3,427	2,683	2,999	2,910	52
2,083,000	2,877	11,600	1,000	2,477	2,321	2,464	3,013	6,256	3,481	2,341	3,888	2,142	2,548	3,179	2,452	53
2,853,000	3,941	17,100	1,400	2,057	2,060	2,907	4,265	10,130	10,760	3,233	2,703	1,814	1,932	2,726	2,650	54
3,298,000	4,542	28,900	960	2,353	2,293	2,792	5,056	15,640	14,270	2,553	1,672	1,361	1,916	2,549	2,071	56
7,868,000	10,870	56,800	1,700	2,248	2,587	2,494	4,878	18,710	43,830	29,590	9,183	4,379	4,206	4,411	3,543	57
5,183,000	7,159	45,000	1,200	2,881	3,486	3,625	7,379	28,820	23,960	3,349	1,692	2,437	2,404	3,074	2,715	53
3,056,000	4,222	23,200	1,310	2,544	2,616	2,312	2,425	8,337	15,300	3,219	2,364	2,078	3,951	3,129	2,430	59
3,651,000	5,029	24,700	1,190	2,490	2,358	3,898	8,628	11,170	16,790	3,745	1,635	1,877	2,480	2,866	2,559	60
3,022,000	4,174	19,300	1,340	2,328	2,383	2,506	2,559	9,300	10,160	1,962	1,968	4,694	5,116	3,978	3,109	61
6,123,000	8,458	40,500	1,700	2,825	4,140	3,649	15,010	23,650	22,900	12,000	3,278	2,867	4,185	3,953	2,886	62
2,350,000	3,245	11,300	1,020	2,639	3,151	3,012	3,259	7,579	5,226	1,731	2,453	2,773	2,186	2,924	2,048	63
3,167,000	4,363	27,300	1,470	1,871	1,815	1,984	2,981	12,520	12,600	4,353	3,575	2,556	2,418	2,888	2,749	64
5,977,000	8,256	36,400	1,870	2,581	2,377	2,406	6,677	16,890	26,140	17,090	6,627	5,652	5,014	3,786	3,567	65
2,695,000	3,723	14,400	1,620	2,770	2,763	3,624	4,982	8,995	6,215	2,828	1,929	2,475	2,845	2,568	2,629	66
3,021,000	4,173	19,400	1,570	2,254	2,368	2,815	3,146	6,899	11,460	4,941	2,550	2,925	2,840	3,662	4,174	67
3,808,000	5,246	26,600	2,300	3,314	3,442	2,835	3,258	8,895	16,730	4,572	5,248	2,643	3,532	4,373	4,188	68
4,473,000	6,179	20,400	2,200	4,369	3,326	4,087	8,796	13,490	11,440	6,860	3,167	4,007	5,454	3,832	4,189	69
5,584,000	7,173	33,000	3,020	3,820	3,940	4,462	4,804	19,720	21,430	8,399	3,887	5,889	5,602	5,446	5,002	70
5,208,000	7,194	22,200	2,630	5,271	5,773	6,465	9,013	11,570	18,010	8,456	3,879	4,681	4,354	4,620	4,343	71
3,505,000	4,828	18,400	1,700	3,884	3,904	4,209	3,325	7,386	12,310	3,135	2,132	3,618	4,624	4,872	4,629	72
5,308,000	7,346	35,000	2,880	4,496	3,593	3,603	3,731	17,710	21,540	11,570	5,183	3,614	3,987	4,090	4,784	73
4,243,000	5,861	22,800	1,850	5,073	5,333	5,920	5,452	15,230	12,120	4,781	2,544	2,683	3,320	4,209	3,656	74
5,220,000	7,210	26,300		3,849	3,823	3,909	5,155	13,150	18,710	11,750	3,713	3,269				75
MEAN				3,084	3,071	3,237	5,527	13,752	17,339	6,880	3,434	3,145	3,481	3,616	3,264	

Table B-2

WATER FLOW DATA - YEARLY SUMMARY

Dolores River near Cisco, 9 miles above mouth

Drainage: 4,580 square miles. Average Discharge 683 cfs/494,500 acre-feet per year.

Maximum: 17,400 cfs (21 April 1958)
 Minimum: 3.4 cfs (23 September 1956)

Water Year AC-FT/YR	Year MEAN	YEAR MAX	YEAR MIN	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YR
162,700	225	2,140	31	148	160	127	123	620	806	192	186	64.3	80	90	122	50
1,095,000	1,509	11,100	34	234	164	251	5,450	5,930	4,076	1,093	343	176	67	95.2	108	51
300,900	416	3,060	38	184	166	196	660	1,035	1,481	297	315	66.4	136	122	162	52
208,500	288	3,220	38	143	170	165	724	866	309	158	107	226	265	189	133	53
342,600	473	3,690	36	92.1	129	515	1,094	1,884	1,108	205	276	57.5	58	101	143	54
264,800	365	2,470	4.2	128	150	265	946	1,372	1,052	131	105	13.8	30	106	87.3	55
1,150,000	1,589	9,500	14	95	230	207	1,912	4,818	5,916	2,562	1,280	720	511	451	320	56
1,016,000	1,404	17,400	64	208	578	573	5,726	5,981	2,757	322	136	146	126	157	157	58
169,300	234	3,300	30	159	176	175	420	536	534	133	210	55.8	171	150	107	59
480,400	662	5,180	28	138	160	712	2,631	1,808	1,743	330	79.7	60.6	81.4	117	111	60
366,600	506	3,510	45	97.2	126	199	967	2,134	1,180	180	221	310	292	200	154	61
530,000	732	6,760	36	131	449	273	3,195	2,186	1,351	533	126	107	191	144	132	62
236,600	327	3,080	41	102	311	581	858	917	309	136	237	163	80.8	136	93.9	63
300,500	414	5,310	32	72.9	103	114	625	1,905	940	228	455	135	111	108	154	64
848,900	1,172	11,000	45	179	158	149	2,926	3,959	2,776	1,564	679	450	492	346	351	65
463,500	640	4,040	10	366	244	1,089	2,185	2,165	744	223	85.2	72.2	103	115	272	66
228,100	314	2,650	30	138	174	317	313	943	761	274	381	158	101	101	109	67
500,800	690	4,870	32	123	191	165	904	2,736	2,660	433	655	82.2	99.9	130	99.7	68
599,300	828	6,480	36	182	189	211	3,584	2,735	1,254	626	204	239	240	242	229	69
560,000	774	7,000	69	205	201	187	859	3,723	1,488	464	291	1,069	267	247	245	70
457,000	631	4,140	25	266	273	687	1,363	1,769	1,739	405	281	139	263	165	220	71
269,000	371	2,410	13	219	208	547	464	631	790	122	33.8	98.8	645	386	300	72
1,289,000	1,780	14,600	77	300	315	539	3,265	8,877	5,393	1,771	213	130	136	131	206	73
329,000	455	4,500	13	166	184	388	1,294	2,112	622	243	66.4	18.1	79.8	137	117	74
887,500	1,226	11,900	83	120	164	223	2,528	5,121	3,660	2,107	256	145				75
MEAN				167.9	214.9	354.2	1,800.6	2,670.5	1,818	588.5	288.9	196.1	222.6	172.7	169.7	

Table B-3

WATER FLOW DATA - YEARLY SUMMARY

Colorado River, near Cisco, Utah: 1 mile below Dolores River
 Drainage: 24,100 square miles. Average Discharge 7,883 cfs/5,707,000 acre-feet per year

Maximum: About 125,000 cfs (4 July 1884)
 Minimum: 558 cfs (21 July 1934)
 (Maximum Gage: 76,800 cfs. 19 June 1917)

Water Year AC-FT/YR.	Year MEAN	YEAR MAX.	YEAR MIN.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YR.
4,074,000	5,627	29,800	1,400	2,484	2,721	2,625	2,904	12,330	19,720	8,610	3,875	2,193	2,749	2,712	2,723	50
3,986,000	5,507	57,200	2,000	3,103	2,706	3,150	16,290	35,000	38,890	10,430	5,817	3,585	2,696	2,995	2,797	51
7,718,000	10,630	57,200	2,000	3,103	2,706	3,015	2,563	3,036	4,207	9,857	5,741	4,161	2,148	2,886	2,971	52
4,062,000	5,610	38,900	1,820	3,070	2,574	2,612	3,714	7,089	3,644	2,439	1,602	2,879	3,502	2,760	2,782	53
2,293,000	3,157	12,900	1,060	2,870	2,185	3,219	5,384	12,226	11,580	3,486	3,008	1,811	1,941	2,833	2,862	54
3,185,000	4,399	18,100	1,370	2,171	2,185	3,219	5,384	12,226	11,580	3,486	3,008	1,811	1,941	2,833	2,862	55
3,568,000	4,916	30,900	1,000	2,521	2,458	3,043	5,976	16,350	15,520	2,800	1,931	1,369	1,964	2,782	2,305	56
8,888,000	12,280	64,200	1,740	2,671	3,018	2,724	6,685	22,360	48,040	31,750	10,750	5,273	4,750	5,034	3,882	57
6,354,000	8,349	49,700	1,200	3,255	4,052	4,134	12,700	33,050	26,220	3,805	1,779	2,573	2,522	3,188	2,860	58
3,214,000	4,439	22,300	1,240	2,725	2,752	2,432	2,735	8,710	15,520	3,482	2,595	2,087	4,075	3,533	2,652	59
4,003,000	5,514	26,100	1,220	2,666	2,490	4,442	10,580	12,330	17,950	4,075	1,716	1,959	2,485	2,972	2,677	60
3,395,000	4,690	21,100	1,450	2,545	2,514	2,634	3,469	11,010	11,170	2,122	2,241	5,305	5,805	4,232	3,203	61
6,575,000	9,082	44,400	1,450	2,964	4,705	4,002	17,710	26,070	23,520	12,440	3,351	2,908	4,268	4,082	2,930	62
2,585,000	3,571	12,500	1,020	2,658	3,480	3,568	4,110	8,402	5,578	1,863	2,727	3,069	2,183	3,004	2,250	63
3,433,000	4,728	29,200	1,230	2,146	2,102	2,090	3,603	14,000	13,100	4,489	3,919	2,564	2,659	3,057	2,948	64
6,723,000	9,286	38,200	1,770	2,631	2,531	2,509	9,450	20,680	27,800	18,160	7,264	6,203	5,854	4,190	3,849	65
3,163,000	4,369	17,800	1,560	3,246	3,040	4,524	7,368	11,330	7,207	3,014	1,949	2,432	2,834	2,577	2,842	66
3,146,000	4,346	21,600	1,390	2,376	2,443	3,017	3,333	7,506	11,990	5,319	2,844	2,984	2,838	3,543	3,919	67
4,185,000	5,765	31,900	2,020	3,339	3,357	2,782	3,869	10,850	19,670	4,969	5,935	2,667	3,470	4,309	4,039	68
4,906,000	6,777	24,000	2,120	4,219	3,396	4,063	12,000	16,060	12,060	7,673	3,236	4,032	5,272	4,855	4,100	69
4,005,000	5,532	36,100	2,650	3,834	3,957	4,499	5,501	22,520	22,520	8,745	3,985	6,836	5,852	5,685	5,155	70
5,458,000	7,538	23,500	2,450	5,399	5,773	6,712	9,738	12,490	19,180	8,708	4,000	4,746	4,548	4,640	4,621	71
3,549,000	4,888	19,600	1,600	4,346	3,941	4,537	3,389	7,366	12,750	3,115	1,943	3,373	4,916	4,727	4,345	72
6,374,000	8,804	42,800	2,500	4,595	3,793	3,908	6,520	25,320	26,170	12,990	5,377	3,705	4,080	4,159	4,717	73
4,416,000	6,100	25,100	1,730	5,067	5,295	5,909	6,072	16,530	12,550	5,097	2,614	2,653	3,348	4,351	3,674	74
5,290,800	7,308	30,000	2,140	3,835	3,731	3,910	6,337	16,380	20,890	13,120	3,682	3,112	3,463	4,770	4,370	75
3,458,700	4,766	15,600	1,910	3,880	3,715	3,520	4,537	12,082	9,601	3,659	2,418	2,931	3,430	3,830	3,570	76
				3,467	2,627	1,943										77
MEAN				3,297	3,256	3,539	6,853	15,688	18,330	7,389	3,643	3,284	3,571	3,750	3,385	

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

TABLE C-1
FISHES OF THE COLORADO AND DOLORES RIVER

Species	Native or Exotic	Colorado River Moab to West-water	Colorado River Westwater to Grand Junction	Dolores River Utah	Population Trends
Roundtail chub					
<i>Gila robusta</i>	N	C	A	A	O
Bonytail chub					
<i>Gila elegans</i>	N	R	R	X	O-
Humpback chub					
<i>Gila cypha</i>	N	R	R	X	O-
Colorado squawfish					
<i>Ptychocheilus lusius</i>	N	R	R	X	O-
Speckled dace					
<i>Rhinichthys osculus</i>	N	C	A	A	O
Fathead minnow					
<i>Pimephales promelas</i>	E	C	A	C	O
Carp					
<i>Cyprinus carpio</i>	E	C	A	C	O+
Red shiner					
<i>Notropis lutrensis</i>	E	A	A	A	+
Sand shiner					
<i>Notropis stramineus</i>	E	A	A	A	+
Flannelmouth sucker					
<i>Catostomus latipinnis</i>	N	A	A	A	O
Bluehead sucker					
<i>Pantosteus discobolus</i>	N	C	A	C	O
Humpback sucker					
<i>Xyrauchen texanus</i>	N	C	R	X	O-
White sucker					
<i>Catostomus commersoni</i>	E	X	A	X	O
Channel catfish					
<i>Ictalurus punctatus</i>	E	A	A	A	O+
Black bullhead					
<i>Ictalurus melas</i>	E	R	A	X	O
Southwest plains killifish					
<i>Fundulus kansasae</i>	E	R	R-C	R	O
Largemouth bass					
<i>Micropterus salmoides</i>	E	R	C	R	O+
Green sunfish					
<i>Lepomis cyanellus</i>	E	C	C-A	A	O+
Bluegill sunfish					
<i>Lepomis macrochirus</i>	E	R	R	X	O+
E-exotic, or introduced	X-not taken	C-common		O-no change	
N-native	R-rare	A-abundant		--decrease	
				+ increase	

Three sucker hybrids were also found; Flannelmouth x Humpback sucker, Bluehead x White sucker; and Flannelmouth x White sucker.

APPENDIX D

TABLE D-1
Wildlife of the Colorado and Dolores River Study Areas

Wildlife	Relative Abundance ¹	Probability ² of Occurrence	Riparian ³	Vegetative Types							
				Greasewood	Juniper	Grassland	Cliffs, Boulders	Shorelines, Pools			
MAMMALIAN SPECIES											
Permanent Residents											
Desert Cottontail	C	C	X	X	X	X	X	X			
Least Chipmunk	U	U	X	X	X	X	X	X			
Colorado Chipmunk	U	U	X	X	X	X					
Whitetail Antelope Squirrel	U	1	X	X	X	X					
Rock Squirrel	U	1	X	X	X	X	X	X			
Thirteen-lined Ground Squirrel	U	1	X	X	X	X					
White-tailed Prairie Dog	U	1	X	X	X	X					
Valley Pocket Gopher	U	3	X	X	X	X					
Apache Pocket Mouse	U	1	X	X	X	X					
Ord Kangaroo Rat	U	2	X	X	X	X					
Beaver	U	2	X	X	X	X		X			
Western Harvest Mouse	U	1	X	X	X	X					
Cañon Mouse	U	U	X	X	X	X	X	X			
Deer Mouse	U	U	X	X	X	X	X	X			
Brush Mouse	U	U	X	X	X	X	X	X			
Pinon Mouse	U	U	X	X	X	X	X	X			
Northern Grasshopper Mouse	U	2	X	X	X	X					
Desert Woodrat	C	2	X	X	X	X					
Mexican Woodrat	U	2	X	X	X	X					
Bushytail Woodrat	U	1	X	X	X	X					
Muskrat	U	1	X	X	X	X					
Porcupine	U	1	X	X	X	X					
Coyote	C	4	X	X	X	X					
Red Fox	U	4	X	X	X	X					
Kit Fox	U	4	X	X	X	X					
Gray Fox	U	1	X	X	X	X					
Ringtail	U	2	X	X	X	X					
Raccoon	U	1	X	X	X	X					
Long-tailed Weasel	U	1	X	X	X	X					
Black-footed Ferret	U	4	X	X	X	X					
Badger	U	1	X	X	X	X					
Striped Skunk	U	1	X	X	X	X					
Bobcat	U	1	X	X	X	X					
Mule Deer	C	X	X	X	X	X					

1 - C= Common

U=Uncommon

R=Rare

2 1=90%

2=50%

3=10%

4=Unknown

3 Cottonwood, tamarisk, and willow.

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife		Vegetative Types							
		Relative Abundance ¹	Probability ² of Occurrence	Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders	Shorelines, Pools
MAMMALIAN SPECIES									
Summer Residents									
Little Brown Myotis		1		X					X
Yuma Myotis		2		X					X
Long-eared Myotis		1		X					X
Fringed Myotis		4		X					X
Long-legged Myotis		2		X					X
California Myotis		1		X					X
Small-footed Myotis		1		X					X
Silver-haired Bat		1		X					X
Western Pipistrel		1		X					X
Big Brown Bat		1		X					X
Hoary Bat		1		X					X
Western Big-eared Bat		1		X					X
Pallid Bat		1		X					X
Brazilian Free-tailed Bat		4		X					X
Big Free-tailed Bat		4		X					X
Domestic Cattle	C			X		X			X
Domestic Horse	C						X		
Winter Residents									
Domestic Sheep		1			X	X	X		
Transients									
Black Bear		4							
Spotted Skunk		3							
Mountain Lion		2		X	X	X			X
AVIAN SPECIES									
Permanent Residents									
Sharp-skinned Hawk		2		X			X		
Cooper's Hawk		1		X		X			X
Golden Eagle				X	X	X	X		X
Marsh Hawk	U			X	X	X	X		
Prairie Falcon	U			X	X	X	X	X	X

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife	Relative Abundance ¹	Probability of Occurrence ²	Vegetative Types						
			Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders		
AVIAN SPECIES									
Permanent Residents									
Ring-necked Pheasant		2	X			X			
Rock Dove	C	2	X		X		X		
Screech Owl			X		X				
Great Horned Owl	U	1	X		X		X		
Long-eared Owl			X		X				
Common Flicker (Red-shafted)	C		X	X	X				
Hairy Woodpecker			X						
Downy Woodpecker			X						
Horned Lark				X		X	X		
Scrub Jay				X	X				
Black-billed Magpie				X	X				
Common Raven									
Common Crow									
Pinon Jay	C			X	X	X			
Black-capped Chickadee			X						
Mountain Chickadee		2	X			X			
White-breasted Nuthatch		2	X						
Canon Wren	U						X		
Robin		1	X	X		X	X		
Loggerhead Shrike		1	X	X	X	X			
Starling	U		X	X		X	X		
Summer Residents									
Great Blue Heron	C		X				X		
Canada Goose	C		X				X		
Turkey Vulture	C		X	X		X	X		
Red-tailed Hawk	C		X	X	X	X	X		
Swainson's Hawk		2							
Peregrine Falcon		2	X	X		X	X		
Kestrel (Sparrow Hawk)	C		X	X	X	X	X		
Killdeer		1				X			
Spotted Sandpiper	C		X				X		
Mourning Dove	C		X	X			X		

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife		Relative Abundance ¹	Probability of Occurrence ²	Vegetative Types								
				Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders	Shorelines, Pools			
AVIAN SPECIES												
Summer Residents												
Common Nighthawk	C	C	X	X	X	X	X	X	X			
White-throated Swift	U	U	2	X				X	X			
Black-Hummingbird	U	U	1	X								
Broad-tailed Hummingbird	U	U	1	X								
Belted Kingfisher	U	U	1	X					X			
Eastern Kingbird	U	U	1	X					X			
Western Kingbird	U	U	1	X				X	X			
Ash-throated Flycatcher	C	C	X	X	X	X	X	X	X			
Say's Phoebe	C	C	X	X	X	X	X	X	X			
Willow Flycatcher (Traill's)	C	C	1	X								
Western Wood Peewee	C	C	1	X								
Violet-green Swallow	C	C	1	X	X		X	X	X			
Tree Swallow	C	C	3	X	X							
Rough-winged Swallow	C	C	1	X	X			X	X			
Cliff Swallow	C	C	1	X	X			X	X			
Bewick's Wren	C	C	1	X								
Rock Wren	C	C	1	X					X			
Hermit Thrush	C	C	1	X								
Swainson's Thrush	C	C	1	X								
Mountain Bluebird	C	C	1	X	X	X	X					
Blue-gray Gnatcatcher	C	C	1	X	X	X	X					
Solitary Vireo	C	C	2	X								
Warbling Vireo	C	C	1	X								
Orange-crowned Warbler	C	C	1	X								
Virginia's Warbler	C	C	2	X								
Yellow Warbler	C	C	1	X								
Yellow-rumped Warbler (Audubon's and Myrtle)	C	C	1	X								
Black-throated Gray Warbler	C	C	1	X	X	X	X					
MacGillivray's Warbler	C	C	1	X								
Common Yellowthroat	C	C	1	X								
Wilson's Warbler	C	C	1	X								
Western Meadowlark	C	C	1	X	X							
Red-winged Blackbird	C	C	1	X				X				

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife	Relative Abundance	Probability of Occurrence ²	Vegetative Types						
			Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders		
AVIAN SPECIES									
Summer Residents									
Scott's Oriole	U	1	X	X		X			
Northern Oriole (Bullock's)		1	X	X					
Brewer's Blackbird		1	X	X	X		X		
Brown-headed Cowbird		1	X	X	X				
Western Tanager	U	1	X	X					
Black-headed Grosbeak		1	X	X					
Blue Grosbeak		1	X	X					
Lazuli Bunting		1	X						
House Finch	C	1	X			X			
American Goldfinch		1	X				X		
Lesser Goldfinch		2							
Green-tailed Towhee		1	X	X					
Rufous-sided Towhee	C	1	X	X					
Lark Sparrow		1	X			X			
Black-throated Sparrow		1		X					
Sage Sparrow		1		X			X		
Chipping Sparrow	C	1		X		X			
Brewer's Sparrow	C		X	X					
Winter Residents									
Common Goldeneye		2	X						
Common Merganser		1	X				X		
Goshawk		2	X	X	X				
Rough-legged Hawk		2		X	X		X		
Bald-Eagle		1	X				X		
Merlin (Pigeon Hawk)		2					X		
Yellow-bellied Sapsucker		1	X				X		
Bushtit	U		X	X					
Townsend's Solitaire		2	X	X		X			
Gray-crowned Rosy Finch		2		X			X		
Black Rosy Finch		2		X			X		
Pine Siskin		2							

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife	Relative Abundance ¹	Probability ² of Occurrence	Vegetative Types						
			Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders		
AVIAN SPECIES									
Winter Residents									
Dark-eyed Junco (Oregon and Slate-colored)	-	1	X	X	X	X	X		
Tree Sparrow	-	2	X	X	X				
White-crowned Sparrow	-	1	X						
Transients									
Mallard	C	1	X						
Gadwall	C	1	X						
Green-winged Teal	U	2							
Blue-winged Teal	U	2							
Cinnamon Teal	U	2							
American Widgeon	U	2							
Northern Shoveler	U	2							
Osprey	C	3		X					
Whooping Crane	U	4							
Greater Yellowlegs	U	2							
Lesser Yellowlegs	U	2							
Barn Swallow	U	1							
House Wren	U	1		X					
Western Bluebird	U	1	X						
Ruby-crowned Kinglet	U	1	X						
Water Pipit	R	2				X			
Cedar Waxwing	R	2	X						
American Redstart	R	2							
Song Sparrow	R	1	X						
AMPHIBIANS AND REPTILES									
Permanent Residents									
<u>Amphibians</u>									
Great Basin Spadefoot Toad	1	X					X		
Woodhouse's Toad (Rocky Mountain)	1	X					X		

Wildlife of the Colorado and Dolores Rivers
(Continued)

Wildlife	Relative Abundance ¹	Probability of Occurrence ²	Vegetative Types						
			Riparian ³	Greasewood	Juniper	Grassland	Cliffs, Boulders		
AMPHIBIANS AND REPTILES									
Permanent Residents									
Amphibians									
Red-spotted Toad	C	2	X				X		
Western Chorus Frog		2	X				X		
Canon Treefrog		2	X				X		
Bullfrog		3	X				X		
Lizards and Snakes									
Collared Lizard	C			X	X		X		
Long-nosed Leopard Lizard		3							
Eastern Fence Lizard (Northern Plateau-Southern Plateau)	C		X	X	X		X		
Northern Sagebrush Lizard	C		X	X	X	X	X		
Desert Side-blotched Lizard	C		X	X	X	X	X		
Tree Lizard	C		X	X	X		X		
Desert Short-horned Lizard		3							
Plateau Whiptail		1	X						
Western Whiptail (Northern)	C		X	X	X				
Racer (Western Yellow-bellied)		1	X						
Striped Whipsnake		1		X			X		
Corn Snake		1	X		X		X		
Great Basin Gopher Snake	C		X	X	X	X	X		
Utah Milk Snake		2	X	X	X	X			
Western Terrestrial Garter Snake (Wandering)		1	X				X		
Western Black-headed Snake (Utah)		3							
Mesa Verde Night Snake		2		X	X				
Western Rattlesnake (midget-faded)		2		X	X				

APPENDIX E
OUTLINE AND APPLICATION OF
PRINCIPLES AND STANDARDS
PROCEDURES TO
ALTERNATIVE ACTIONS

APPLICATION

Planning for the use and development of the nation's water and related land resources serves two major objectives - national economic development and environmental quality. Sometimes contributions to one objective do not conflict with contributions to the other, and alternative plans need not be developed. Normally, there is conflict, and alternatives must be generated.

In such a case, at least two alternative plans must be developed, one optimizing contributions to the national economic development objective and the other optimizing contributions to environmental quality. Both objectives are equal in importance and are treated with equal weight in the analysis. A series of plans is generated to satisfy each objective. Each alternative plan is then evaluated to determine how well it satisfies the objective for which it was formulated, by displaying its measured beneficial and adverse effects in the four-account system mentioned in chapter XI. In this analysis, satisfaction of the national economic and environmental quality objectives cannot be wholly complementary, so alternative plans were developed to meet both objectives.

SPECIFICATION OF OBJECTIVES

The first step in the analysis is to identify or specify the components of the two major objectives. These components must be of concern to the nation, be present in the study area or relevant to the resources being studied, be measurable or capable of being qualitatively defined, and be substantially influenced by management alternatives available to the planners.

The national economic development objective can be served in two basic ways; (1) by increasing output or production of goods and services, and (2) by increasing economic efficiency in the production of goods and services.

The Colorado River area's economy is largely resource oriented. Its major goods are agricultural products, timber, and minerals; its major service is outdoor recreation. So national economic development can be served by increasing production of any of these components, provided that the share of national demand allocated to this area exceeds the current or projected supply (production). Increased efficiency in producing these goods or services will also contribute to the national economic development objective.

The initial components of the national economic development objective identified in the Colorado and Dolores River study areas were:

- (1) increased or more efficient output of outdoor recreation services and uses,
- (2) increased or more efficient production of agricultural products,
- (3) increased or more efficient production of mineral resources,
- (4) increased or more efficient hunting and fishing opportunities, and
- (5) increased or more efficient water resource development.

The environments of the Colorado and Dolores River study areas possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, and cultural values. To preserve or enhance these values for the benefit and enjoyment of present and future generations of the nation would serve the environmental quality objective of Principles and Standards.

The initial components of the environmental quality objective identified in the Colorado and Dolores River study areas were:

- (1) to preserve or enhance areas of natural beauty and river segments with wild, scenic, or recreational river characteristics,
- (2) to preserve or enhance areas with historic, archeologic, and cultural value,
- (3) to preserve or enhance endangered or threatened wildlife, fish, or vegetation,
- (4) to preserve or enhance air, auditory, and water quality,
- (5) to preserve or enhance freedom of choice for future resources users by avoiding irreversible or irretrievable effects,
- (6) to preserve or enhance outstandingly remarkable scenic, recreational, geologic, fish and wildlife, or other similar values, and
- (7) to preserve or enhance other endemic vegetation, wildlife, and their habitat.

SECOND LEVEL SPECIFICATION OF COMPONENTS

A second level specification of components was made to determine which components are relevant to the Colorado and Dolores River study areas and to the powers and actions available to planners under the authority of this study.

Components of the national economic development objective which were identified in the second level specification were increased or more efficient provision of recreation services for floatboating and associated camping, picnicking, and hiking activities; and increased or more efficient water resource development.

Components of national economic development eliminated in the second level specification were:

- (1) increased or more efficient production of agricultural products within the corridor. This was eliminated because the agricultural land in the corridor is fully utilized now and will continue to be utilized at its maximum economic potential without conflicting with wild and scenic river designation.
- (2) increased or more efficient hunting and fishing. These were eliminated because increased opportunities are already part of the management programs of the area.
- (3) increased or more efficient production of mineral resources. There is not a large enough quantity of mineral resources in the corridor to provide a basis for a national economic development alternative, and
- (4) increased or more efficient water resource development. This component was eliminated because data to determine the feasibility and economic potential of the only contemplated project that could conflict with wild and scenic river designation were not made available to planners in this analysis.

Components of environmental quality identified in the second level specification were:

- (1) preservation of 13 miles (20.9 km) of wild river values in and along the Colorado River in Westwater Canyon,

- (2) preservation of 38.7 miles (62 km) of scenic river values in and along the Colorado River in Horsethief and Ruby Canyons and from Rose Ranch to Cisco Wash,
- (3) preservation of 4 miles (6.4 km) of recreational river values in and along the Colorado River from Cisco Wash to the confluence of the Dolores River,
- (4) preservation of 6 miles (9.6 km) of wild river values in and along the Dolores River between Fisher Creek and Bridge Canyon.
- (5) preservation of 25 miles (40.2 km) of scenic river values in and along the Dolores River between Gateway, Colorado, and Fisher Creek; and between Bridge Canyon and the confluence with the Colorado River,
- (6) preservation or enhancement of areas of natural beauty,
- (7) preservation or enhancement of air quality, and
- (8) preservation of freedom of choice for future resource users by avoiding irreversible or irretrievable effects.

The following components of the environmental quality objective were eliminated in the second level specification:

- (1) Protection of endangered species was eliminated because they are already fully protected by the Endangered Species Act of 1973, and
- (2) Preservation of water quality was eliminated since adequate protection currently exists. Statutes, regulations, and policies will be recognized in the management plans for designated segments to provide for protection of water quality.

ASSUMPTIONS FOR COMPONENT NEED SPECIFICATION

To contribute to either objective, a plan must provide for a demand which is unmet by current or expected supply (need). The need

for increased recreational services within the Colorado and Dolores River corridors is evident from current trends. In recent years the use of rivers for floatboating has been increasing rapidly. From 521 recreation days in 1971, use of the Colorado River in Westwater Canyon has increased to over 10,000 in 1977. The same trend is evident on other whitewater rivers such as the Green or Yampa, which have already reached their maximum capacity. As these pressures increase, the Colorado and Dolores Rivers, which have not yet reached their capacity, will continue to experience rapidly increasing use. Such increases will require support facilities such as campgrounds, a picnic ground, and access. As Westwater Canyon approaches its capacity, use pressures will extend from the canyon to other portions of the study area.

Assumptions related to derivation of need for components of the environmental quality objective are:

- (1) that there is a national need for the beneficial esthetic, environmental, and spiritual effects associated with the preservation of free-flowing streams that have outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historical, cultural, and other similar values.
- (2) that the greatest contribution to the environmental quality objective is made by including wild river areas in the National Wild and Scenic River System; the next greatest, by scenic river areas; and the least by designating recreational river areas.

The following tables display additional information resulting from the Principles and Standards analysis. Table 1 displays differences in effects between the recommended plans and the other alternatives, plans. The difference in effects between the no action option and each alternative plan are displayed in table XI-2 and XI-4 in chapter XI.

Table 2 displays anticipated government expenses for each option and segment. All expenses listed are in addition to existing government expenses in the area. Government cost data shown in table 2 are summarized in table 3 in both discounted and non-discounted forms. Also shown in table 3 are on-site recreationist expenditure data.

Note

Because the effects of the plans must be quantified if possible, the tables (XI-2 and XI-4) showing their dollar-value effects tend to be quite precise. This apparent precision should not be relied upon too much, since most of these figures have been prepared by 1) estimating the present amount of a type of use or the volume of a resource like uranium ore, 2) estimating the rate of change in use of that resource or activity over a period of future years, and 3) consulting studies, memos, and papers to determine a monetary value for the activity or the resource. Multiplying these estimates compounds the uncertainty of the final figure. At best these figures only approximate what will later be found to have happened.

But while the absolute reliability of the figures is questionable, the relation they bear to one another is useful. If one plan has an effect twice as great as another's, the factor of two by which they differ is more accurate than the dollar values offered. On this basis comparisons should be made between the plans.

TABLE E-1a. Differences In Effects Between The Recommended Plan and Other Plans in 1990 – Colorado River

Account	Components	Recommended Plan (Plan 1)		National Economic Development ('89)		Plan 2		Plan 3		
		Segment A – Scenic Segment B – Wild Segment C – Scenic Segment D – Recreational		No Designation Increased Recreation		Segment A – Scenic Segment B – Wild Segment C – Recreational Segment D – Recreational		Segment A – Scenic Segment B – Wild Segment C – No Designation Segment D – No Designation		
		Total	Net*	Total	Difference**	Total	Difference**	Total	Difference**	
NATIONAL	RECREATION USE	Boating Fishing Hunting	36,000 1,164 585	4,500*** 0 0	70,000 1,164 585	+ 34,000*** 0 0	38,000 1,164 585	+ 2,000*** 0 0	34,500 1,164 585	- 1,500*** 0 0
CONOMIC	Total Annual Recreation Days	37,749	4,500	71,749	+ 34,000	39,749	+ 2,000	36,249	- 1,500	
DEVELOPMENT	Annual Recreationist Expenditures	\$522,000	63,000	999,000	+ 477,000	550,000	+ 28,000	501,000	- 21,000	
ENVIRONMENTAL	Annual Government Expenditures	\$ 4,400		+ 87,600	+ 19,000	416,300	+ 21,300	362,800	- 3,100	
ENVIRONMENTAL	Household Income	\$395,000	46,500	798,000	+ 403,000				- 32,400	
ENVIRONMENTAL	MINERALS AND ENERGY	Ore containing .15% U_3O_8 and .42% V_2O_5 occurs in the lower visual corridor. Since 1948 a total of only 50 tons of ore have been extracted. If the value of U_3O_8 were to increase to \$42 per pound, 3000 pounds (worth \$126,000) could be economically extracted. This option would increase the cost of or preclude mining in the visual corridor.	No interference with potential mineral extraction.		Less interference with mineral extraction expected than with recommended option.			No interference with potential mineral extraction.		
ENVIRONMENTAL	PRESERVATION OF FREE-FLOWING STREAM	13 miles – Wild River 38.7 miles – Scenic River 4 miles – Recreational River 55.7 miles – Preserved	-13 miles – Wild River -38.7 miles – Scenic River - 4 miles – Recreational River 0 miles – Preserved	No change – Wild River -11 miles – Scenic River +11 miles – Recreational River 55.7 miles – Preserved	No change – Wild River -11 miles – Scenic River - 4 miles – Recreational River 40.7 miles – Preserved	No change – Wild River -11 miles – Scenic River - 4 miles – Recreational River 40.7 miles – Preserved				
ENVIRONMENTAL	PRESERVATION OF AREAS OF NATURAL BEAUTY	Areas of natural beauty preserved along 55.7 miles of river at the most protective level of classification they qualify for. Scenic easements may be acquired 5350 acres of private land.	Areas of natural beauty not protected by inclusion in the National Wild and Scenic River System along 55.7 miles of river. No scenic easements acquired on private lands.	11 miles of river qualifying for scenic river classification will only be protected at the recreational river level. Scenic easements may be acquired on the same number of acres.	11 miles of river qualifying for scenic river classification will only be protected at the recreational river level. Scenic easements may be acquired on the same number of acres.	11 miles of river qualifying for scenic river classification will only be protected at the recreational river level. Scenic easements may be acquired on the same number of acres.		Areas of natural beauty not protected by inclusion in the National Wild and Scenic River System along 18 miles of river. Scenic easements not acquired on 1160 acres.		
ENVIRONMENTAL	PRESERVATION OF CULTURAL RESOURCES	Sites protected by federal and state laws. Higher level of recreation use is offset by additional efforts for protection.	Higher level of recreational use without additional protection could result in damage to sites.	No change.	No change.	No change.		Some resources of cultural value may be damaged in non-designated segments.		
ENVIRONMENTAL	PRESERVATION OF FREEDOM OF CHOICE	Preservation options increase. Potential for economic development decreases somewhat.	Economically important options increase. Preservation options decrease.	No change except potential mineral extraction could result in loss of preservation options in segments C & D.	No change except potential mineral extraction could result in loss of preservation options in segments C & D.	No change – Segments A & B. Potential economic options retained in Segments C & D.		No change – Segments A & B. Potential economic options retained in Segments C & D.		
ENVIRONMENTAL	AVOID IRREVERSIBLE OR IRRETRIEVABLE EFFECTS	Scenic and recreational values preserved. Some potential economic values lost.	Probable loss of many scenic and recreational values. Economic values not affected.	Potential for some loss of scenic and recreational values in Segments C & D. Lesser loss of potential economic values.	Potential for some loss of scenic and recreational values in Segments C & D. Lesser loss of potential economic values.	Segments A & B – no change. Potential economic values retained in segments C & D.		Segments A & B – no change. Potential economic values retained in segments C & D.		

* Figures in the "net" column are the difference between effects of the recommended option and the no action plan (see Table V-1).

** These differences are between the effects of the recommended option and the effects of other plans.

*** In 1947, the Moab District Economist for the BLM estimated primary benefits for a private trip in Westwater Canyon at \$6.20/day/person. Applying this figure to the net increases under the various plans produce primary benefits to the nation as follows: Recommended option – \$27,900; NED Option – \$210,800; Option 2 – \$12,400; Option 3 – \$9,300.

TABLE E-1b. Differences In Effects Between The Recommended Plan and Other Plans in 1990 — Dolores River

Account N A T I O N A L E C O N O M I C D E V E L O P M E N T	Components	Plan 1 (Recommended)		National Economic Development Plan No Designation		Plan 2		Plan 3	
		Segment A — Scenic Segment B — Wild Segment C — Scenic		Increased Recreation		Segment A — Recreational Segment B — Wild Segment C — Recreational		Segment A — Scenic Segment B — Wild Segment C — Not Designated	
		Total	Difference**	Total	Difference**	Total	Difference**	Total	Net*
RECREATION USE									
Boating	7,560	+ 1,110	12,240	+ 5,970	10,620	+ 4,170	8,450	+ 1,950	
Fishing	300	0	300	0	300	0	300	0	
Hunting	200	0	200	0	200	0	200	0	
Total Annual Recreation Days	8,060	+ 1,110	12,740	+ 5,970	11,120	+ 4,170	6,950	+ 1,950	
Annual Recreationist Expenditures	\$111,000	\$15,000	\$177,000	\$81,000	\$154,000	\$58,000	\$96,000	\$28,000	
Annual Government Expenditures	\$ 11,076	\$ 2,950	\$ 28,276	\$20,150	\$ 13,376	\$ 5,250	\$ 8,126	\$ 2,850	
Household Income	\$ 75,400	\$11,900	\$159,500	\$96,000	\$118,700	\$55,200	\$63,500	\$20,500	
MINERALS AND ENERGY	Ore containing 15% U_3O_8 and .42% V_2O_5 occurs in the lower visual corridor. Since 1948 a total of only 50 tons of ore have been extracted. If the value of U_3O_8 were to increase to \$42 per pound, 15,000 lb (worth \$630,000) could be economically extracted. This option would increase the cost of or preclude mining in the visual corridor.	No interference with potential mineral extraction.		Some interference with mineral extraction, but less than in option 1.			No interference with potential mineral extraction.		
PRESERVATION OF FREE-FLOWING STREAM	No change — Wild River +11 miles — Scenic River No change — Recreational River +11 miles — Preserved	0 miles — Wild River 0 miles — Scenic River — Recreational River 0 miles — Preserved		6 miles — Wild River 25 miles — Scenic River 0 miles — Recreational River 31 miles — Preserved			6 miles — Wild River 25 miles — Scenic River 0 miles — Recreational River 31 miles — Preserved		
PRESERVATION OF AREAS OF NATURAL BEAUTY	Areas of natural beauty preserved along 31 miles of river at the most protective level of classification. Scenic easements may be acquired on 1640 acres of private land.	Areas of natural beauty not protected by inclusion in the National Wild and Scenic River System along 20 miles of river. No scenic easements acquired on private lands.		14 miles of river qualifying for scenic river designation will only be protected at recreational river level. Scenic easements may be acquired on 1640 acres.			Areas of natural beauty preserved along 20 miles of river at most restrictive classification. Scenic easements may be acquired on 920 acres. Areas of natural beauty not legally protected on 11 miles of river qualifying for scenic designation.		
PRESERVATION OF CULTURAL RESOURCES	Sites protected by federal and state laws. Higher level of recreation use is offset by additional efforts for protection.	Higher level of recreation use without additional protection results in increased damage to sites.		Sites protected by federal and state laws. Higher level of recreation use partially offset by management of recreation river area in Segment C.			Sites protected by state and federal law. Increased recreation use offset by designation in Segments A & B. Possible increased damage in Segment C not offset by legal protection.		
PRESERVATION OF FREEDOM OF CHOICE	Preservation options increase. Potential for economic development decreases somewhat.	Economically important options increase. Preservation options decrease.		No change except potential mineral extraction would result in loss of preservation options in Segment C.			Freedom of choice for potential mineral extraction preserved in Segment C. Option for preservation of natural values in Segment C may be lost.		
AVOID IRREVERSIBLE OR IRRETRIEVABLE EFFECTS	Scenic and recreational values preserved. Some potential economic values lost.	Probable loss of many scenic and recreational values. Economic values not affected.		Potential for some loss of recreational and scenic values in Segment C. Lesser loss of potential economic values.			Scenic and recreational values in Segment C may be degraded, others preserved.		

* Figures in the "net" column are the difference between effects of the recommended option and the no action plan (see Table V-1).

** These differences are between the effects of the recommended option and the effects of other plans.

***In 1947, the Moab District Economist for the BLM estimated primary benefits for a private trip in Westwater Canyon at \$6.20/day/person. Applying this figure to the net increases under the various plans produce primary benefits to the nation as follows: Recommended option — \$12,090; NED Option — \$37,015; Option 1 — \$6,882; Option 2 — \$25,859.

TABLE E-2
GOVERNMENT COST ASSUMPTIONS
COLORADO WILD AND SCENIC RIVER STUDY

Item	Cost	No Action Plan	National Economic Development Plan	Environmental Quality Plans		
				Plan 1	Plan 2	Plan 3
				Segment A - Scenic Segment B - Wild Segment C - Scenic Segment D - Recreational	Segment A - Scenic Segment B - Wild Segment C - Recreational Segment D - Recreational	Segment A - Scenic Segment B - Wild Segment C - No Designation Segment D - No Designation
Colorado River						
Segment A:						
Boatramp at Loma	\$ 3,000	\$ 0	0	3,000	3,000	3,000
1. Parking	5,000	0	0	5,000	5,000	5,000
2. Sanitation	10,000	0	14,000	10,000	10,000	10,000
3. Upgrade road	300	0	14,300	300	300	300
20-unit campground at Loma	28,000	0	28,000	0	0	0
10-unit campground at Blackrock	10,000	0	10,000	0	0	0
2-3 mi. trail at Rattlesnake	10,000	0	10,000	0	0	0
2-3 mi. trail at Mee	10,000	0	10,000	0	0	0
2-3 mi. trail at Knolls	10,000	0	10,000	0	0	0
Westwater Ranger Station						
Access road	10,000	10,000	0	0	0	0
20-unit campground	30,000	30,000	0	0	0	0
Improve boatramp	5,000	5,000	0	0	0	0
Build ranger station	75,000	75,000	0	0	0	0
Subtotal Nonannual Cost	\$120,000		96,300	18,300	18,300	18,300
Additional AO&M	\$48,595		36,582	500	500	500

TABLE E-2 (Continued)

Item	Cost	No Action Plan	National Economic Development Plan	Environmental Quality Plans		
				Plan 1	Plan 2	Plan 3
Segment B:						
Hiking Trails (3 miles)	\$ 30,000	0	30,000	0	0	0
10-unit campground at Little Dolores	30,000		30,000	0	0	0
Canyon overlook at Skull 20-unit campground Road access	30,000 180,000	0	30,000 180,000	0 0	0 0	0 0
Subtotal Nonannual Cost		0	\$270,000	0	0	0
Additional AO&M			\$ 14,000			
Segment C:						
Rose Ranch boat ramp						
Acquire 6 acres	\$ 5,000	5,000	0	0	0	0
Improve boat ramp	5,000	5,000	0	0	0	0
Provide parking	5,000	5,000	0	0	0	0
Sanitation at Fish Ford	10,000	0	0	0	10,000	0
10-unit campground at Fish Ford	30,000	0	30,000	0	0	0
Gravel access road to Fish Ford	15,000	0	15,000	0	0	0
Subtotal Nonannual Cost		\$15,000	45,000	0	10,000	0
Additional AO&M		\$ 3,000	2,000	0	1,000	0

TABLE E-2 (Continued)

Item	Cost	No Action Plan	National Economic Development Plan	Environmental Quality Plans		
				Plan 1	Plan 2	Plan 3
Segment D:						
Dewey boat ramp						
Parking	\$ 6,000	6,000	0	0	0	0
Boat ramp	8,000	8,000	0	0	0	0
5-unit campground	20,000	0	20,000	20,000	20,000	0
2-unit sanitation	10,000	10,000	0	0	0	0
Subtotal Nonannual Cost		\$24,000	20,000	20,000	20,000	0
Additional AO&M		\$ 4,000	1,000	1,000	1,000	0

Item	Cost	No Action Plan	National Economic Development Plan	Environmental Quality Plans		
				Plan 1	Plan 2	Plan 3
Segment A - Scenic				Segment A - Recreational	Segment A - Scenic	Segment A - Scenic
Segment B - Wild				Segment B - Wild	Segment B - Wild	Segment B - Wild
Segment C - Scenic				Segment C - Recreational	Segment C - Not Designated	Segment C - Not Designated
DOLORES RIVER						
Segment A:						
Gateway boat ramp	\$ 1,000	1,000	0	0	0	0
Acquire access	3,000	3,000	17,000	0	0	0
Sanitation	7,000	7,000	0	0	0	0
10-unit campground	35,000		35,000	0	0	0
Subtotal Nonannual Cost		\$11,000	52,000	0	0	0
Additional AO&M		\$ 3,015	6,037	0	0	0
Segment B:						
Trail through canyon	\$37,000	0	37,000	0	0	0
Subtotal Nonannual Cost		0	\$37,000	0	0	0
Segment C:						
Easement to Utah Bottom	\$ 4,000	4,000	0	0	0	0
5-unit campground at Lake Bottom	15,000	0	30,000	15,000	30,000	0
Subtotal Nonannual Cost		\$ 4,000	30,000	15,000	30,000	0
Additional AO&M		\$ 1,000	4,000	3,000	3,000	2,000

TABLE E-3 - COST ASSUMPTIONS - COLORADO AND DOLORES WILD AND SCENIC RIVERS STUDY

ITEM	NO ACTION PLAN	NATIONAL ECONOMIC DEVELOPMENT PLAN	ENVIRONMENTAL QUALITY		
			PLAN 1	PLAN 2	PLAN 3
Total Nonannual Cost-Colorado River	\$159,000	\$431,300	\$64,300	\$74,300	\$37,300
Annual Additional A, O & M	55,595	53,382	1,500	2,000	500
Partial Payment (50-yr. Analysis)	10,620	28,810	4,295	4,962	2,491
Sinking Fund (25-yr. Analysis)	2,840	7,704	1,149	1,327	666
Total Annual Costs	69,055	89,896	6,944	8,789	3,657
On-site Recreationist Expenditures in 1990	459,183	540,540	63,180	91,260	42,120
Discounted Total Annual Costs- 1990	30,922	40,255	3,109	3,936	1,638
Discounted On-site Recreationist Expenditures - 1990	206,623	242,054	28,292	40,866	18,861
Easement or Acquisition Portion of					
Total Nonannual Cost	5,000	0	0	0	0
Total Nonannual Cost - Dolores River	\$15,000	119,000	38,600	53,600	13,600
Annual Additional A, O & M	4,015	13,037	3,000	4,000	1,935
Partial Payment (50-yr. Analysis)	1,002	7,948	2,578	3,580	908
Sinking Fund (25-yr. Analysis)	259	2,057	259	518	0
Total Annual Costs	5,276	23,042	5,837	8,098	2,843
On-Site Recreationist Expenditures in 1990	68,280	108,670	42,962	85,925	28,000
Discounted Total Annual Costs - 1990	2,363	10,318	2,614	3,626	1,273
Discounted On-Site Recreationist Expenditure - 1990	30,576	48,663	19,238	38,477	12,538
Easement or Acquisition Portion of Total					
Nonannual Cost	7,000	17,000	0	0	0

APPENDIX F

APPENDIX F
COLORADO - LOWER DOLORES WILD
AND SCENIC RIVER STUDY AND
ENVIRONMENTAL STATEMENT
CONTRIBUTORS

<u>Agency</u>	<u>Title/Speciality</u>
<u>National Park Service</u>	
Don Bock	Outdoor Recreation Planner (Team Leader)
Earl Perry	Outdoor Recreation Planner
<u>Heritage Conservation and Recreation Service (formerly Bureau of Outdoor Recreation)</u>	
Barry Tollefson	Outdoor Recreation Planner (Former Team Leader)
Duane Holmes	Outdoor Recreation Planner
<u>Bureau of Land Management, Moab District Office</u>	
Scott Packer	Outdoor Recreation Planner (Team Representative)
Cliff Franklin	Watershed and Soils Specialist
Richard Kness	Geologist
Bruce Louthan	Cultural Resource Specialist
Joe Cresto	Wildlife Biologist
Neal Armentrout	Fisheries Biologist
Daryl Trotter	Botanist
Larry Peterson	Chief of Resources

Bureau of Land Management, Grand Junction District Office

Jon Bley	Outdoor Recreation Planner (Former Team Representative)
Jim Keeton	Outdoor Recreation Planner (Team Representative)
Carlos Sauvage	Outdoor Recreation Planner
Steve Smith	Outdoor Recreation Planner

Department of Energy

William Chenoweth	Geologist (Team Representative)
-------------------	---------------------------------

U.S. Fish and Wildlife Service

Keith Rose	Fish and Wildlife Biologist (Team Representative)
------------	--

Colorado Department of Natural Resources

Duane Helton	Chief, Environmental Section (Team Leader) - Colorado Water Conservation Board
Earl Perry	Consultant - Colorado Water Conservation Board
Bruce Rippeteau	State Archeologist
Don Smith	Wildlife Program Specialist - Division of Wildlife

Utah Department of Natural Resources

Terry Green	Chief of Park Planning and Development (Team Leader) - Department of Parks and Outdoor Recreation
Milo Barney	Resources Coordinator - Department of Natural Resources
David Madsen	State Archeologist

Division of Wildlife Services

B I B L I O G R A P H Y
COLORADO AND DOLORES RIVER STUDY

Bosworth, William C. Letter of March 24, 1978, on water rights in the Colorado River study corridor, from Sheridan Enterprises, Inc.

Bureau of Economic and Business Research, University of Utah. Utah Facts. University of Utah, Salt Lake City (1977).

Bureau of Land Management. Final Environmental Statement, Northwest Colorado Coal. Department of Interior, Washington, D.C. (1977).

Bureau of Outdoor Recreation, Colorado Department of Natural Resources, Forest Service. Dolores River Wild and Scenic River Study Report. (March, 1976).

Bureau of Reclamation. Letter of May 18, 1977, transmitting information on projects on the two rivers under study or their tributaries, from the Upper Colorado Regional Office, Salt Lake City.

Bureau of Reclamation. Paradox Valley Unit Draft Environmental Statement. Salt Lake City (1978).

Business Research Division, Graduate School of Business Administration, University of Colorado. The Plateau Region: Colorado Planning and Management Region Number 11, Colorado Regional Development Profile. Colorado Department of Local Affairs (1975).

Chenoweth, William L. Letter of August 9, 1976. Energy Research and Development Administration (now Department of Energy), Grand Junction, Colorado.

Colorado Division of Wildlife. 1975 Big Game Harvest. Denver (1976).

Colorado Division of Wildlife. "Wildlife in Danger," a supplement in Colorado Outdoors Magazine, 27:4. Denver (1978).

Colorado River Fishes Recovery Team. Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service. (1978).

Colorado State University. "Mesa County," in County Information Service, Colorado State University (Revised annually; 1976 edition used).

Crampton, C. Gregory and Madsen, Steven K., Boating on the Upper Colorado - A History of the Navigational Use of the Green, Colorado, and San Juan Rivers and Their Major Tributaries. U.S. Army Corps of Engineers, Sacramento (1975).

Daber, James C. Letter of October 18, 1978, on Water Quality Standards, from the Colorado Water Conservation Board.

Dellenbaugh, F.S. The Romance of the Colorado River. G.P. Putnam and Sons, New York (1902).

Department of Agriculture and Colorado Water Conservation Board. Water and Related Land Resources, Colorado River Basin in Colorado. Denver (1965).

Department of Agriculture and Colorado Water Conservation Board.

Water and Related Land Resources, Dolores River Basin,
Colorado and Utah. Denver (1972).

Department of the Interior. Quality of Water, Colorado River
Basin. Washington (1979).

Dominguez, Silvestre, and Escalante, Velez de. Diario, in Pageant
in the Wilderness. Introduced, translated, and edited by
Herbert E. Bolton. Utah State Historical Quarterly XVIII, Salt
Lake City (1950).

Energy Research and Development Administration. National Uranium
Resource Evaluation, Preliminary Report. USERDA, Grand
Junction (1976).

Federal Power Commission. Hydroelectric Power Resources of the
United States - Developed and Undeveloped, January 1, 1976.
Washington, D.C. (1976).

Geological Survey. Water Supply Papers, Colorado and Utah. For
the Dolores, 1937-1975; for the Colorado, 1930-1976.
Washington, D.C. (published yearly and gathered into
volumes every five years).

Gunnerson, James H. The Fremont Culture; A Study in Culture
Dynamics on the Northern Anasazi Frontier. Peabody Museum
59:2, Cambridge, Mass. (1969).

Harmon, O'Donnell, & Henninger Associates. Visual Resource
Inventory and Evaluation of the Horsethief, Ruby, and
Westwater Canyons Portion of the Colorado River. Department
of the Interior, Denver (1976).

Heil, R.D., and others. General Soil Map - Colorado. Colorado State University Experiment Station and United States Soil Conservation Service Denver (1977).

Historical Museum and Institute of Western Colorado. "Antiquities Inventory for the Wild and Scenic River Designation of the Colorado River." Report, Bureau of Land Management contract, Grand Junction, Colorado (1976).

Holmgren, Arthur. "Study of Threatened and Endangered Flora of Westwater Canyon." BLM contract. Unpublished report, Moab (1976).

Hunt, Charles B. "The Geologic History of the Colorado River," in The Colorado River and John Wesley Powell. Professional Paper 669. U.S. Geological Survey, Washington, D.C. (1969).

Lohman, S.W. Geology and Artesian Water Supply of the Grand Junction Area, Colorado. Professional Paper 451. U.S. Geological Survey, Washington (1965).

Perry, Earl. Rivers of Colorado; Ten Easy River Trips in the Mountains, Canyons, and Plains of Colorado. American Canoe Association, Denver (1978).

Quinn, Michael C., Letter of August 9, 1977. State Historical Society of Colorado.

Rippeteau, Bruce E. Letter of May 10, 1977. Office of the State Archaeologist of Colorado.

Rippeteau, Bruce E. Memorandum of June 17, 1977. Office of the State Archaeologist of Colorado.

Rosar, Edward C. Letter of August 18, 1977, on water rights in the Colorado River study corridor, from Industrial Resources, Inc.

Shinn, Randall S., and Smith, Frank J. "Vegetation Inventory for the Colorado Wild and Scenic River Study." Bureau of Land Management Contract. Report, B10/ WEST, Inc., Logan, Utah (1976).

Stanton, Robert Brewster. Down the Colorado. Edited by Dwight L. Smith. University of Oklahoma Press (1965).

Stiles, Helen J. "Down the Colorado in 1889," in Colorado Magazine, 41:3 (1964).

Tanner, Faun M. The Far Country; A Regional History of Moab and La Sal, Utah. Olympus Publications, Salt Lake City (1976).

Terry, Claude E. "A filter system for determining river suitability for National Wild and Scenic River status," in Proceedings: River Recreation Management and Research Symposium. General Technical Report NC-28. North Central Forest Experiment Station, Forest Service, St. Paul (1977).

Toll III, Henry Wolcott. Dolores River Archaeology: Canyon Adaptations as Seen Through Survey. Cultural Resources Series No. 4. Bureau of Land Management, Denver (1977).

Ubbelohde, Carl; Benson, Maxine, and Smith, Duane A. A Colorado History. Pruett Publishing Co., Boulder (1972).

United States Department of the Interior. Westwide Study Report on Critical Water Problems Facing the Eleven Western States. Washington D.C. (1975).

University of Colorado Wilderness Study Group. "Recommendations for Classification of the Dolores River under the Wild and Scenic Rivers Act." Report, Boulder (1975).

Utah Division of Water Rights, Department of Natural Resources. Inventory of Water Rights, Upper Colorado River Basin, Utah. Salt Lake City (1974).

Waters, Frank. The Colorado. In the Rivers of America series. Rinehart and Co., New York (1946).

Wilson, L., and others. Soils of Utah. Utah Agricultural Experiment Station and Soil Conservation Service, USDA. Salt Lake City (1974).

As the nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, and parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the graphics and editorial staffs of the Denver Service Center. NPS 1391A