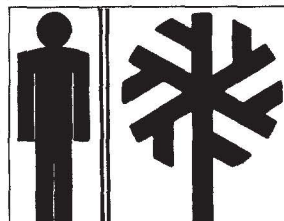


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Environmental Assessment
for the
RESTORATION OF BIGHORN SHEEP

SEQUOIA & KINGS CANYON



SEQUOIA AND KINGS CANYON NATIONAL PARKS / CALIFORNIA

March 1987

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U.S. Department of the Interior/National Park Service

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ENVIRONMENTAL ASSESSMENT

for the

Restoration of Bighorn Sheep
(*Ovis Canadensis Californiana*)

to the Great Western Divide

Sequoia and Kings Canyon National Parks (SEKI)
Three Rivers, California 93271

March 23, 1987

I. PURPOSE AND NEED FOR ACTION

A. INTRODUCTION

Sequoia and Kings Canyon National Parks, in cooperation with the California Department of Fish and Game and the Inyo National Forest, propose the introduction of approximately thirty (30) Sierra Nevada bighorn sheep (Ovis canadensis californiana) into the area of the Great Western Divide, Sequoia National Park, Tulare County, California (Fig. 1). This introduction could occur as early as February 1989.

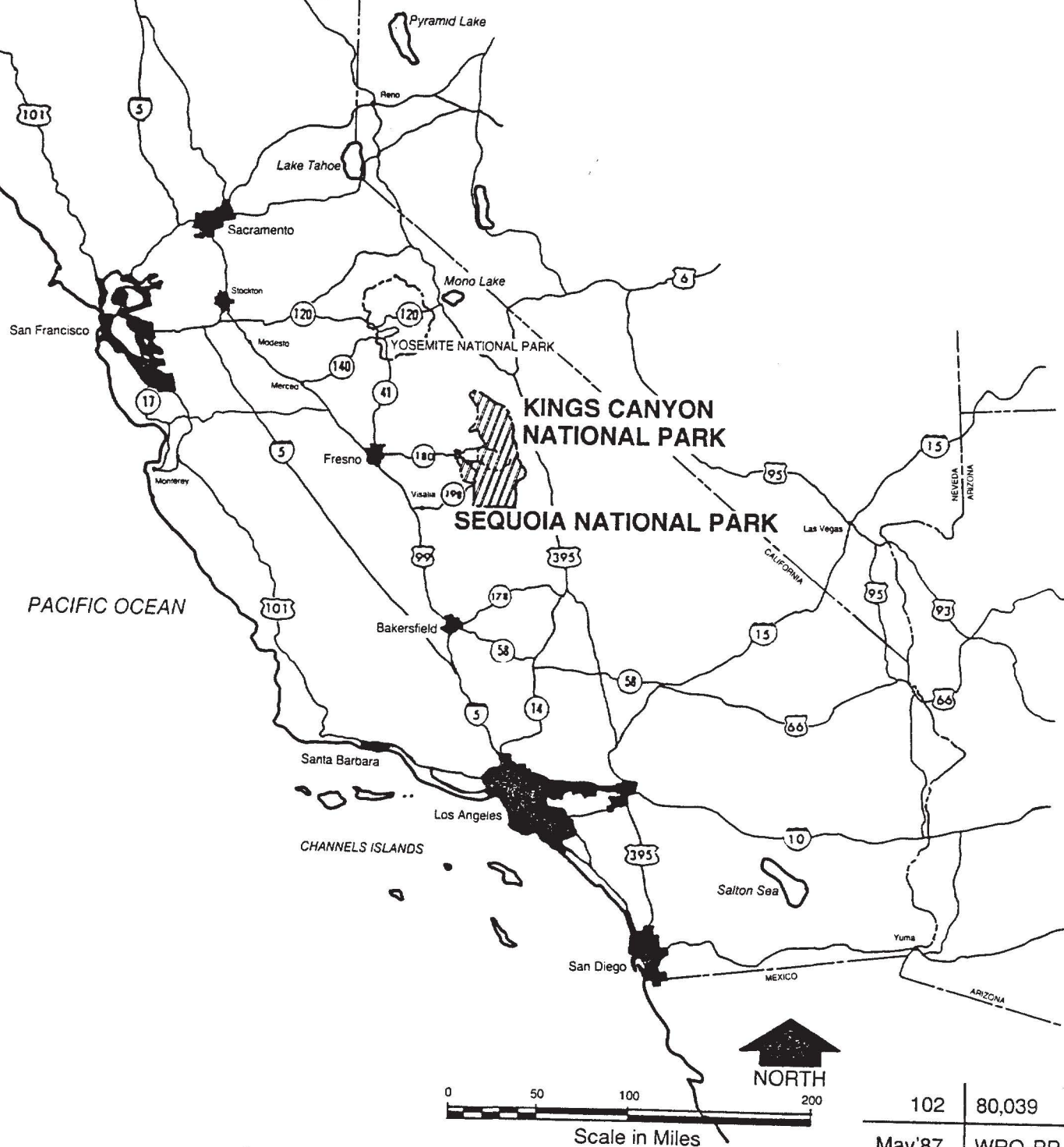
The restoration of Sierra bighorn sheep into the Great Western Divide area of Sequoia National Park would be an appropriate management action by the National Park Service and is consistent with the goals and directions of the three agencies involved. One of the goals in the State of California's Management Plan for Bighorn Sheep in California 1984 "is...to reestablish bighorn populations on historic ranges where feasible."

The Sequoia and Kings Canyon National Parks Natural Resources Management Plan (Rev. Jan. 1986) states that "...in the late 1800's sheep ranged along most of the Sierra Crest and the Great Western Divide, but they were rapidly decimated by hunting, competition with cattle and domestic sheep, and diseases acquired from domestic stock." One of the Natural Science Project Statements in the Natural Resources Plan states "...bighorn sheep (Ovis canadensis), were once extant throughout the mountains of the western states, but are now reduced to remnant herds. In the Sierra Nevada, the two surviving endemic herds both include Sequoia and Kings Canyon National Parks within their summer ranges. They winter on the eastern slopes, outside these Parks. A large and well-known herd of bighorn sheep once occupied the Great Western Divide above Mineral King until the 1920's when it was eliminated, presumably by hunting and perhaps diseases from domestic sheep. Consequently, since that time a substantial portion of these Parks has been absent its principal alpine herbivore. This represents a fundamental aberration of that ecosystem."

The Natural Resources Management Plan (Rev. Jan. 1986), lists two (2) project statements for bighorn sheep:

VICINITY MAP

SEQUOIA AND KINGS CANYON
NATIONAL PARKS



ON MICROFILM

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1. SEKI-N-22, Natural Resources Management Plan: Reintroduction of Bighorn Sheep; a research project consisting of three (3) years of intensive study following the restoration of bighorn sheep.
2. SEKI-RM-36, Natural Resources Management Plan: Monitor Status of Reintroduced Bighorn Sheep; management and monitoring of the reintroduced herd upon completion of the research project.

The Sierra Nevada Bighorn Sheep Recovery and Conservation Plan, (1984), a document written jointly by the Inyo National Forest, California Department of Fish and Game, Yosemite National Park, and Sequoia and Kings Canyon National Parks, establishes three (3) objectives for bighorn sheep management. One of these objectives is "...to restore bighorn sheep to all former ranges within the Sierra Nevada where it is ecologically, economically, and politically feasible, and where conditions would be favorable to their success."

The purpose of this environmental assessment is to analyze effects of the proposed action and to provide a series of reasonable alternatives including no action (maintaining the status quo).

II. DESCRIPTION OF THE AFFECTED AREA

A. GREAT WESTERN DIVIDE (Fig. 2)

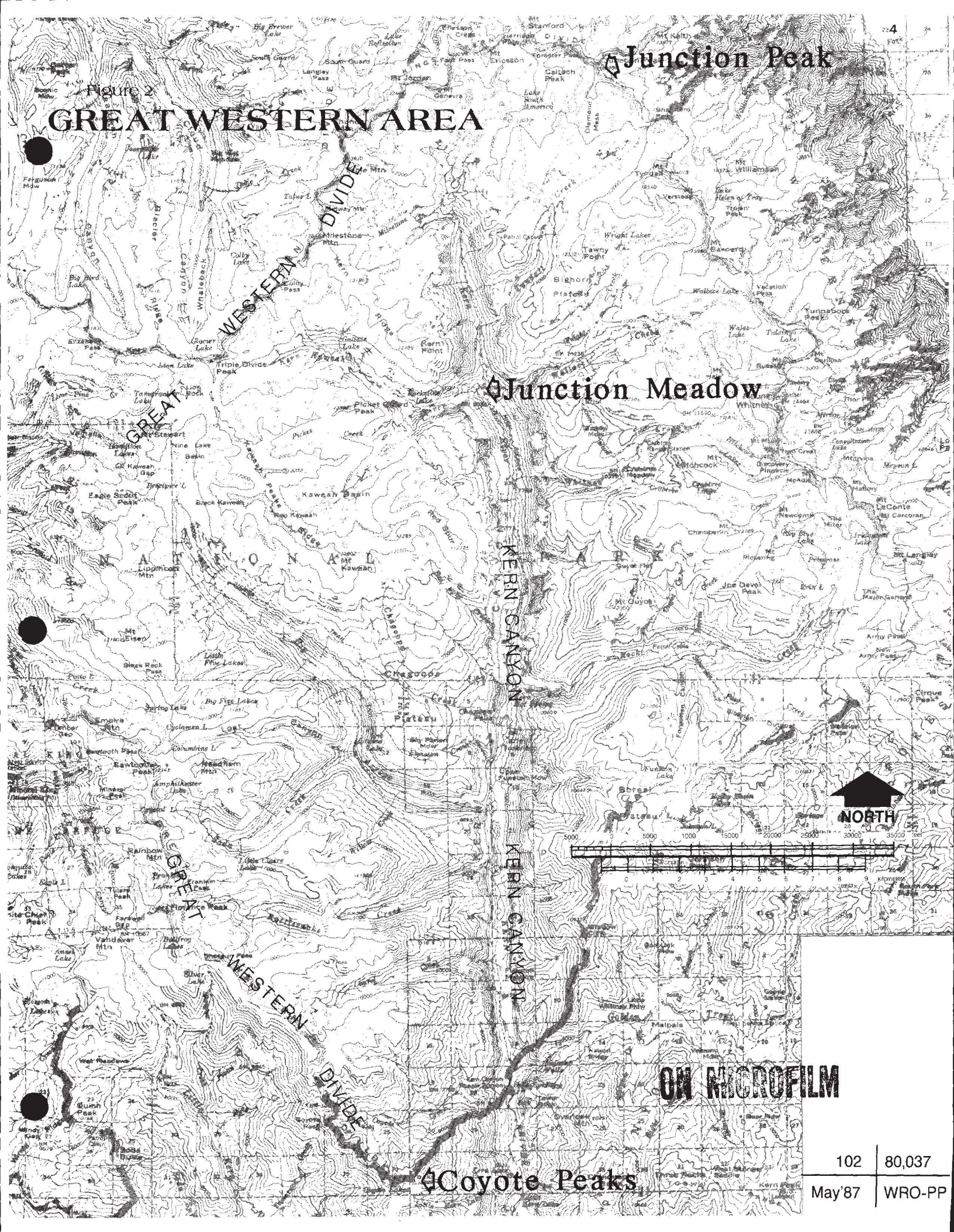
The "Great Western Divide" area is defined as follows:

1. On the North: Kings-Kern Divide.
2. On the West: The Great Western Divide and its western slopes, south to Coyote Peaks.
3. On the South: Coyote Peaks east to the eastern slopes of the Kern Canyon.
4. On the East: The eastern slopes of the Kern Canyon, north to Junction Meadow and extending north to Junction Peak.

B. POTENTIAL RESTORATION SITES FOR BIGHORN SHEEP

A primary and an alternate site for the restoration of bighorn sheep has been selected from foot surveys,

Figure 2
GREAT WESTERN AREA



Junction Peak

Junction Meadow

NORTH

ON MICROFILM

Coyote Peaks

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aerial surveys, winter snow depth surveys, and consultations with bighorn sheep authorities.

a. Primary Site: Big Arroyo at junction of Kern Canyon

b. Alternate Site: Kern Point

The historical records and data do not furnish information on seasonal distribution of bighorn sheep prior to their extirpation from the Great Western Divide. The few available historical records indicate that the Great Western Divide apparently at our time contained and supported a viable population of bighorn sheep.

Consequently, it is necessary to anticipate where the restored sheep will establish ranges after their release into the selected restoration sites, based on known behaviors of the species (Fig. 3).

III. DEFINITION OF TERMS

- A. RANGE - the total area of occupied habitat or area of use by bighorn sheep.
- B. SEASONAL RANGE - a component of range, used for extended periods of time, limited by external and internal conditions. Seasonal ranges include winter range, summer range, ewe-lamb range and migration routes.
- C. COMPLETE CLOSURE - the closure to visitor use of the ranges occupied and used by the reintroduced bighorn sheep.
- D. LIMITED CLOSURE - the closure to visitor use of selected areas, e.g. seasonal range(s), and selected use restrictions within these seasonal ranges occupied by the restored bighorn sheep, e.g. ewe-lamb ranges.

IV. ALTERNATIVES

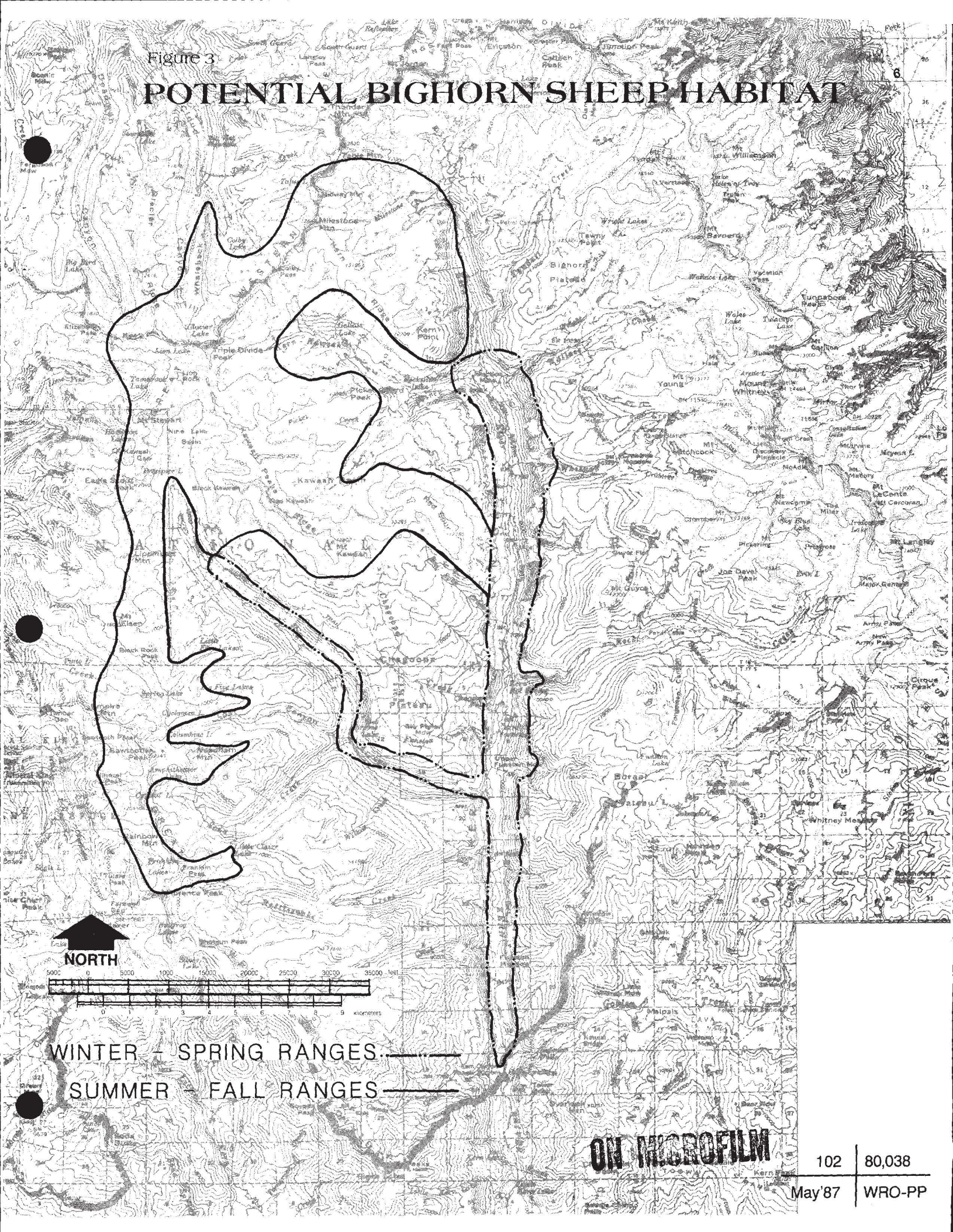
The following alternatives and their potential effects are being considered in the evaluation and analysis of restoring bighorn sheep to the Great Western Divide:

- A. ALTERNATIVE A...RESTORE BIGHORN SHEEP, NO CLOSURE OR USE RESTRICTIONS - PREFERRED ALTERNATIVE

Under this alternative, bighorn sheep would be restored into the Great Western Divide and there would be no

Figure 3

POTENTIAL BIGHORN SHEEP HABITAT



WINTER - SPRING RANGES

SUMMER - FALL RANGES

ON MICROFILM

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closures or use restrictions placed into effect unless significant problems arise. Public and NPS use would continue under existing guidelines and management policies.

B. ALTERNATIVE B...NO ACTION (MAINTAIN STATUS QUO)

Under this alternative bighorn sheep would not be restored into the Great Western Divide of these Parks. Public and NPS use would continue under existing guidelines and management policies.

C. ALTERNATIVE C...RESTORE BIGHORN SHEEP, LIMITED CLOSURE AND VISITOR USE RESTRICTIONS

Under this alternative bighorn sheep would be restored into the Great Western Divide and limited closures and visitor use restrictions would be placed into effect until the completion and evaluation of the three (3) year research study. A reevaluation of the limited closure and visitor bighorn restrictions would be made at that time. Areas of bighorn restoration would be closed to all public and NPS administrative use (except bighorn sheep researchers) during the first year only of the restoration. Ewe-lamb ranges would be closed to all cross-country travel and overnight use by both the public and NPS administrative use (except researchers) until completion of the bighorn sheep research study.

These closures would be transient and temporary depending on where the sheep establish ranges, when (time) they establish ranges and inhabit an area, and where ewe-lamb ranges are established. The field researchers would establish these closures based on field observations, radio telemetry and consultation with park management.

D. ALTERNATIVE D...RESTORE BIGHORN SHEEP, COMPLETE CLOSURE

This alternative proposes that bighorn sheep be restored into the Great Western Divide and that a complete closure of the bighorn sheep range(s) be implemented to all public and NPS entry and use, at least until the sheep are well established.

V. IMPACTS OF ALTERNATIVES

A. ALTERNATIVE A

No special closure or use restrictions to bighorn sheep

or to its habitat would be afforded under this alternative. Stock, backpacker and NPS use would continue under existing guidelines and management policies. Though unlikely, unrestricted off-trail stock and backpacker travel and use in bighorn sheep ranges could create serious and significant stress to bighorn sheep and could compromise the success of the restoration.

Under this alternative, the Parks' Superintendent may impose closures and public use limits in accordance with 36 CFR 1.5. Such closures and public use limits would be based on recommendations of the bighorn sheep researchers, research scientists and resource management managers. Such closures and public use limits are expected to be extremely rare and limited in their implementation.

Visitor and NPS use would continue under existing guidelines and management policies and would not be impacted by this alternative.

Socio-economic effects on the private user, commercial operators and customers of commercial operators would not occur.

B. ALTERNATIVE B

A major high elevation ungulate will continue to be absent from its former range on the Great Western Divide. The opportunity to reintroduce bighorn sheep may be foregone and these Parks may lose the opportunity to reestablish this alpine herbivore to its historical range. Since only one thriving herd (the Mt. Baxter herd) exists, the race is vulnerable to possible extinction caused by disease. The no action alternative fails to take advantage of an opportunity to improve the future of bighorn sheep in the Sierra Nevada by providing an additional geographically isolated population and therefore enhancing genetic integrity and viability.

Visitor and NPS use would continue under existing guidelines and management policies and would not be impacted.

Socio-economic effect on the private user, commercial operators, and customers of commercial operators would not be impacted by this alternative.

C. ALTERNATIVE C

Cross-country travel either by stock or foot and overnight use would be prohibited during the first year of restoration only. Cross-country travel by stock or foot and overnight use would be prohibited in ewe-lamb ranges until completion of the three (3) year research study. This would place major restrictions and limitations on visitor and NPS use of the area for the first year only. Limited restrictions and use would be in effect until completion of the research study.

Backpacking and stock use of adjacent and surrounding areas may be expected to increase during the first year of closure. This increase is expected to be slight, not significantly impacting adjacent or surrounding areas.

Private users, commercial operators and customers of commercial operations would lose that opportunity and portion of their income derived from the use of any closed area during the first year only, and that opportunity and portion of their businesses derived from their use of any ewe-lamb ranges until completion of the research study. This socio-economic loss may range from slight to major, depending on the size and location of any of the closed area(s) and any closed ewe-lamb ranges.

NPS administrative use and maintenance of trails and backcountry facilities would be eliminated for the first year only. Administrative use and maintenance of trails and backcountry facilities would be eliminated from ewe-lamb ranges until completion of the research study. This alternative may therefore result in trail and facilities damage and deterioration ranging from slight to moderate. This damage and/or deterioration may increase the cost and personnel required to make necessary repairs and restoration.

D. ALTERNATIVE D

Complete closure of range(s) occupied by restored bighorn sheep would have several major impacts. Complete closure would not be consistent with present guidelines and management policies of Sequoia and Kings Canyon National Parks. Existing scientific and biological data do not support the assumption that bighorn sheep and visitor use, including backpacking and stock use,

are incompatible, given certain restrictions. A complete closure of bighorn sheep range(s) would deny opportunity for visitors to enjoy a variety of backcountry experiences including the experience of observing bighorn sheep restored into its historical range. A goal of the 1916 Act establishing the National Park Service is to provide for visitor enjoyment of the Parks in ways that do not result in significant impairment of park resources, or severe disruption of the natural processes which shaped them, or seriously impair the quality of experiences associated with these resources. Complete closure would not be in keeping with these goals.

Visitor and NPS use would be eliminated from bighorn range(s) under this alternative. Maintenance of trails and backcountry facilities would be eliminated, which may result in damage and deterioration to trails and backcountry facilities. Backpackers and stock users would be denied the opportunity to enjoy a variety of backcountry experiences including the experience of observing bighorn sheep.

Economic impacts on commercial operators may range from slight to major impact, depending on the portion of their business that was derived from use of the closed areas.

APPENDIX I

SUMMARY OF EFFECTS

	ALT. A (NC)	ALT. B (NA)	ALT. C (LC)	ALT. D (CC)
1. Protection of bighorn sheep and its habitat.	Improved ¹	Decreased	Improved	Optimum ²
2. Stock use as a recreational activity.	None ^{3,4}	None	Slight	Major Decrease ⁴
3. Backpacking as a recreational activity.	None ^{3,4}	None	Slight-Major Decrease ⁴	Major Decrease ⁴
4. Socio-economic effect on private user, commercial operators, and customers of commercial operators.	None ^{3,4}	None	Slight-Major Decrease ⁴	Slight-Major Decrease ⁴
5. NPS administrative use and maintenance of trails and backcountry	None ^{3,4}	None	Slight-Moderate Decrease ⁴	Slight-Major Decrease ⁴

Notes:

NC = No closure
 NA = No action
 LC = Limited closure
 CC = Complete closure

- 1 = Protection increases, but there is risk of human disturbance.
 2 = The effect of this alternative is to provide the best protection for bighorn sheep and their habitat.
 3 = Slight decrease if a closure is required.
 4 = This relates only to areas affected by the reintroduction.

APPENDIX II

TRAVEL ZONES, STOCK USE
 ZONES 79, 80, 82, 86, 87, 88, 89
 GREAT WESTERN DIVIDE AREA

(DATA INCLUDES NPS AND PRIVATE USE)

<u>TRAVEL ZONES</u>	<u>ZONE NO.</u>	<u>STOCK USE NIGHTS</u>							
	ZONE- FORAGE AREA	1977	1978	1979	1980	1981	1982	1983	1984
Milestone Basin	79-1	194	24	77	NR	88	209	5	40
Upper Kern River Canyon	79-2	NR	192	NR	NR	77	NR	NR	NR
Gallats Lake	79-3	66	12	26	NR	66	NR	NR	NR
Kern Kaweah River	79-4	NR	39	NR	NR	21	8	NR	NR
TOTALS ZONE	79.....	260	267	103	NR	252	217	5	40
Sheep Camp	80-1	NR	NR	NR	NR	NR	NR	NR	NR
Tyndall Creek	80-2	161	NR	NR	NR	NR	NR	NR	NR
Bighorn Plateau Little Meadow	80-3	78	NR	48	NR	44	111	NR	NR
Tyndall Creek Cabin	80-4	161	82	138	84	119	95	68	104
Lake South America	80	45	NR	NR	NR	NR	NR	NR	NR
TOTALS ZONE	80.....	445	82	186	84	163	206	68	104

	ZONE	1977	1978	1979	1980	1981	1982	1983	1984
Junction Meadow-Kern	82-1	NR	NR	122	42	18	26	49	35
Junction Meadow-1 mi	82-2	108	28	NR	NR	11	33	NR	NR
Junction Meadow-3 mi	82-3	NR	NR	NR	NR	NR	NR	NR	NR
TOTALS ZONE	82.....	108	28	122	42	29	59	49	35

Kern Bridge	86-1	NR	NR	NR	18	131	192	27	85
Upper Funston	86-2	137	221	382	274	210	483	63	247
Lower Funston	86-3	50	111	176	215	244	349	46	78
Kern Station/ Lewis Camp	86-4,5	81	220	122	367	140	278	209	41
Snake Camp	86	74	47	180	123	62	41	NR	NR
21 Inch Camp	86	56	52	NR	209	NR	105	12	124
TOTALS ZONE	86.....	398	651	860	1206	787	1448	357	575

Big Arroyo	87-1-3	208	70	21	115	71	189	18	NR
Chagoopa	87-4-8	6	NR	NR	80	22	NR	NR	NR
Sky Parlor	87-9	58	25	NR	4	46	63	NR	NR
TOTALS ZONE	87.....	272	95	21	199	139	252	18	NR

Lower Lake Five-4 areas	88-1	50	111	96	190	252	74	NR	304
Upper Lake Five-5 areas	88-2	64	NR	NR	NR	NR	NR	NR	NR
Big Five		74	53	100	172	145	27	84	147
TOTALS ZONE	88.....	188	164	196	362	397	101	84	451

	ZONE	1977	1978	1979	1980	1981	1982	1982	1984
Spring Lake	89-1	NR	NR	NR	NR	NR	NR	NR	NR
Glacier Pass Meadow	89-2	NR	NR	NR	NR	NR	NR	NR	NR
Lost Canyon	89-3	56	81	137	14	22	14	NR	NR
Upper Rattle- snake Creek	89-4	132	140	192	132	187	170	103	104
Forester Lake	89-5	125	145	183	175	227	213	167	241
Lower Rattle- snake Creek	89-6	47	160	57	50	45	164	37	154
Cow Camp	89-7	NR	97	4	78	NR	NR	NR	NR
Crytes Creek	89-8	NR	NR	NR	NR	NR	NR	NR	NR
Mirror Camp	89-9	NR	NR	NR	NR	NR	27	NR	NR
Upper Coyote Creek	89-10	NR	NR	NR	NR	NR	NR	NR	NR
TOTALS ZONE	89.....	360	623	573	449	481	588	307	499

GRAND TOTALS 1950 1690 1939 2216 2213 2732 679 1663

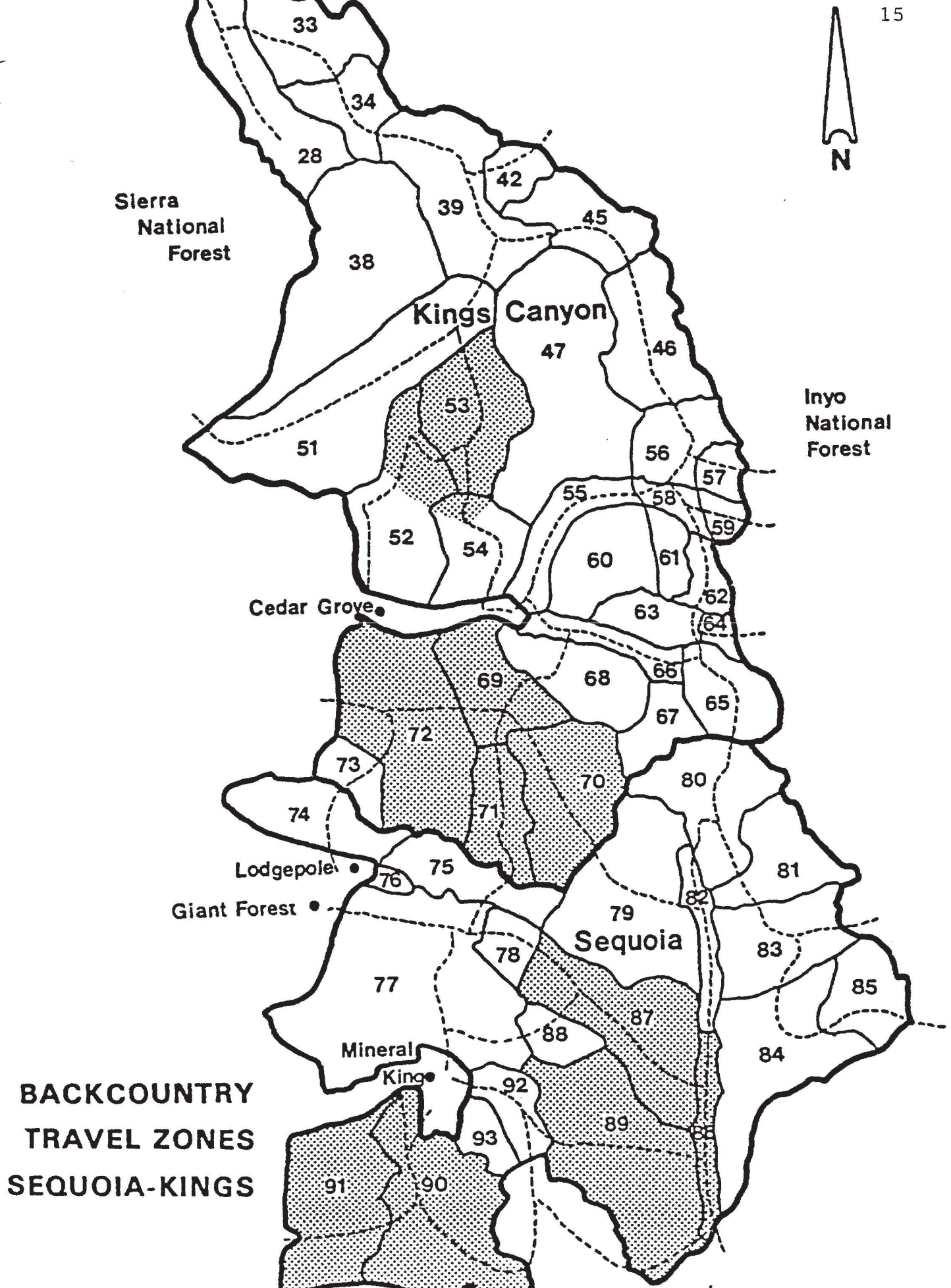
TOTAL NUMBER OF STOCK USE NIGHTS FOR THE EIGHT (8) YEARS...15,082

AVERAGE FOR STOCK USE NIGHTS FOR THE EIGHT (8) YEARS..... 1,885

NR = Not Reported

See Figure 4 (Map of Travel Zones)

FIGURE 4. Stippled Areas are Travel Zones in which off-trail stock travel is unrestricted.



BACKCOUNTRY
TRAVEL ZONES
SEQUOIA-KINGS

APPENDIX III

Table 1 below shows the actual number of visitor nights used in each travel zone and the percent of the total visitor nights accounted for in each travel zone.

TABLE 1

BACKCOUNTRY VISITOR USE BY TRAVEL ZONES

(ZONES 79, 80, 82, 86, 87, 88, 89)

(BACKPACKER AND STOCK USE)

1976 DATA:

TRAVEL ZONE	TOTAL NUMBER VISITOR NIGHTS	PERCENT OF TOTAL
79	2,176	1%
80	4,490	3%
82	1,678	1%
86	2,837	2%
87	2,485	2%
88	3,394	2%
89	7,478	5%
TOTALS	24,538	16%

Table 2 provides an estimate of the number of visitor nights that might be affected by the proposed bighorn sheep reintroduction. These estimates are made by multiplying the actual use percentages from Table 1 for each Zone by the nine (9) year averages of total visitor and visitor nights. The nine (9) year average use from 1977 to 1985 was 41,645 visitors and 179,206 visitor nights.

TABLE 2

Travel Zone	Percent of Total	Number Visitors	Number Visitor Nights
79	1	416	1,792
80	3	1,248	5,376
82	1	416	1,792
86	2	832	3,984
87	2	832	3,984
88	2	832	3,984
89	5	2,082	8,960
TOTALS	16	6,658	29,872

