

BIGHORN SHEEP MANAGEMENT PLAN



SEQUOIA AND KINGS CANYON National Parks

NATIONAL PARK SERVICE / U.S. DEPARTMENT OF THE INTERIOR



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BIGHORN SHEEP MANAGEMENT PLAN
For
Sequoia and Kings Canyon National Parks

Prepared by:

Michael Drey
Natural Resource Specialist

Date Aug 4, 1986

Recommended by:

Shelley Williams
Fish and Wildlife Biologist

Date Aug 5, 1986

William Brant
Chief of Resources Management

Date Aug 7, 1986

Don M. Grob
Research Scientist

Date 10 Aug 1986

Approved By:

[Signature]
Superintendent

Date Aug. 11, 1986

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Sequoia and Kings Canyon
Bighorn Sheep Management Plan

1. INTRODUCTION

Sequoia and Kings Canyon National Parks manage the natural resources of these Parks to maintain and perpetuate their inherent integrity. Sequoia and Kings Canyon National Parks Statement for Management and Master Plan establish the objectives for this management. To achieve these objectives, the Parks prepare plans to guide natural resources management, interpretation, visitor use, and development, placing the Parks within the context of the surrounding region. The Parks cooperate with other agencies and outside parties in the development of plans, and provide for public participation in the planning process.

The Natural Resources Management Plan for the Parks (Rev. Jan. 1986) defines the course of action based on National Park Service policy and law, as: (1) the continuous protection, management and maintenance to perpetuate the resources, (2) to achieve the Parks purposes and objectives and (3) to appropriately regulate the effect of park use on the resources. The Natural Resources Management Plan enumerates the natural resources and science programs. In the absence of adequate knowledge, programs are designed to maintain the ecosystem at the status quo to avoid long term or possibly irreversible changes until research can provide necessary information for management actions.

This Bighorn Sheep Management Plan is an addendum to the Sequoia and Kings Canyon National Parks Natural Resources Management Plan (Rev. Jan. 1986). It identifies the goal and objectives and actions for the management of bighorn sheep within these Parks.

A. GOAL: To restore and perpetuate the native California bighorn sheep (Ovis canadensis californiana) and to protect the integrity of the ecosystem. Management will be directed toward restoring and maintaining populations of bighorn sheep for ecological, scientific, educational, aesthetic, and recreational values.

B. OBJECTIVES:

1. To restore bighorn sheep to those areas of the Parks where the species was extirpated or was substantially diminished because of human activities either directly or indirectly through changes in the ecosystem.
2. To perpetuate bighorn sheep for their essential role in the ecosystem and to strive to maintain their abundance, behavior, diversity, and ecological integrity within the Parks.

3. To support an active research program designed to provide natural resource management with assistance in all aspects of planning, development, implementing, and monitoring the bighorn sheep management program in these Parks.

4. To provide the opportunity for visitors to enjoy observing bighorn sheep in their natural environment, including those restored to historical range.

C. HISTORY

One hundred fifty years ago, bighorn sheep were distributed in the Sierra Nevada from the Sonora Pass region south to the southern end of the range (Wehausen 1983). Summer ranges were typically along the mountain crest and winter ranges on the eastern side of the Sierra Nevada. One clear exception is known: The Great Western Divide, a western spur of high peaks in Sequoia National Park (Jones 1950), served as summer range for a herd probably wintering in the Kern drainage. A second possible exception may have been a herd wintering along the Middle Fork of the Kings River, possibly below the confluence of the South Fork of the Kings River and using the White Divide-LeConte Divide region in Kings Canyon National Park as summer range (Wehausen 1979).

The decline of bighorn sheep in the Sierra Nevada began with the influx of gold miners. By 1880 much extirpation had already taken place. Miners and sheepherders shot bighorn sheep on vulnerable winter ranges. Perhaps the greatest toll on bighorn came as a result of the large numbers of livestock, especially domestic sheep, that were grazed in the Sierra Nevada in the late 19th and early 20th centuries. Domestic sheep devastated bighorn sheep forage areas and brought with them diseases highly contagious to bighorn sheep, scabies being the one recorded at that time. In the 1870s a major dieoff of bighorn sheep occurred in the Great Western Divide as a result of the only recorded scabies epidemic in the Sierra Nevada. By the early 1900s the Great Western Divide herd of bighorn sheep was extinct (Jones 1950).

By 1978, despite considerable effort to find evidence of the existence of suspected remnant native herds of bighorn in the Sierra Nevada, none had been found; the Mt. Baxter and the Mt. Williamson herds are the only known native herds to have survived (Wehausen 1979), although the Mt. Baxter herd is now believed to consist of two demographically distinct populations (Wehausen pers. comm.).

In 1979, 1980, 1982, and 1986, bighorn sheep were removed by the California Department of Fish and Game from the Mt. Baxter herd for reintroductions at three sites within the Sierra Nevada Wheeler Crest (Inyo Co.), Mt. Langley (Inyo Co.), Lee Vining Canyon (Mono Co.) and to the Warner Mountains (Modoc Co.).

As of 1986, bighorn in the Sierra Nevada occur in five herds: Mt. Baxter, Mt. Williamson, Wheeler Crest, Lee Vining Canyon, and Mt. Langley. The Mt. Baxter herd presently consists of approximately 200 animals, Mt. Williamson herd approximately 30 animals, Mt. Langley herd approximately 30 animals, Wheeler Crest approximately 25 animals and Lee Vining Canyon approximately 28 animals.

In 1984, at the request of the California Department of Fish and Game, a formal interagency group, The Sierra Bighorn Sheep Interagency Advisory Group, was formed. This advisory group is composed of wildlife biologists from the California Department of Fish and Game, Inyo National Forest, Sequoia and Kings Canyon National Parks, Yosemite National Park, Bakersfield District of the Bureau of Land Management, and Dr. John Wehausen, a private consultant. Consonant with the policies and directives of the individual management agencies, the advisory group provides guidelines, recommendations, consultation service, and advice to respective management agencies on bighorn sheep management in the Sierra Nevada.

II. MANAGEMENT POLICIES

A. RESTORATION

Restoration of bighorn sheep into Sequoia and Kings Canyon National Parks will be in accordance with Management Policies, U.S. Department of the Interior, National Park Service, 1978, and Sequoia and Kings Canyon National Resources Management Plan (Rev. Jan. 1986). Guidelines and recommendations in the Sierra Nevada Bighorn Sheep Recovery and Conservation Plan, Sept. 1984 [(Sierra Bighorn Sheep Interagency Advisory Group (SBSIAG)], consonant with the policies and directives of the National Park Service, will be followed for all restorations of bighorn sheep in these Parks.

1. Site Selection: (SBSIAG Criteria)

- a. Evidence of Historic Use- Documentation of historic use of an area by bighorn is a good measure of habitat suitability and will be the primary basis for selecting and prioritizing restoration sites.

b. Quality_of_Winter_Range- Good winter range should contain precipitous rocky escape terrain on south facing slopes where snow melts quickly enough to prevent excessive accumulation. It also provides adequate forage with mixtures of shrub and grass species for use under different phenological and snow conditions.

c. Accessibility_to_Summer_Range- Unobstructed migratory corridors between suitable winter and summer ranges are essential to any successful restoration.

d. Geographic_Separation_from_Existing_Herds- With three introductions already having taken place in the Owens Valley, priority will be given to sites further removed from the Mt. Baxter herd so that they may act as insurance against potential catastrophic loss of the Sierra population.

e. Carrying_Capacity- Sites will be preferred that appear capable of supporting relatively large populations (e.g. over 100 animals). Such populations are expected to have greater intrinsic stability.

2. An environmental assessment will be prepared and approved prior to any restoration operation.

3. The Mt. Baxter herd will be managed to provide donor stock for restorations. Sheep removal from the Mt. Baxter herd will attempt to approximate a maximum sustainable harvest.

4. All plans, environmental assessments, augmentation, removal or other population manipulation for bighorn sheep in the Parks will be reviewed by the Sierra Bighorn Sheep Interagency Advisory Group and the California Department of Fish and Game. Pre-planning and early consultation with the above groups is required.

5. Restored herds may be augmented to compensate for excessive losses, to add genetic variability, increase population growth rate, or to add telemetry collars.

6. Transplant Operation Guidelines-Non Park Lands

a. The California Department of Fish and Game will be the lead agency for all transplant removals from non-park lands.

(1). Bighorn sheep will be captured by whatever methods are deemed most efficient and safest by the California Department of Fish and Game personnel and are in accordance with the policies of the National Park Service. Current successful techniques include drop netting, drive netting with a helicopter, net gunning with a helicopter, and free range capture using immobilizing drugs and projectile syringes.

(2). The capture team will attempt to transplant at least 25-30 animals, approximately 2/3 of the cohort being female, for all initial restorations. No fewer than 20 animals will be released for initial restorations.

(3). All captured animals will be ear tagged, and will have blood samples, weights and standard biological measurements taken prior to their release. A minimum of 50 percent of the sheep captured will be fitted with telemetry collars.

7. Transplant Operation Guidelines within Park lands

a. Sequoia and Kings Canyon National Parks will consult with and request the assistance of the California Department of Fish and Game and the Sierra Bighorn Interagency Advisory Group for all bighorn sheep transplant operations and augmentations.

b. Bighorn sheep will be handled only for management and research purposes. Valid causes for handling include the installation or removal of telemetry collars, relocation, augmentation, and for the assessment and/or treatment of injury or disease. Under no condition will bighorn sheep be handled solely for training purposes.

c. Handling will be directed and accomplished by only those persons having the necessary training, experience and certification as described in the Parks Operational Manual for the Capture and Immobilization of Wildlife, or by qualified personnel from the California Department of Fish and Game.

d. The California Department of Fish and Game, Wildlife Investigations Staff will be consulted for recommendations on the selection of immobilization drugs, drug dosage, animal handling techniques and for consultation on other veterinary problems.

B. RESEARCH

An active research program is essential to provide natural resource management with information, baseline data, and management recommendations in all aspects of planning, development, implementing and monitoring the bighorn sheep management program in these Parks.

Research priorities should include specific management needs:

1. Studies of food habits and preference
2. Movements, migration routes and ranges
3. Demography
4. Vegetation status in principal home range centers
5. Human disturbance- visitor and NPS Use
6. Evaluation of the restoration project
7. Investigation and surveys of the White Divide-LeConte Divide area of Kings Canyon, and in the area of the confluence of the South and Middle Fork of the Kings River to determine if the site criteria requirements established by the Sierra Bighorn Sheep Interagency Advisory Group show this area to be a potential restoration site.
8. All research studies will be conducted or administered by the Parks' Research Scientist.

C. MONITORING

The purpose of monitoring is to track bighorn distribution, habitat use, population status, reproduction and mortality, human disturbance, and management practices that may adversely effect bighorn sheep. Monitoring is essential to revise management in accordance with changing conditions.

At the conclusion of any research study or restoration of bighorn sheep, herd and vegetation status will be monitored indefinitely by the Division of Resource Management. In addition, the Division of Resource Management will monitor all known populations of bighorn sheep within these Parks.

1. The Fish and Wildlife Biologist will ensure that all known populations of bighorn sheep will be surveyed to determine population estimates, sex ratios, age structures, and ewe-lamb ratios. Surveys should be conducted while bighorn are on their winter ranges.

2. The Fish and Wildlife Biologist will monitor and evaluate summer ranges of known bighorn sheep herds regularly to determine whether ranges are expanding or decreasing.

3. The Fish and Wildlife Biologist will monitor all vegetation status plots established in bighorn ranges.

4. All National Park Service management activities and visitor use activities occurring within bighorn sheep ranges will be reviewed by the Fish and Wildlife Biologist for potential disturbance prior to implementation.

5. Specific monitoring requirements (Refer Min.Stds.)

a. All initial restorations will require daily monitoring for a period of 30 days following restoration.

b. Bighorn sheep will be monitored winter and summer for the first two years following initial restoration.

c. Restored herds will be monitored annually until their populations exceed 50 animals or have stabilized at some lower number, and so long as sheep are removed for relocation or other purposes.

d. Once restored herds have stabilized, monitoring and census data will be taken every three years.

e. Status reports will be written yearly so long as annual monitoring continues, and following each census thereafter.

f. Sequoia and Kings Canyon National Parks will cooperate with and provide assistance to the California Department of Fish and Game and U.S. Forest Service in the annual monitoring of the Mt. Baxter herd.

D. CLOSURES

1. In order to safeguard this limited resource, ewe-lamb ranges in the Parks may be closed temporarily to entry by visitors if research and monitoring indicate that significant disturbance is occurring. Such closures are not likely. All closures will be based on scientific and biological recommendations of the Research Scientist and/or the Fish and Wildlife Biologist, through the Chief of Resource Management to the Parks' Superintendent.

E. EDUCATION

1. Information about bighorn sheep will be provided to visitors. This information will include one or more brochures explaining bighorn sheep ecology, bighorn behavior, the Parks' bighorn sheep management and restoration program, appropriate visitor behavior, and the Parks' regulations on bighorn sheep. The brochure(s) will be provided with wilderness permits, provided at visitor centers, posted on bulletin boards and provided through concession facilities. All handouts-brochures will be reviewed for accuracy and adequacy each fall by the Interpretive, Resources Management, and Fire Management-Visitor Protection Divisions and by the Superintendent's office.

2. As appropriate, articles about bighorn sheep will be placed in the "Sequoia Bark", the "Gigantea", and local newspapers. All articles shall be reviewed by the Fish and Wildlife Biologist before they are published.

3. Park Rangers, Interpreters, and Fish and Wildlife Technicians have the primary responsibility for contacting visitors in areas with bighorn sheep and advising them of appropriate visitor behavior. However, all employees should take full advantage of opportunities to provide this information to visitors.

4. The Chief of Interpretation will designate an interpreter to be responsible for developing, coordinating, and implementing programs to disseminate bighorn sheep management and research information both within and outside these Parks.

III. MINIMUM STANDARDS

At minimum standards, the bighorn sheep management program will detect and evaluate changes in bighorn sheep numbers (abundance) and distribution.

<u>STANDARD</u>	<u>MECHANICS</u>	<u>RESPONSIBILITIES</u>
A. Information		
Every visitor and person obtaining a backcountry wilderness permit is informed of: 1. Bighorn ecology 2. Bighorn behavior 3. Visitor behavior 4. Bighorn program	pamphlets at contact stations and with back-country and wilderness permits	Rangers, Interpreters Fish and Wildlife
B. Research		
Acquire knowledge of local influences on bighorn ecology and behavior	research studies	Research Scientist
Provide alternatives to management to mitigate human influences	research studies	Research Scientist
Prepare Project Statements and Natural Science Project Statements for addition studies	research proposals	Research Scientist
C. Monitoring		
Initial Restorations will be monitored: 1. Daily for 30 days following restoration 2. Summer and Winter monitoring for first two years 3. Monitored annually until population exceeds 50 or stabilized 4. Monitored and census every 3 years upon completion item 3.	monitoring program monitoring program monitoring program monitoring program	Research Scientist Research Scientist Fish and Wildlife Biologist Fish and Wildlife Biologist

III. MINIMUM STANDARDS con't

5. Established Herds will be monitored or censused every 3 years.	monitoring program	Fish and Wildlife Biologist
6. Mt. Baxter herd will be monitored/census annually (This may be accomplished in cooperation with CDFG census)	monitoring program	Fish and Wildlife Biologist
7. Status Reports Status reports will be written yearly as long as monitoring continues and following each census.	monitoring program	Research Scientist Fish and Wildlife Biologist

IV. REVIEW AND REVISION

All persons with bighorn management responsibilities should review this plan annually. Revisions should normally be made during the winter, but they can be made during any time of the year. Proposed changes in the Bighorn Sheep Management Plan should be submitted to the Fish and Wildlife Biologist in writing. The Fish and Wildlife Biologist will compile the suggestions and forwarded them to the Division Chiefs for their review and comments. If the Fish and Wildlife Biologist determines that a proposed revision should be adopted, the plan will be sent to the Superintendent with the recommended changes identified. Only changes in the bighorn sheep management program need to be approved by the Superintendent; grammatical corrections and changes in the content of any appendix may be updated by the Fish and Wildlife Biologist as necessary. All revised pages will have the date of revision typed in the lower right hand corner of the page. Revised pages will be sent to each Division, District and Sub-district office and to other persons upon request.

The Fish and Wildlife Biologist will review and document the adequacy of the bighorn sheep management program annually. This may include adequacy of pamphlets, adequacy of interpretive messages, adequacy of enforcement, and general recognition and inventory of anything which may contribute to bighorn sheep management. Documentation will be by written report to the Superintendent.

V. RESPONSIBILITIES

A. Superintendent

1. Responsible for the Bighorn Sheep Management Program.
2. Approves/disapproves revisions to the Bighorn Sheep Management Plan.
3. Approves/disapproves recommendations for closures.

B. Resources Management Division

1. Chief of Resources Management
 - a. Supervises the Fish and Wildlife Biologist
 - b. Oversees the Bighorn Sheep Management Program.
2. Fish and Wildlife Biologist
 - a. Reviews and revises the Bighorn Sheep Management Plan.
 - b. Coordinates and monitors the bighorn sheep management program.
 - c. Monitors impacts of bighorn sheep management on bighorn sheep populations when these are not being monitored by researchers.
 - d. Maintains liaison with Parks' bighorn sheep researchers and the Sierra Bighorn Interagency Advisory Group.
 - e. Develops and/or coordinates development of bighorn sheep information.
 - f. Prepares written reports to the Parks, the Regional Office, and the California Department of Fish and Game.
 - g. Supervises the Biological Technician

3. Parks' Drug Practitioner

- a. Purchases and inventories drugs, distributes drugs to field areas, and maintains records of drug use.
- b. Provides the necessary formal and in-formal training and certification for personnel involved in bighorn sheep handling.
- c. Provides information on current capture techniques and drug selection and drug dosages.
- d. Maintains working relationship and consults with the California Department of Fish and Game, Wildlife Investigations Staff regarding capture techniques, drug selection and drug dosages.

4. Biological Technician

- a. Supervises Fish and Wildlife Technicians and VIP's.
- b. Coordinates and teaches annual bighorn sheep management training session for NPS employees.
- c. Captures, marks, measures, relocates bighorn sheep as may be required.
- d. Coordinates acquisition, distribution and maintenance of bighorn sheep management equipment.
- e. Accurately records bighorn sheep management and research records, and coordinates and enters records into the computer.
- f. Locates bighorn sheep using radio telemetry equipment and by direct observations.
- g. Prepares bighorn sheep summaries and reports as may be required.
- h. Normally serves as the Parks' Drug Practitioner.
- i. Maintains current files on all bighorn sheep observations, handling, relocations, individual histories and movements.
- j. Reads and records data on all vegetation status plots in bighorn sheep ranges.

C. Research Division

1. Research Scientist

- a. Conducts and supervises bighorn sheep research.
- b. Directs research bighorn sheep handling operations within these Parks.
- c. Maintains liaison and coordination with other bighorn sheep researchers, bighorn sheep management operations, and the Sierra Bighorn Sheep Interagency Advisory Group.
- d. Coordinates transfer of specimens to museums or research institutions.
- e. Prepares necessary Research Development/Study Proposals, Natural Science Projects Statements, Research Study Plans and reports.

D. Fire Management-Visitor Protection Division

1. Visitor Protection personnel are encouraged to assist with all bighorn sheep management and research programs.
2. Visitor Protection personnel will inform visitors of appropriate visitor behavior in bighorn sheep ranges.
3. Visitor Protection personnel will post and enforce all bighorn sheep closures and restrictions.

E. Interpretive Division

1. Informs the Parks' visitors of bighorn sheep research and management programs in these Parks.
2. Prepares books, pamphlets, and other material on bighorn sheep and bighorn sheep management and research of distribution and/or sale to the public.

3. Bighorn Sheep Information Coordinator

- a. Revises and repackages existing bighorn sheep management and research information to make it more attractive and interesting.
- b. Develops, coordinates and disseminates bighorn sheep information.
- c. Seeks and utilizes new opportunities to deliver the bighorn sheep management and research program information to the public.

F. All Divisions and Employees

1. All Park Divisions and functions will coordinate their respective needs in bighorn sheep management through the Resources Management Division.
2. All concession and Park employees are encouraged to be aware of the bighorn management and research programs, the Parks' bighorn sheep restoration programs and of the methods being implemented to achieve these objectives and programs.

VII. LITERATURE CITED

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