National Park Service
U.S. Department of the Interior
Sequoia and Kings Canyon National Parks
California

FINDING OF NO SIGNIFICANT IMPACT

Sierra Nevada Bighorn Sheep: Research and Recovery Actions Environmental Assessment

Sequoia and Kings Canyon National Parks
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INTRODUCTION

The National Park Service (NPS) has prepared an environmental assessment (EA) that analyzed proposed Sierra Nevada bighorn sheep (*Ovis canadensis sierra*) research and recovery actions within Sequoia and Kings Canyon National Parks (SEKI). The Sierra Nevada bighorn sheep (hereafter, bighorn sheep) is a federally endangered species that utilizes habitat in the parks. The EA analyzed impacts from the proposed 2-year research project on NPS lands and adjoining U.S. Forest Service (USFS) lands within Inyo National Forest (Inyo NF) as the USFS was considering issuing a permit to the California Department of Fish and Game (CDFG) for helicopter landings in USFS wilderness. However, the selected action incorporates the slight modification of not utilizing wilderness lands within Inyo National Forest to support the NPS research component of the project. Therefore, NPS activities will not entail permitting from the USFS, and Inyo NF will be preparing a separate environmental document to address their implementation of the *Recovery Plan for Sierra Nevada Bighorn Sheep* (hereafter, *Recovery Plan*; USFWS 2007) on USFS lands.

The finding of no significant impact (FONSI), EA, and Errata constitutes the record of the environmental impact analysis and decision-making process for this project. The EA analyzed the no action alternative and three action alternatives.

Cooperating with the NPS on this project is the CDFG, the U.S. Geological Survey (USGS), and the USFS, Inyo NF. The activities are being proposed primarily to facilitate meeting the goals of the *Recovery Plan*, and also to inform the development of a new Wilderness Stewardship Plan and Environmental Impact Statement (WSP/EIS) for Sequoia and Kings Canyon National Parks. Several goals of the *Recovery Plan* will be met by monitoring the status of radio-collared bighorn sheep, scientific study of bighorn sheep habitat use and the impacts of wilderness recreational activities on bighorn sheep and their habitat, and by a translocation of bighorn sheep into the Big Arroyo and Laurel Creek areas of Sequoia National Park. Development of the WSP/EIS will be informed by scientific study of the impacts of wilderness recreational activities on bighorn sheep and their habitat.

PURPOSE AND NEED FOR FEDERAL ACTION

The NPS Organic Act of 1916 (Organic Act) (16 U.S.C. 1, 2–4) and the General Authorities Act (16 U.S.C. 1a–8) direct the NPS to conserve the scenery, natural and historic objects, and wild life, and to provide for the enjoyment of those resources in such a manner as to leave them unimpaired for future generations. The *Endangered Species Act of 1973* (ESA, as amended, 16 U.S.C. 1531–1544; P.L. 93-205) directs all federal agencies to cooperate in the conservation and management of federally-listed threatened

and endangered species and their habitats. The bighorn sheep is federally listed as an endangered species that warrants special protection and management. Per NPS *Management Policies 2006*, the NPS will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The NPS will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both pro-actively conserve listed species and prevent detrimental effects on these species. (§4.4.2.3 "Management of Threatened or Endangered Plants and Animals").

The *Wilderness Act of 1964* (16 U.S.C. 1131–1136, P.L. 88-577) directs the NPS to administer wilderness to preserve the wilderness character of the area and establishes that wilderness will be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use (§4(b)). The *Wilderness Act* prohibits certain uses, including aircraft landings, except as necessary to meet the minimum requirements for the administration of the area for the purposes of the *Wilderness Act* (§4(c)). Therefore, the NPS conducted a minimum requirement analysis to determine 1) whether or not the proposed management action is appropriate or necessary for the administration of the area as wilderness, and does not pose a significant impact to the wilderness resources and character; and, 2) to select the management method (tool) that causes the least amount of impact to the physical resources and experiential qualities (character) of wilderness.

It was determined through the minimum requirement analysis process that the project activities were required in wilderness as that is where bighorn sheep and critical bighorn sheep habitat occurs, and that the purpose of the proposed activities includes restoring a component of wilderness character in the long-term by improving the natural condition of wilderness. The project would also meet the public purpose of wilderness by improving scientific knowledge of bighorn sheep, allowing for the long-term conservation of this species, which is itself a distinctive attribute of the parks wilderness.

Overall, the protection and restoration of bighorn sheep would result in short-term adverse effects to wilderness experience because of the transitory disturbance of helicopter operations, as well as long-term beneficial effect on wilderness because of the of the improvement in the condition of a federally endangered species. Upon completion, the traces of the restoration activity would be extinguished over a short period of time, while the benefits to restoring the naturalness to wilderness character would be long-term.

Purpose and Need for Population Monitoring

CDFG has been monitoring bighorn sheep throughout the Sierra Nevada, including bighorn sheep within Sequoia and Kings Canyon National Parks, for more than 30 years. Appendix D of the *Recovery Plan* (USFWS 2007) calls for continued monitoring of bighorn sheep populations, especially with the aid of radio-telemetry when feasible, because of the several different types of data that can be collected. For example, monitoring bighorn sheep populations with radio-telemetry allows greater understanding of spatial patterns of habitat use and population dynamics. Spatial information on habitat use has allowed documentation of population substructuring (different home range patterns), seasonal migratory patterns, and occasional extreme movements that have brought bighorn sheep close to domestic sheep allotments where they risk transmission of disease. Disease transmission from domestic sheep has been hypothesized to play a significant role in catastrophic sheep die-offs throughout their range (Goodson 1982, Martin et al. 1996). Further, monitoring demographic parameters such as adult and lamb survival, cause-specific mortality, and obtaining population estimates allows a greater understanding of factors controlling population dynamics including density-dependence and predation. In addition to information gathered from radio-collars, biologists determine nutritional status, health/disease status, and pregnancy status by handling bighorn sheep during captures. Data obtained from these capture efforts has been used and will continue to be used to direct management and species recovery. This essential level of

monitoring requires the capture and collaring of bighorn sheep to identify progress towards recovery goals and continuously evaluate threats.

Purpose and Need for Research

Research is distinguished from monitoring in the *Recovery Plan* and Recovery Action 6 calls for an adaptive approach to management that requires scientific research. Specific topics for research that are suggested include studies of habitat use and studies that analyze human use patterns relative to habitat use patterns of bighorn sheep. Both of these types of studies were analyzed in the EA.

The studies will provide essential information on bighorn sheep habitat selection, habitat quality and availability, and reactions of bighorn sheep to wilderness recreational activity that will inform park management and aid in the recovery of this endangered species. This data is needed to inform future management of bighorn sheep herds and critical habitat within Sequoia and Kings Canyon National Parks and Inyo NF and to determine what actions may be needed to protect, improve, and maintain habitat essential for bighorn sheep recovery and population viability. These studies will also provide adequate information to allow the NPS to develop alternatives for the Sequoia and Kings Canyon National Parks WSP/EIS, including any necessary adjustments to visitor and stock use.

Purpose and Need for Translocation

The *Recovery Plan* also calls for bighorn sheep translocations for both reintroductions and herd augmentations. The translocation includes reintroducing bighorn sheep in to the Big Arroyo and Laurel Creek areas of Sequoia National Park, which are currently not occupied by bighorn sheep, but are 2 of the 12 critical habitat units essential to species recovery. Delisting of bighorn sheep as an endangered species cannot occur until these habitat units are occupied. Because bighorn sheep are naturally slow to disperse and colonize new habitat, occupation of Big Arroyo and Laurel Creek within a reasonable time period will ultimately depend on translocations of bighorn sheep from other areas.

Project Objectives

Objective 1: Facilitate Recovery of Sierra Nevada Bighorn Sheep

The *Recovery Plan* (USFWS 2007) established conservation goals for the bighorn sheep, including restoring bighorn sheep in a geographic distribution throughout most of their native range with genetic representation that assures their long-term viability as a unique life form. The objectives of the recovery plan are to: (1) recover the bighorn sheep to a self-sustaining population size and geographic distribution that buffers them against extinction; and (2) maintain long-term viability through establishment of programs and mechanisms that ensures the protection of these populations from outside threats following a potential delisting.

The NPS, as a partner in recovery planning efforts and a federal land management agency, is obligated to protect bighorn sheep and critical habitat, and implement appropriate (based on NPS mandates and policies) components of the *Recovery Plan*. The proposed population monitoring, research, and translocation are all components of the *Recovery Plan*.

Specific objectives include:

1a. Monitor indicators of population status such as abundance, recruitment and mortality, movements, body condition, disease, etc.

1b. Develop a predictive model of future bighorn sheep distribution to aid in identifying future habitat needs and movement corridors and selecting sites for reintroductions.

1c. Reintroduce bighorn sheep into the currently vacant Big Arroyo and Laurel Creek critical habitat units.

Objective 2: Inform development of the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan (WSP/ EIS) to develop strategies for managing recreational use in bighorn sheep habitat

Sequoia and Kings Canyon National Parks began developing a Wilderness Stewardship Plan in early 2011, and part of that process was to gather existing data and identify data gaps. The proposed research studies will support development of this plan and address data gaps.

Specific objectives include:

2a. Determine the degree of spatial overlap between bighorn sheep and areas grazed by packstock.
2b. Measure the impacts of packstock on bighorn sheep forage resources.
2c. Improve knowledge of bighorn sheep diet.
2d. Identify areas where visitor use inappropriately modifies bighorn sheep behavior.

SELECTED ALTERNATIVE

The preferred alternative, Alternative 4: Implement Bighorn Sheep Research and Monitoring with Translocations – is the selected alternative. Alternative 4 is slightly modified from the alternative presented in the EA, however there is no change in any of the determinations of environmental consequences. While the USFS is still a cooperating agency in the NPS research project, they will not be issuing a permit to CDFG to land a helicopter within Inyo NF wilderness (as proposed in the EA), as this will not be necessary to support the NPS research activities. Instead, the USFS will be conducting a separate analysis for CDFG actions which may need to be taken for their implementation of *Recovery Plan* activities on USFS lands.

In addition, the elements common to all action alternatives will be implemented as part of the research, including the vegetation monitoring component, the bighorn sheep diet study, and the visitor / bighorn sheep interaction study.

Vegetation Monitoring

The purpose of vegetation monitoring is to examine packstock use impacts on meadow vegetation. Meadows are important sources of forage for bighorn sheep and therefore bighorn sheep may be negatively impacted by stock use of meadows. Vegetation data will be collected by NPS and USGS staff at 20 meadows throughout Sequoia and Kings Canyon National Park during 2011 and 2012. Vegetation data will be gathered in four meadows conditions: (1) those used by bighorn sheep and packstock, (2) those used by bighorn sheep but not packstock, (3) those used by packstock but not bighorn sheep, and (4) those used by neither bighorn sheep nor packstock. Species composition, diversity, and biomass will be compared between the four meadow conditions.

Bighorn Sheep Diet Study

The purpose of examining bighorn sheep diets is to refine understanding of bighorn sheep diet and foraging behavior. CDFG biologists will assess bighorn sheep diet quality by measuring digestible energy and digestible protein of forage samples collected during vegetation monitoring. Diets will be determined by microhistological analysis of fecal samples. This work will occur in 2011 and 2012.

Visitor/ Bighorn Sheep Interaction Study

The purpose of examining visitor/bighorn sheep interactions is to evaluate the impacts that wilderness recreational activities have on bighorn sheep. This study, conducted by sociologists from Yosemite National Park (YOSE), will employ direct observation of bighorn sheep and visitor interactions coupled with Global Positioning System (GPS) tracking of visitor movements. The study locations are expected to be Mount Langley and Baxter Pass. Visitor use estimation equipment will be used to understand the

timing and quantity of visitors that frequent these locations over the course of the summer/fall seasons. This equipment will be limited to small 2" × 4" counter equipment obscured along trails. This work will occur in 2012.

Bighorn Sheep Research and Long-Term Monitoring
During 2011 and 2012 bighorn sheep from Sequoia and Kings Canyon National Parks and potentially the Inyo NF (depending on the sheep's location at the time) will be captured and fitted with GPS collars by CDFG biologists and qualified personnel certified by USFWS. Data obtained from these bighorn sheep will support the wilderness research needed to develop the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan; however data will also be used for the CDFG monitoring program for the overall recovery effort. Upon completion of the research project, CDFG will continue to implement their monitoring program using both VHF and GPS collars within Sequoia and Kings Canyon National Parks for an additional 8 years (i.e., 2013-2021).

Bighorn sheep will initially be located from a helicopter and captured by using a net gun fired from the helicopter at close range. Immediately after firing the net, the helicopter will be landed nearby and crew members (two personnel) will exit the helicopter and restrain the bighorn sheep. No chemical immobilization is required for this technique. Captured bighorn sheep will then be transported via helicopter, using external rigging, to a staging area on the Inyo NF (located outside of designated wilderness) where they will receive a physical examination; age and body condition (i.e., body fat) will be measured, and blood and fecal samples will be collected to survey herd health by screening for exposure to diseases and parasites loads.

A CDFG veterinarian will participate in all captures and translocations and will ensure the health of all animals and attend to any health concerns. Captured bighorn sheep will be fitted with VHF and/or GPS collars and marked with numbered and colored ear tags. Since VHF collars have a lifespan of at least five years and can be active for as long as 10 years, they will likely be on animals for the remainder of their lives. GPS collars in current use by CDFG are programmed to drop off automatically after two years. Care will be taken to ensure that the collars are fit snugly and do not slide up and down the animal's neck. Little impact on individual bighorn sheep is expected from the collars, since each animal will adjust to the presence of a properly applied collar within a short period of time. After handling is complete, bighorn sheep will be transported via helicopter to their initial capture location, where the capture crew will be waiting, and released. The entire operation, from capture to release is expected to take about 60 minutes.

Captures will be conducted at times of the year that minimize the impact to the animals both physically and socially. In most cases, captures will be conducted in October to avoid disturbance during the rut (November and December) and bighorn use of lower elevation winter ranges. Occasionally captures might occur in January through the first week of April, if animals were located in higher elevation winter habitat. No captures will occur from mid-April to October in order to avoid lambing season. Overall it is expected that flights could occur on approximately 6 days/year.

Bighorn Sheep Translocation Project
Under this alternative, bighorn sheep will also be translocated into the currently vacant Big Arroyo and Laurel Creek critical habitat units when suitable stock becomes available (likely beginning within the next 3-5 years). Bighorn sheep will be captured from occupied source herd units that will be selected based on herd unit abundance and distribution, ability to support removals, and on genetic considerations of both source and reintroduced herds. The selected herd units may or may not be those that use Sequoia and Kings Canyon National Parks (i.e., source herd units may be those that exist exclusively on Inyo NF lands). Animals will be selected for translocation based on their age, prior reproductive success, nutritional condition, and absence of disease.

Selection of the Minimum Tool
The minimum tool was determined after consultation with subject matter experts and review of past and current research on bighorn sheep. Research comparing alternative techniques (e.g., helicopter/capture, drop-nets, drive-nets, chemical immobilization) has found that helicopter capture using net-guns is the safest method for bighorn sheep capture (Kock et al. 1987, Jessup et al 1988). Kock et al. (1987) found that only 2 of 137 (1.5%) of bighorn sheep captured with net-guns were accidentally killed and net-gunning had the lowest overall measure of risk (i.e., impacts of stress, capture myopathy, and accidental mortality) compared to other techniques. This capture method requires the shortest amount of time to complete captures (reducing impacts to wilderness character), would allow CDFG to achieve its recovery plan goals before the start of the bighorn sheep lambing season (April 1 – July 15) when captures cannot occur, and is the safest capture method for bighorn sheep. And, captures are the only means to reintroduce and augment herds through translocations.

ALTERNATIVES CONSIDERED IN THE EA

In addition to the preferred alternative (to be implemented as modified above), the EA analyzed three other alternatives.

Under the no action alternative, alternative 1, bighorn sheep would not be captured and radio collared, for research, monitoring, or translocation. Existing collared bighorn sheep (approximately 18) within Sequoia and Kings Canyon National Parks would continue to be monitored by CDFG until the collars are no longer usable.

Under alternative 2, the research and monitoring component would be implemented, but there would be no translocations of Sierra Nevada bighorn sheep into the Big Arroyo or Laurel Creek herd units within Sequoia National Park.

Under alternative 3, there would be no additional research and monitoring implemented within the parks, but bighorn sheep would be translocated into the currently vacant Big Arroyo and Laurel Creek critical habitat units when suitable stock becomes available (likely beginning within the next 3-5 years). Bighorn sheep would be captured from occupied source herd units that would be selected based on herd unit abundance and distribution, ability to support removals, and on genetic considerations of both source and reintroduced herds. The selected herd units may or may not be those that use Sequoia and Kings Canyon National Parks (i.e., source herd units may be those that exist exclusively on Inyo NF lands). Animals would be selected for translocation based on their age, prior reproductive success, nutritional condition, and absence of disease. The techniques for capturing bighorn sheep in the source herd units would be the same as described above.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM CONSIDERATION

Monitor Bighorn Sheep Movements by Direct Observation Only Without the Use of Radio-Collars
Direct observation could provide some bighorn sheep observations but the data would be significantly inferior to that collected with radio-collars because (1) the presence of observers would likely influence bighorn sheep movements, biasing the data, (2) the sample of observations would be further biased because bighorn sheep would not be observed at night, when they are in areas inaccessible to humans, or when they are in vegetative cover, (3) the movements of individual bighorn sheep could not be determined, (4) bighorn sheep could not be "followed" from one area to another and may not be reasonably observed in much of their habitat, and (5) the number of observations would be too small to make statistical inferences. Thus this alternative was ruled out from further consideration.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The CEQ defines the environmentally preferred alternative as "the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act (NEPA) § 101." [Section 101 states that] it is the continuing responsibility of the Federal Government to:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The identification of the environmentally preferred alternative was based on an analysis that balances factors such as physical impacts on various aspects of the environment, mitigation measures to deal with impacts, and other factors, including the statutory mission of the NPS and the purposes for the project.

Alternative 1 is not the environmentally preferred alternative for the following reasons: (1) it would not allow for the recovery of bighorn sheep as directed by the *Recovery Plan* and, (2) it would not provide adequate information to park managers to allow them to understand impacts to bighorn sheep from wilderness recreational activities, and to promote management actions to reduce impacts. Therefore, the NPS would not be fulfilling the responsibilities of each generation as a trustee of the environment, and the NPS would not be preserving important natural aspects of our national heritage, and there would be risk of not attaining the widest range of beneficial uses of the environment without degradation.

Alternative 2 would provide information to adequately manage wilderness visitor use in bighorn sheep habitat, but it would not provide for the recovery of bighorn sheep per the *Recovery Plan*, as one of the measures of success is restoring bighorn sheep to previously occupied habitat, including Big Arroyo and Laurel Creek. This alternative would allow the NPS to attain the widest range of beneficial uses of the environment without degradation or other undesirable and unintended consequences because managers would have information to understand impacts to bighorn sheep from wilderness recreational activities, and to promote management actions to reduce impacts. However, this alternative would not fulfill the responsibilities as a trustee of the environment for succeeding generations or preserve important natural aspects of our national heritage because the full recovery of bighorn sheep would not be attained without reintroductions, per the *Recovery Plan*. Therefore, while alternative 2 would be more environmentally preferable than alternative 1, it is still not the environmentally preferred alternative.

Alternative 3 would meet one of the goals of the *Recovery Plan* by restoring bighorn sheep into the previously occupied habitat of Big Arroyo and Laurel Creek. However, it would not provide park management with adequate information to understand impacts to bighorn sheep from wilderness recreational activities, and to promote management actions to reduce impacts. While alternative 3 would allow the NPS to fulfill the responsibilities as a trustee for future generations by restoring bighorn sheep

in previously unoccupied areas, there may be undesirable and unintended consequences because managers would not have information to allow improved management of visitor use in wilderness. Therefore, alternative 3 is not the environmentally preferred alternative.

Alternative 4 will provide NPS managers with the information to understand impacts to bighorn sheep from wilderness recreational activities, promote management actions to reduce impacts, and it will meet one of the goals of the *Recovery Plan* by restoring bighorn sheep into the previously occupied habitat of Big Arroyo and Laurel Creek. Therefore, alternative 4 is the most environmentally preferred course of action because it will allow the NPS to fulfill the responsibility as trustee of the environment, it will allow for the widest range of beneficial uses without degradation or other undesirable and unintended consequences, and it will allow the NPS to preserve important natural aspects of our national heritage.

MEASURES TO MINIMIZE OR AVOID ENVIRONMENTAL HARM

Throughout the conservation planning and environmental impact analysis process, mitigation measures were identified, and these are incorporated into the selected alternative (alternative 4- preferred alternative) to reduce or avoid impacts. All mitigation measures which are incorporated in the selected alternative are summarized in the matrix below.

Mitigation Matrix

MITIGATION TOPIC	MITIGATION MEASURES	RESPONSIBILITY
INVASIVE VEGETATION	All equipment (including the helicopter and nets) and clothing will be inspected for weeds and seeds prior to project activities. All soil and plant parts will be removed.	NPS WILDLIFE BIOLOGIST/PROJECT MANAGER
SIERRA NEVADA BIGHORN SHEEP	Pursuits will occur only in terrain where bighorn sheep may be safely netted and recovered. After bighorn sheep are located and pursuit begins, pursuit will be terminated after 5 minutes if capture was unsuccessful. If the net misses or bighorn sheep escapes, pursuit will be terminated unless recapture was imminent (i.e., within 30 seconds). The number of people needed to safely and efficiently handle each bighorn sheep will be minimized as well as all sudden movements, auditory, visual, and touch stimuli. Vital signs (temperature, pulse, and respiration) shall be assessed immediately after capture and monitored during processing. Water shall be available at both the capture and processing sites and used as necessary to cool animals. In the event of a major injury, the bighorn sheep will be quickly and humanely euthanized and the project would be stopped for a review and assessment of the incident. Helicopters will be landed immediately after bighorn sheep are netted. The helicopter will not park (i.e., the engine would not be turned off).	NPS WILDLIFE BIOLOGIST/PROJECT MANAGER

WILDERNESS CHARACTER	Nets that miss bighorn sheep will be collected to prevent adverse effects on wilderness character or the safety of wildlife and visitors. The helicopter that would be used for this project will be the lightest and quietest helicopter possible to carry out the mission safely. Flights and landings are expected to occur 6 days annually in each of the herd units. The time of year (i.e., research and monitoring captures primarily in October but possibly January-April translocation captures in March-April) will occur outside of the peak visitor season.	

WHY THE SELECTED ALTERNATIVE WILL NOT HAVE A SIGNIFICANT EFFECT ON THE QUALITY OF THE HUMAN ENVIRONMENT

As defined by 40 CFR 1508.27, significance is determined by examining the following criteria:

Impacts that may have both beneficial and adverse aspects and which on balance may be beneficial, but that may still have significant adverse impacts which require analysis in an EIS: As fully discussed in the EA, alternative 4 (the selected alternative) will have no major adverse impacts on natural or cultural resources that would require further environmental analysis through an environmental impact statement.

Wildlife: There will be short-term adverse effects to wildlife in the project area due to the noise of the helicopter used for capturing bighorn sheep. This could result in flight responses by wildlife in a localized area, particularly where the helicopter is in close proximity to the ground or lands. These impacts are outside the normal range of variability, but will not be expected to result in mortality or long-term adverse impacts. The threats will also be localized and effect only a small number of animals or individual animals. In addition, wildlife will be impacted from the relocation of bighorn sheep into Big Arroyo and Laurel Creek areas, improving the ecosystem integrity in the long term. Other park operations and visitor use can impact wildlife by disturbance, resulting in flight response to human presence. These impacts are generally temporary, adverse and minor and will not occur during the same period as the project work. When considered with the environmental effcts from the selected alternative, the cumulative effects are short term, minor to moderate and adverse. Because this project will result in moderate adverse effects, and minor to moderate adverse cumulative effects which are temporary in nature, and long term beneficial effects to overall ecosystem integrity; none of the foreseeable impacts associated with this project reach a level of significance that will require analysis in an environmental impact statement (EIS).

Wilderness Character: Under the selected alternative, there will be helicopter use in wilderness. The helicopter will be used the first two years of the project to capture bighorn sheep for the research study. The next eight years, there will be periodic flights to capture and release sheep for the translocation component of the study. The amount of flight time will vary by year; some years, there could be no flights as a result of project work. Most of the project flights will occur in October, or in January to April. The number of flights expected for project implementation is minimal (approximately 6 days/year, sometimes less). There would be a very low likelihood of overlapping project work in the same areas within the wilderness, and a low likelihood that visitors would be near or in the project areas.

This work will result in readily apparent human-caused impacts in limited areas of the wilderness, and will have an adverse effect on three of the four qualities of wilderness: untrammeled, undeveloped, and

providing solitude or primitive and unconfined recreation. In the long-term, as bighorn sheep are restored and protected, the selected alternative will result in a beneficial effect to the natural element of wilderness within Sequoia National Park.

Untrammeled: Collaring bighorn sheep during 1-14 day periods (with flights approximately 6 days per year) over ten years will adversely affect the untrammeled quality of the park and forest wilderness areas from the handling of bighorn sheep during project work, as this is considered a manipulation of a component of the ecosystem. Trammeling activities per individual bighorn sheep are expected to take about 60 minutes from capture to release.

Undeveloped: The use of helicopters will cause temporary adverse effects on the undeveloped quality of park and forest wilderness areas. The project will affect the undeveloped quality (with flights in each herd unit approximately 6 days per year) over the next 10 years. Helicopter flights will occur along flight paths in occupied herd units once bighorn sheep are observed. Flights within the Taboose Creek herd unit (should they be necessary; this herd unit is not currently occupied) may not follow such specific flight paths, as bighorn sheep have not been collared in these areas and it may take longer for flight crews to locate the bighorn sheep. Once bighorn sheep are located the helicopter will continue flights along the same flight path when capturing occurs.

Helicopter landings within wilderness will occur when a bighorn sheep is captured. Landing is required to allow capture crews (two personnel) to exit the helicopter once an animal is captured by net-gun. The animal will then be flown to a processing station (located outside wilderness) where data are collected and collars are maintained or fitted. Helicopter landings will also occur to collect nets in the event a capture attempt is not successful. The helicopter use in wilderness will be short-term, moderate, and adverse. No staging will occur in wilderness.

The collaring of bighorn sheep also affects the undeveloped quality of wilderness since there would be a visual impact from the presence of collars on bighorn sheep. Since VHF collars have a lifespan of at least 4 years and can be active for as long as 10 years, they would likely be on the animals for the remainder of their lives.

Providing Solitude or Primitive and Unconfined Recreation: The sights and sounds of the helicopter and project crews would affect opportunities for solitude or primitive and unconfined recreation during project activities. The collaring involves helicopter use in the shoulder seasons (fall and spring). While the project would occur outside the peak visitor use season, opportunities for solitude or primitive and unconfined recreation could still be impacted for visitors to park and forest wilderness during project activities.

This project would introduce a short-term visual and audio disturbance to visitors in the specific areas where the helicopter would be operating. Users who visit these areas during helicopter operations include cross country or backcountry skiers, however, due to the time of year, visitation in these areas is lower than other months of the year. Visitors may see and/or hear the helicopter when it is in flight. However, this would be a short-term impact, limited to one day (or less) in each helicopter flight area. The helicopter may not be seen or heard continuously during the day from the same location, as flight paths may change depending on bighorn sheep locations or while the helicopter is parked at the base station. This would reduce the potential for recreationists in these areas to see or hear the helicopter. Potential helicopter landings are generally located above 9,000 feet and adjacent to steep topography, generally on wind-swept slopes. These locations are not ideal for winter recreation users as access is difficult and dangerous due to potential avalanches.

Natural: The natural quality will be improved in the long term under the selected alternative as bighorn sheep are restored into previously occupied habitat in Laurel Creek and Big Arroyo within Sequoia National Park.

A minimum requirement and minimum tool analysis was included in the EA and consideration was given to the potential trade-offs of the research and translocation projects. In this document, the NPS determined that the long-term benefits of the knowledge gained by the research study, and the long-term benefits to the natural quality of wilderness that will result from the translocation of bighorn sheep, will outweigh the short-term transitory and adverse effects of the helicopter activities in wilderness. In addition, the minimum tool analysis looked at alternative methods and through this process. In consultation with subject matter experts in Sierra Nevada bighorn sheep science and management, the parks determined the minimum tool for bighorn sheep capture, collaring, and translocation is a helicopter.

Existing facilities, trails, park operations, and periodic flights result in adverse moderate cumulative effects on the wilderness character and experience. There will be a slight increase in the use of a helicopter (into October and potentially in January through April when helicopter use is normally very low). It is likely that this slight increase in use will not be noticeable to the average wilderness visitor due to the timing of the operations, and the short time frame the helicopter will be utilized. The selected alternative will contribute slightly to the overall cumulative effects from ongoing park activities. Therefore, cumulative effects on wilderness character will be short- and long-term, moderate and adverse. However, the cumulative effects from other ongoing bighorn sheep recovery efforts, when added to the translocation of bighorn sheep into previously occupied habitat, will result in a long-term beneficial impact on the natural quality of wilderness by restoring a native species to its former location, thus improving the integrity of the natural conditions of the wilderness.

The selected alternative will result in adverse effects to three components of the wilderness character, and a long term beneficial effect to the natural quality of wilderness by improving the condition of the bighorn sheep through research and recovery actions. Managers must consider these effects when making a decision to implement a project in wilderness, and weigh the long-term benefits against the short-term adverse effects. In consideration of this, the NPS has determined that the short-term adverse effects are tolerable in order to meet the long-term beneficial effect to the wilderness character. When considering both the adverse and beneficial effects, none of the impacts associated with this project reach a level of significance that would require analysis in an EIS.

Soundscapes: Helicopter use during the research and translocations would adversely affect the natural soundscape during project work. The selected alternative will be conducted over a larger geographic area and occur at two distinct time periods during the year (late fall and late winter to early spring) as it includes both research and translocation. The project will occur over a several year period and each capture operation would be of short duration (1-14 day periods). Therefore, the resulting effects on the soundscape from the use of helicopters will be short-term, adverse and moderate. Since effects to the soundscape are transitory, and the project will occur outside the primary work season in the parks and forest, and other park and forest helicopter operations will likely not be underway during this period, except for emergency operations, there will be no cumulative effects. Therefore, there will be no significant effects on the human environment.

Visitor Experience and Recreational Opportunities: Helicopter operations will occur for the research, monitoring, and the translocation efforts. Bighorn sheep will be collared for all of these efforts. Therefore, the impacts on visitors who wish to experience wilderness without human influence will be adversely affected in the short- and long-term from the use of helicopters and the presence of collars on bighorn sheep. This is mitigated substantially by scheduling the helicopter operations in the lowest visitor use season; however some visitors who visit the parks in the shoulder seasons or winter could be affected.

The public could be adversely affected just with the knowledge that these operations are occurring, even if they are not visiting the park during the project work.

There will be beneficial effects on the visitor's experience from relocating bighorn sheep into currently unoccupied habitat as many visitors feel viewing wildlife is an important part of their wilderness experience. This alternative will provide additional opportunities to view wildlife and enhance the naturalness of the parks' wilderness. The impacts to the public are not quantifiable but it is likely that some visitors will be adversely affected, some visitors will not notice the operations, and some visitors may benefit from increased viewing opportunities. However, none of the impacts associated with this project reach a level of significance that would require analysis in an EIS.

Degree of effect on public health or safety: Helicopter, capturing, and collaring operations can result in minor to major adverse impacts on the health and safety of those participating in these actions. There will be no NPS personnel participating in these activities. The operations will be contracted out and will be directed by CDFG. CDFG has specific requirements for contractors who are hired for these operations, including experience in similar operations. Still there is some risk to those participating. These operations will not occur during periods of high public use, and will occur in areas that the public generally does not visit during the selected operational periods. Also the helicopter will avoid conducting operations in areas where the public is present. Therefore, there would be no effect to public health and safety, but aerial capture and collaring activities could result in moderate adverse impacts on the health and safety of those participating in these activities.

Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas: As fully discussed in the EA, there are no known archeological, ethnographic, historic structures, cultural landscapes or Indian trust resources proximate to the project area; therefore, no impacts to these resources are anticipated. Implementation of the selected action (alternative 4 - preferred alternative) will not affect prime and unique farmlands, floodplains and wetlands. Wild and scenic rivers will not be affected by the implementation of the preferred alternative. No ecologically critical areas occur within the project area and very little disturbance to the surrounding vegetation will occur.

Degree to which effects on the quality of the human environment are likely to be highly controversial: There were no highly controversial effects identified during the preparation of the environmental assessment, agency consultations, or the public review period. Collectively there were 57 comment letters received during public review. Of those, 14 were form letters expressing concerns related to impacts to wilderness and the necessity for the proposal. The proposed project was not modified based on these concerns, but was further clarified in the Errata.

Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks: The analysis is based on the most up-to-date available information. There were no highly uncertain, unique, or unknown risks identified during the preparation of the environmental assessment, agency consultation, or the public review period.

Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration: The selected action (alternative 4- preferred alternative) neither establishes a NPS precedent for future actions with significant effects nor represents a decision in principle about a future consideration.

Whether the action is related to other actions with individually insignificant but cumulatively significant impacts: Potential for cumulative effects for all alternatives was thoroughly addressed in the

Environmental Consequences section of the EA. Implementation of the selected alternative will contribute moderately to the continued recovery of bighorn sheep region-wide, resulting in long-term and beneficial cumulative effects. The Project will not result in any significant impacts.

Degree to which the action may adversely affect an endangered or threatened species or its critical habitat: Net-gunning and helicopter operations do have the possibility of disturbing, injuring or killing Sierra Nevada bighorn sheep. However, research comparing this technique to alternatives (e.g., drop-nets, drive-nets, chemical immobilization) has found that it is the safest method for bighorn sheep capture (Kock et al. 1987, Jessup et al 1988). The capture related mortality rate of 3.3% when net-gunning that CDFG has experienced during the last 10 years falls below the limits of the Recovery Permit issued from the USFWS for the capture of bighorn sheep. Therefore, while implementation of this project might be expected to harm 1-3% of the bighorn sheep handled, the loss will be negligible compared to the value of the data obtained to guide their management.

Captured bighorn sheep will be fitted with VHF or Global Positioning System (GPS) radio-collars and marked with numbered and colored ear tags. Since VHF collars have a lifespan of at least 5 years and can be active for as long as 10 years, they will likely be on animals for the remainder of their lives. GPS collars in current use by CDFG are programmed to drop off automatically after two years. Care will be taken to ensure that the collars are fit snugly and do not slide up and down the animal's neck. Little impact to individual bighorn sheep is expected from the collars, since each animal will adjust to the presence of a properly applied collar within a short period of time.

Evidence exists that indicates bighorn sheep may travel further than expected and through different terrain and habitat than previously thought. Monitoring the bighorn sheep's movements at more frequent intervals with GPS will provide better information on their habitat preferences, and allow managers to protect suitable and preferred habitat, and to respond quickly to threats such as interactions with domestic stock, unacceptable levels of predation, or impacts from recreation or administrative activities.

This project will result in improved knowledge about the impacts of recreational use on bighorn sheep and meadow habitat. Also, relocation of bighorn sheep into two vacant herd units is expected to benefit bighorn sheep populations and overall recovery efforts.

The USFWS has issued permits to CDFG to utilize the method described above for the capture and collaring of bighorn sheep. They have determined that this project and any associated adverse effects on bighorn sheep have already been analyzed through section 7(a)(2) consultation as part of the process issuing a recovery permit to the CDFG. While there is the potential for bighorn sheep mortality from the operations, the overall beneficial effects outweigh the potential adverse effects. Overall the selected alternative will result in short-term minor to moderate adverse effects on bighorn sheep from the helicopter net-gun activities, and long-term beneficial effects derive from obtaining additional information needed to inform future wilderness management activities, and long-term beneficial effects from the translocation of bighorn sheep into unoccupied herd units. Recovery of the bighorn sheep is an ongoing process, and while this project will implement two additional components of the *Recovery Plan,* there will be no change to Sierra Nevada bighorn sheep critical habitat. Therefore there will be no effect to critical habitat.

This project will result in moderate adverse effects, and minor to moderate adverse cumulative effects which are temporary in nature, and long term beneficial effects to overall ecosystem integrity and contribute to the recovery of the endangered Sierra Nevada bighorn sheep; none of the impacts associated with this project reach a level of significance that will require analysis in an EIS.

No federally listed or candidate plant species are known to occur within Sequoia or Kings Canyon National Parks. It is highly unlikely and improbable that any park sensitive species or California state-listed endangered, threatened, or rare species will be trampled or damaged during the proposed vegetation sampling or capture operations. Other federally listed or sensitive wildlife may occur near the project area. Several candidates for federal listing as endangered occur in or near some of the project sites, but they will not be affected by the project activities; therefore, no further evaluation is necessary.

Whether the action threatens a violation of federal, state, or local environmental protection law: The selected action (preferred alternative) violates no federal, state, or local environmental protection laws.

PUBLIC ENGAGEMENT AND AGENCY COORDINATION

Public Scoping: Public scoping was initiated for the proposed Sierra Nevada Bighorn Sheep Study on June 18, 2010. A press release was distributed to 107 media outlets, and letters with project information requesting public input were mailed to 83 individuals, agencies and organizations, and to 34 tribes or tribal representatives. In addition, scoping information was emailed to 311 agencies, area tribes, organizations, businesses, and individuals. Notification of the scoping period was published in the Kaweah Commonwealth newspaper on July 2, 2010. Information was also posted on the National Parks Travelers and the Wilderness Watch websites. Additionally, information was posted on the NPS Sequoia and Kings Canyon website and links were provided to the NPS Planning, Environment, and Public Comment website (PEPC).

Five letters were received during the scoping phase; two from individuals; two comment letters were received from interest groups (High Sierra Hikers Association and Wilderness Watch); and one "no comment" letter was received from the California Dept of Transportation. Responses were sent by a variety of methods, including letters, email, and completing and submitting the form provided by the parks. Each letter was reviewed by park staff to determine the potential issues and impact topics related to the proposed project.

In April of 2011, the proposal was listed on the quarterly Schedule of Proposed Actions (SOPA) for the Inyo NF. The SOPA was published on the forest website and distributed to more than 100 individuals and organizations interested in the ongoing management of the forest. Finally, during April 25-29 five public scoping meetings were hosted in Bishop, Fresno, Los Angeles, Oakland and Visalia.

Public Review of the EA: The EA was made available for public review and comment during a 38-day period from June 14 to July 21, 2011. A press release was sent to media outlets and posted to the parks' internet website. Letters were sent to approximately 90 individuals, interest groups, businesses, and agencies, and, a printed EA, or CD version were distributed to approximately 50 additional individuals, organizations, local news media, agencies, and interested parties on the parks' mailing list. A printed EA was also sent to 21 area tribes or tribal representatives. Approximately 230 interested parties were notified by email that the document was under review. An electronic version of the EA was broadly available to the public through a posting on the NPS PEPC website and linked to the parks' public website. The printed version of the EA was available at the following area libraries: California State University, San Joaquin Sierra Unit; Fresno County Libraries: Bear Mountain, Central, Sunnyside, Fowler, Kingsburg, Orange Cove, Parlier, Reedley, Sanger, and Selma; San Joaquin Valley College: Hanford Extension, Visalia Campus, and Fresno Campus; Tulare County Law Library; Tulare County Libraries: Exeter, Lindsay, and Three Rivers.

An article on the public review of the project was published in The Kaweah Commonwealth newspaper on June 17 and in the Inyo Register on June 20, 2011. Information was also posted on several websites including the National Parks Traveler, VisitSequoia.com, YubaNet.com, Wilderness Watch, the CDFG

website, and the USFS website. Information on the project was provided to attendees at the USFS Sierra and Sequoia Tribal Forum meetings on May 12 to June 8 respectively.

A total of 57 comments were received during the 38-day public review period. This included one letter from a state agency (Native American Heritage Commission), three letters from representatives/members of Wilderness Watch, one letter from the Backcountry Horsemen of California, and four letters from two bighorn sheep-related groups (Sierra Nevada Bighorn Sheep Foundation and Wild Sheep Foundation – California and National Chapters). There were also 13 form letters received.

A number of groups and individuals expressed support of the plan's preferred alternative; however there were a number of letters that identified a variety of issues. Substantive comments requiring an agency response and/or editorial clarification or corrections to the EA are documented in an Errata prepared as a technical attachment to the environmental assessment. The following is a summary of the comments received.

Many of the comments received were similar to those received during the public scoping period, thus were addressed in the EA. Commenters wanted clarification that the proposed project is consistent with the USFWS Recovery Plan for Sierra Nevada Bighorn Sheep, and were concerned about potential adverse effects to bighorn sheep. Both of these topics were discussed at length in the EA. Past capture and collaring efforts conducted by the CDFG have not shown these effects. During 1999 to 2010, CDFG deployed a total of 211 GPS collars and 230 VHF collars from 249 captures, representing 180 individual animals rangewide. To date, no more than 87 females and 37 males have been collared at any one time. Great effort is expended during captures to minimize the risk of injury and mortality to bighorn sheep. For example, during 249 captures of which 240 were by helicopter net-gun, 8 mortalities occurred over a 10-year period; this represents a capture related mortality rate of 3.3% when using a net gun from a helicopter. This observed capture-related mortality rate falls below the limits of the Recovery Permit issued from the USFWS for the capture of bighorn sheep, which allows for three bighorn sheep per year to be killed incidentally during the performance of permitted activities. Thus far, CDFG has retrieved GPS data from 140 different animals with additional GPS collars still deployed.

Every bighorn capture method has potential to cause capture myopathy mortality, but the capture tool with the least likely hood of mortality is net-guns. Sheep mortality was 2.0% for net-guns compared to drop nets (3%), drive nets (4%), and chemical immobilization (8%) based on data from 634 captures (Kock et al. 1987, Jessup et al 1988). Net guns caused the lowest frequency of compromised sheep with 11% compared to drop nets (15%), drive nets (16%), and chemical immobilization (19%) capture Kock et al. 1987). Compromise describes a temporary condition resulting from capture-elevated temperature, open-mouth breathing, clinical evidence of shock, or other stress-induced nonfatal conditions.

The Environmental Consequences section of the EA evaluates the potential effects to bighorn sheep from this project, and concluded that the helicopter-netgunning operations have the potential to disturb, injure or kill bighorn sheep. However, literature shows that use of a net-gun fired from a helicopter is the safest method for bighorn sheep capture. As stated in the EA, direct mortality could result from net-gun operations, and also from the translocation into Big Arroyo and Laurel Creek. However, this alternative would result in improved knowledge about the impacts of recreational use on bighorn sheep. Also, this alternative would relocate bighorn sheep into two vacant herd units, which, if successful, would benefit bighorn sheep populations and overall recovery efforts. While there is the potential for bighorn sheep mortality from the operations, the overall beneficial effects outweigh the potential adverse effects. Overall this alternative would result in short-term minor to moderate adverse effects on bighorn sheep from the helicopter net-gun activities, and long-term beneficial effects from additional information needed to inform future wilderness management activities, and long-term beneficial effects from the translocation of bighorn sheep into unoccupied herd units.

In response to requests from several commenters, the study plan has been made available on the NPS website http://parkplanning.nps.gov/SEKISHEEP.

Several commenters asked about the status of the bighorn sheep and whether the sheep would naturally expand into currently unoccupied habitat. As addressed in the EA and in the Recovery Plan, bighorn sheep have low dispersal rates and the only proven method to expand sheep populations is translocations. Several commenters stressed the importance of on-the-ground studies, which are a component of the preferred alternative as stated in the EA.

Commenters also questioned the appropriateness of the proposed project activities in wilderness, and whether the project met the minimum requirements for administering wilderness, in accordance with the Wilderness Act. It was determined, through the minimum requirement analysis process that the project activities were required in wilderness as that is where bighorn sheep and critical bighorn sheep habitat occurs, and that the purpose and need for the proposed activities included restoring a component of wilderness character in the long-term by improving the natural element of wilderness character. Commenters also expressed concerns about the use of helicopters in wilderness, and how the minimum tool was selected. The minimum tool was determined through a minimum tool analysis, and after consultation with subject matter experts and review of past and current research on bighorn sheep. Research comparing alternative techniques (e.g., helicopter/capture, drop-nets, drive-nets, chemical immobilization) has found that helicopter capture using net-guns is the safest method for bighorn sheep capture (Kock et al. 1987, Jessup et al 1988). Plus, this method is consistent with the Wilderness Act and will provide for the long term preservation of wilderness character in that it will optimize the probability of the continued existence of bighorn sheep in these wildernesses. As related to wilderness character and as stated in the EA, this action will have short term adverse effects on the elements of solitude, via helicopter noise, and untrammeled, via the manipulation of sheep in the ecosystem. Conversely it will have long-term benefits on the element of natural by ensuring that all is being done to ensure the survival of this critical species.

The landing of helicopters is a *generally* prohibited activity as described in Section 4(c) of the Wilderness Act. However, this activity is allowed for wilderness managing agencies so long as it is the "minimum requirement" for the administration of the area for the purpose of the Act. This project will further the public purposes of recreational, scientific, educational, and conservation as defined in the Wilderness Act. This analysis was provided for public review in the EA (Appendix A).

A commenter stated that reestablishing extirpated species or increasing the numbers of rare species is not required to administer the wilderness. However, the NPS has a legal requirement to adhere to the Endangered Species Act, per section 2(c)(1), all federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the Endangered Species Act. The Endangered Species Act also directs all federal agencies to cooperate in the conservation and management of federally-listed threatened and endangered species and their habitats (Sec. 7. [16 U.S.C. 1536] (a)). It is the agency's responsibility to find balance in its varying mandates (i.e. complying with Endangered Species Act may have effects on wilderness). Legal mandates may not necessarily be conflicting, but many are not necessarily in parallel either. This project considers both the requirements of the Endangered Species Act and the Wilderness Act.

One group was concerned about impacts to recreational users from changes to stock use, meadow closures, or other recreational uses based on results of studies. There will be no changes to recreational use as part of the selected alternative. However, the research will be used to inform the development of alternatives in the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan /

Environmental Impact Statement (WSP/EIS). Any potential future changes in recreational use would be proposed and fully evaluated in the WSP/EIS, with an opportunity for public review and comment.

The California State Clearinghouse sent a letter acknowledging that the NPS has complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act and that no comments were submitted through their review process. Caltrans District 6 identified that they had no comment on the project. The Native American Heritage Commission (NAHC) sent a letter stating that no Native American cultural resources were identified in their NAHC Sacred Lands File search. Enclosed with the NAHC letter, was a list of Native American contacts. The parks' mailing list was previously updated to reflect the lists so no additional tribal notifications were required.

Agency Consultation, Coordination, and Permitting

The USFWS determined that any associated adverse effects on the bighorn sheep had already been analyzed through a §7(a)(2) consultation as part of the process of issuing a recovery permit to CDFG, therefore no additional consultation for bighorn sheep or their critical habitat was necessary (Dec. 22, 2010 memo). In addition, the USFWS determined no other listed species will be affected by the selected actions since they do not occur in the study area. Therefore, no additional consultation is required.

IMPAIRMENT

NPS *Management Policies 2006* (section 1.4) requires analysis of potential effects to determine whether or not proposed actions would impair a park's resources and values. The fundamental purpose of the national park system, established by the *Organic Act* and reaffirmed by the *General Authorities Act*, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of the park. That discretion is limited by the statutory requirement that the NPS must leave resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (NPS *Management Policies 2006*). Whether an impact meets this definition depends on the particular resources that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further

mitigated. Impairment may result from visitor activities; NPS administrative activities; or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park. The description of the parks' purpose and significance is found below and is subject to the no-impairment standard.

Description of Park Purpose and Significance
Sequoia National Park was established on September 25, 1890. The primary purpose for establishing the park is described in the act's preamble:

> *Whereas, the rapid destruction of timber and ornamental trees in various parts of the United States, some of which trees are the wonders of the world on account of their size and limited number growing, makes it a matter of importance that at least some of said forests should be preserved. (26 Stat. L., 478)*

The legislation further stated that Sequoia National Park is to be a place "dedicated and set apart as a public park, or pleasuring ground, for the benefit and enjoyment of the people," and shall be managed "for the preservation from injury of all timber, mineral deposits, natural curiosities and wonders ... [and for] their retention in their natural condition."

The purpose of Sequoia and Kings Canyon National Parks as defined in the parks' FGMP/FEIS (NPS 2007) is as follows:

- Protect the greater Sierran ecosystem—including the sequoia groves and high Sierra regions of the park—and its natural evolution forever.
- Provide appropriate opportunities to present and future generations to experience and understand park resources and values.
- Protect and preserve significant cultural resources.
- Champion the values of national parks and wilderness.

Sequoia and Kings Canyon National Parks are significant because they contain the following resources:

- The largest giant sequoia trees and groves in the world, including the world's largest tree, the General Sherman tree.
- An extraordinary continuum of ecosystems arrayed along the greatest vertical relief (1,370 to 14,497 feet in elevation) of any protected area in the lower 48 states.
- The highest, most rugged portion of the high Sierra, which is part of the largest contiguous alpine environment in the lower 48 states.
- Magnificent, deep, glacially carved canyons including Kings Canyon, Tehipite Valley, and Kern Canyon.
- The core of the largest area of contiguous designated wilderness in California—the second largest in the lower 48 states.
- The largest preserved southern Sierra foothills ecosystem.
- More than 250 known marble caverns, many inhabited by cave wildlife found nowhere else.
- A wide spectrum of prehistoric and historic sites documenting human adaptations in their historical settings throughout the Sierran environments.

Natural Resource Topics

Wildlife: The project will occur in montane, subalpine and alpine areas of Sequoia and Kings Canyon National Parks. There are a variety of wildlife in these areas, including small mammals, mule deer, and birds. There is also habitat that supports the mountain yellow-legged frog. Healthy wildlife is necessary to

fulfill the purposes for which the parks were established, and are key to the natural integrity of the parks.

Wildlife in localized areas could be disturbed from the flight operations and landing of helicopters. The actions undertaken to implement the selected alternative will have only short-term temporary adverse impacts to wildlife primarily due to flight response, leading to a temporary disruption in normal behavior. These temporary responses will not permanently alter behavior, will not remove or damage habitat, and will only affect individual species in a small area, and therefore will not result in impairment.

Federally Listed Species – Sierra Nevada Bighorn Sheep: The *Endangered Species Act* requires federal agencies to ensure that their activities will not jeopardize the existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. The endangered Sierra Nevada bighorn sheep is the only federally listed species that occurs in the project area and will be affected by the proposed project activities. Of the herd units identified for bighorn sheep in the 2007 *Recovery Plan for Sierra Nevada Bighorn Sheep* (USFWS 2007), 10 of 16 (62.5%) herd units are located partially or wholly within Sequoia and Kings Canyon National Parks. This makes habitat within the parks vital to the recovery of the bighorn sheep. Two of these herd units, Laurel Creek and Big Arroyo, are the two locations proposed for translocation of bighorn sheep. There is the potential for adverse effects to occur as a result of the helicopter/netgun operations that will be used to capture, collar, and relocate bighorn sheep. However, research comparing this technique to alternatives (e.g., drop-nets, drive-nets, chemical immobilization) has found that it is the safest method for bighorn sheep capture (Kock et al. 1987, Jessup et al 1988). For example, Kock et al. (1987) found that only 2 of 137 (1.5%) of bighorn sheep captured with net-guns were accidentally killed and net-gunning had the lowest overall measure of risk (i.e., impacts of stress, capture myopathy, and accidental mortality) compared to other techniques. Further, as noted above, capture related mortality rate of 3.3% when net-gunning that CDFG has experienced during the last 10 years falls below the limits of the Recovery Permit issued from the USFWS for the capture of bighorn sheep. Therefore, while implementing this project might be expected to harm 1-3% of the bighorn sheep handled, the loss will be negligible compared to the value of the data obtained to guide their management, and the value of restoring bighorn sheep populations into unoccupied habitat.

The USFWS has issued permits to CDFG to utilize this method for the capture and collaring of bighorn sheep. The USFWS have determined that this project and any associated adverse effects on bighorn sheep have already been analyzed through section 7(a)(2) consultation as part of the process issuing a recovery permit to the CDFG, and that the selected alternative will not jeopardize the continued existence of the bighorn sheep nor result in the destruction or adverse modification of critical habitat.

In addition, management of critical habitat to protect bighorn sheep and implementing the translocation portion of the recovery plan will result in long-term beneficial effects on bighorn sheep. The long-term beneficial effects of increasing knowledge of bighorn sheep and visitor interactions, and translocating bighorn sheep into previously occupied areas outweigh the potential for harm, injury, or death to an individual bighorn sheep during project activities. Thus, there will be no impairment to bighorn sheep.

Wilderness Resources and Character: Sequoia and Kings Canyon National Parks' total designated and managed wilderness is approximately 839,172 acres; approximately 96% of the parks' total acreage of 865,964. Sequoia and Kings Canyon National Parks' original wilderness designation occurred under the *California Wilderness Act of 1984* (16 USC 1131, P.L. 98-425, 98 Stat. 1619); additional acreage was designated as wilderness by the *Omnibus Public Land Management Act of 2009* (H.R. 146). The Sequoia-Kings Canyon and John Krebs Wildernesses are the officially designated wilderness areas, both entirely located within the parks. *Recovery Plan* activities will occur in both wilderness areas, and in adjacent wilderness areas in Inyo, Sequoia, and Sierra National Forests.

Management of wilderness must preserve its wilderness character and allow for visitor enjoyment. There

are six specified purposes of wilderness: recreational, scenic, scientific, education, conservation, and historical use. Land managers can approve and implement activities in wilderness provided that the activities further one or more purposes of wilderness without degrading wilderness character.

Several components of the selected alternative result in adverse effects on wilderness character and resources. Collaring operations (use of helicopters) will adversely affect the untrammeled quality of the park and forest wilderness areas temporarily during project activities. The use of helicopters will cause temporary adverse effects on the undeveloped quality of park and forest wilderness areas. VHF collars have a lifespan of at least 4 years and can be active for as long as 10 years, and will likely be on animals for the remainder of their lives, affecting the undeveloped quality of wilderness. Sights and sounds of the helicopter and project crews will affect opportunities for solitude or primitive and unconfined recreation during project activities. The project will occur outside the peak visitor use season, but still could affect these opportunities for visitors to park and forest wilderness during project activities. Therefore, effects on wilderness character and resources will be short- and long-term, moderate and adverse.

While there will be adverse effects on three qualities of wilderness character as a result of implementing the selected alternative, these effects will be mitigated by the long-term beneficial effects of restoring a native species into vacant habitat within Sequoia National Park. Viable populations of special status species, including bighorn sheep, are necessary to fulfill the purposes for which the park was established, and are key to the natural integrity of the park. The natural element of wilderness will be improved under this alternative as bighorn sheep are restored into previously occupied habitat in Laurel Creek and Big Arroyo within Sequoia National Park.

When considering the temporary nature of the adverse effects, and the long-term beneficial effects of the selected alternative, these activities will not result in impairment of park resources.

Natural Soundscapes: Natural soundscapes are an intrinsic element of the parks' wilderness environment. Natural soundscapes include all sounds that are inherent in nature, such as singing birds, insect noises, wind blowing through trees, waterfalls, rain events, and natural quiet. Natural sounds prevail in the subalpine environment. In contrast to the alpine zone, the natural soundscape of the montane and subalpine zones is less dominated by wind due to the presence of trees and tall shrubs that block and reduce wind speed. Animal sounds are more frequently audible in the montane and subalpine zones than in the alpine zone. Audible sounds are usually generated by nearby natural sources than carried from distances. Woodland birds such as thrushes and warblers can be heard in many areas. Flowing water is developing into larger streams, having a greater influence on the nearby soundscape, which then dominates the acoustics in the riparian and surrounding areas.

Natural soundscapes in wilderness areas of the park are necessary to fulfill the purposes for which the park was established, and are key to the natural integrity of the park. Actions in the selected alternative including helicopter operations will result in short-term adverse effects in a localized area over a period of several years during project work. However, individual flights in any given location will be short-term, and impacts will be localized and will not affect the soundscape in large portions of the wilderness, and will not result in permanent adverse effects. Therefore, implementing the selected alternative will not result in impairment.

The adverse impacts anticipated as a result of implementing the selected alternative on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified as significant in the park's GMP or other relevant NPS planning documents, will not rise to levels that will constitute impairment.

CONCLUSION

Based on the conservation planning and environmental impact analysis documented in the EA, with due consideration of the nature of the public comments and consultations with other agencies, and given the capability of the mitigation measures to avoid, reduce, or eliminate impacts, the NPS has determined that the selected actions do not constitute a federal action that normally requires preparation of an EIS. Environmental impacts that could occur are limited in context and intensity, with generally adverse impacts that range from localized to widespread, short- to long-term, and negligible to moderate. The selected actions will not have a significant effect on the quality of the human environment or the parks' cultural resources, or natural resources, and there will be no effect to threatened or endangered species.

There are no unmitigated adverse impacts on public safety, sites, or districts listed in, or eligible for listing in, the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local environmental protection law.

Based on the foregoing, it has been determined that an EIS will not be prepared and the selected actions may be implemented as soon as practicable.

Recommended:

Karen F. Taylor-Goodrich — Date: 7/29/2011
Superintendent, Sequoia and Kings Canyon National Parks

Approved:

Christine S. Lehnertz — Date: 08/04/2011
Regional Director, Pacific West Region