

Appendices



Appendices

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**APPENDIX A: 2011 OLYMPIC NATIONAL PARK MOUNTAIN GOAT
ACTION PLAN**

MOUNTAIN GOAT ACTION PLAN

Revised June 2011

I. Background:

Biology:

Mountain goats are ungulates that typically inhabit high elevation alpine and subalpine habitats. They are most prevalent in areas that contain rugged and steep terrain and cool areas often with persistent snow (17, 20). In most areas of their range mountain goats are reclusive (5), and do not allow humans to approach closely. When threatened or alarmed, mountain goats will seek steep rocky areas, often referred to as escape terrain (7, 15). They are renowned for their exceptional speed and agility on steep terrain, reaching short term speeds of 10-15 mph.

In most areas where they occur, they are reclusive and keep large distances between themselves and humans. In a hunted population in the Washington Cascades, the mean closest distance an observer could approach goats on foot was 351 m (> 1000 ft.) for females with kids and 213 m (> 600ft) for males (21). However in some areas where unhunted populations come in repeated contact with humans, goats have become habituated to the presence of humans (2, 12) and allow people to approach much closer, including within 10 feet.

Although they can occur in large groups, in most portions of their range mountain goats occur in small groups of adult females (nannies) and their dependent young (kids) and occasionally a few associated immature males and females. Adult males (billies) are usually solitary or found in small groups (2, 5, 21) except during the breeding season (rut) when they seek out and tend breeding females. Within groups, goats have an established hierarchy and fair amount of intra-specific aggression. Both males and females have sharp horns which can cause severe injury (2, 6). Consequently, goats have evolved behaviors in which dominance and aggression are communicated through display and aggressive contact is avoided, minimizing the chance for injury.

Alarm, threat and aggressive behaviors include (Figures and nomenclature primarily from Geist [6] and deBock [4]).

1) Stare threat

Intense stare at opponent.

2) Horn threat

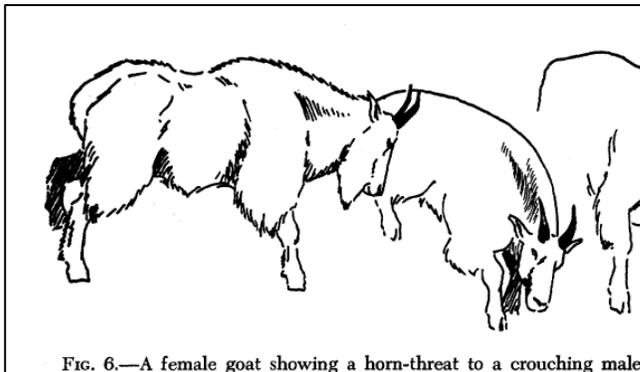


FIG. 6.—A female goat showing a horn-threat to a crouching male.

Goat lowers head and pulls in chin, prominently showing horns to opponent.

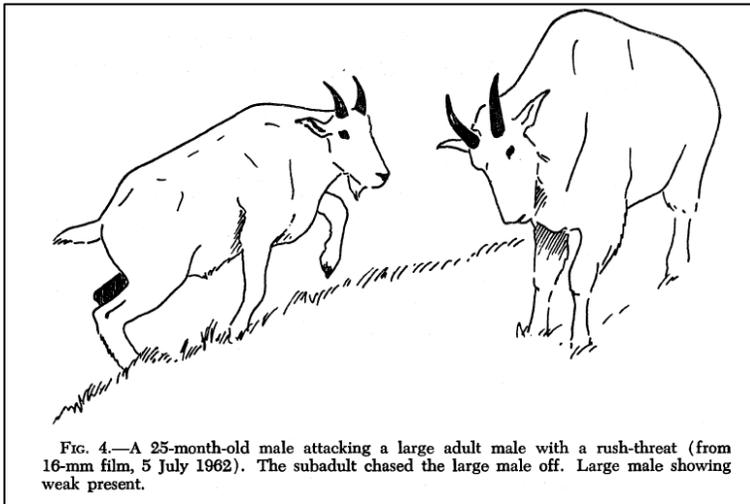


FIG. 4.—A 25-month-old male attacking a large adult male with a rush-threat (from 16-mm film, 5 July 1962). The subadult chased the large male off. Large male showing weak present.

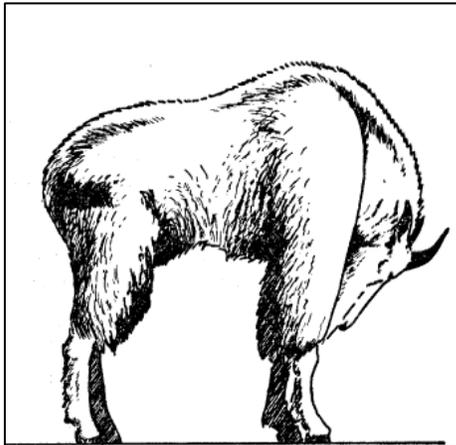
3) Rush threat

This threat is poorly developed in mountain goats as compared to other ungulates. The goat will walk or trot, but rarely run, at an opponent. At the end of the rush threat females and sub adults usually do a horn threat or horn swipe and males do an upward swipe with their horns.

4) Horn swipe

Goat lowers head and sweeps its horns upwards in a half circle motion.

5) Present threat (can follow up with Horn swipe)

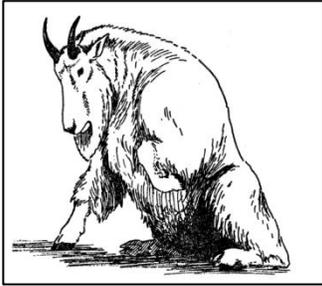


This is a dominance display, done by both male and female goats. It is a fronto-lateral body display, in which the goat raises high on its legs while arching its back and pulling its head down and away, as if ready to strike upwards with its horns. At the same time the displaying goat moves ponderously, slowly, with a nod of the head. The opponent is thus presented with the body mass and height of the displayer. The message is simple: I am bigger than you! If the onlooker is less than impressed he or she will display back. Consequently, the two rivals move in ever-tightening circles about one another, till one loses the nerve and jumps aside, or one of the rivals utters suddenly a harsh roar. At this point the opponent jumps away, or one of the opponents strikes the other with its sharp, dagger-like horns precipitating a fight (Giest, pers. comm. 2010).

In most situations females are dominant to males (2, 14); dominance status has been observed to increase with age (3). Dominance status has also been observed to persist even after horns are lost (17).

Rut in mountain goats typically occurs from November through December (6, 18). Ages of sexual maturity usually range from 2-4 for females, although it can occur earlier in areas where goats are on an exceptionally high plane of nutrition (8, 13). Typically only the most mature and dominant males breed.

Behaviors of billies in rut:



1) Pitting

During the rut billies will sit on the ground similar to a sitting dog. With an arched neck and head looking towards the ground, the male will paw quickly and vigorously with a front leg, throwing snow and dirt at his belly, hind legs and flanks creating a rutting pit (6). This often results in males having “dirty trousers’ appearance of dark patches on flanks, rump, and bellies.



2) Brush rubbing

Males will stand and rub the supraoccipital glands (located at the base of their horns) on twigs or bunches of grass by brushing their horns and frontal area of the skull from side to side.

Salt and Mineral Licks: In most areas where they have been studied, mountain goats make regular use of natural or man-made salt licks. Although they can be used throughout the spring through fall months, in most studies peak salt or mineral lick use is June – July (4,10,12,17). In salt lick situations normal patterns of dominance in goat groups are usually NOT observed; males are dominant over females, with adult males being the most dominant and aggressive (19, 17). Males also can be more resistant than nannies to moving out of the area (12). There are no known natural salt licks in the Olympic range.

Hazardous Encounters: Reports of hazardous interactions between goats and humans are extremely rare. In all reported instances, the encounters were between large, mature males in areas where there was a history of both habituation and salt conditioning.

- 1) Glacier National Park (198??), Gunsight Pass. *Details of this encounter are reported in Doug Chadwick’s book ‘The Beast the Color of Winter’ – reference #2.*

The incident took place in midsummer, in an area where hikers lingered, lunched and urinated. Consequently the goats were habituated to people and made a positive association between people and salt. Doug observed that the goats at Gunsight Pass behaved in the same way they behaved at natural salt lick sites – with males being dominant to nannies. Doug used the presence of habituated animals to allow him to get close-up observations of goat behaviors. At first they treated him as a dominant animal and gave him wide berth. However, eventually Doug realized that the largest male in the group was behaving in a manner similar to a goat in rut, and was exhibiting dominance displays towards Doug. This

culminated one day with the large male came in very close to Doug, and performing a stare threat. As Doug looked away, the male drove his horn into Doug's knee and jerked his head upright, knocking Doug to the ground.

- 2) Mt Ellinor (1999), Olympic National Forest, Washington. *There is no formal report on this incident. The details of this incident, including date and time, are unknown; all information comes from accounts that were printed in local papers following the Boardman death in 2010.*

The reporting party states that he was gored in the thigh by a large mountain goat minutes after he left a group of friends on the top of Mt. Ellinor. "We were eating lunch on the top...While we were eating lunch, a big male goat came up to us. I've never seen a real aggressive goat like this...He was licking us and our packs and getting in our food and everything. Eventually, he just left...Usually, you move and they kind of move back. This one was in your face." The injured party had to leave the summit before his friends. As he was changing into ski pants for the descent, the mountain goat jumped from a rock about 15 feet away. "He drilled me right in the upper thigh...It was the last thing that I expected. Fortunately, it turned its head." It knocked him back and opened a 4-inch deep wound in his upper right leg. Instinctively, he swung at the buck (Sic.) with an ice ax. He missed but scared away the animal by yelling at it. Hearing the shouts, his three friends came to his aid and helped him cover the wound with bandages and duct tape. He said the mountain goat waited until he was alone. "It was odd because it was similar to what happened to the guy in Port Angeles...That's exactly what happened to me. His mission was to hit me. He wasn't going to be stopped...The doctor said I was very lucky...It missed the femoral artery by about an inch."

- 3) Hurricane Ridge (October 2010), Olympic National Park, Washington.

This incident took place in an area with high visitor use (primarily day hikers) and year-round goat occupancy. There was a history of habituated goats in the area for over 5 years, with reports of a large male goat (or goats) not yielding way to, following, and occasionally being aggressive to hikers for over 3 years. The victim, Bob Boardman, and two others were hiking on Klahhane Ridge when they encountered a large male while they were eating lunch. The goat approached them and then followed them on the trail for about $\frac{3}{4}$ of a mile. Boardman sent the other two people ahead of him on the trail as they attempted to leave the goat behind. One member of the group said she saw Boardman and the goat walking side by side several hundred yards behind her. The actual attack was un-witnessed but the evidence shows the goat gored Boardman in the lower thigh/knee area and severed a major artery causing fatal blood loss. Emergency care for Boardman was hampered because the goat would not move away from him after the attack until several bystanders were able to scare it away in a concerted effort. Rangers shot the goat later the same day and a necropsy was done on the animal. The necropsy showed no disease or other significant health issues, and confirmed the goat was in rut.

Situation in OLYM:

Eleven or 12 mountain goats were introduced to the Olympics near Lake Crescent from 1925 to 1929, prior to the formation of the park (1, 13). By 1983 it was estimated that the population had grown to 1175 + 171 (SE) animals, with mountain goats occurring throughout suitable habitat on the Olympic Peninsula (13). Over 200 goats occurred in the highest density population – Klahhane Ridge. In the 1980's OLYM implemented a series of live capture operations and removed over 325 animals from the population, and the numbers in the park declined significantly. The latest population estimate, from

2004, is that there are approximately 300 goats in the park (9).

Because many of the areas that goats inhabit are also popular destinations for park visitors, both in the front country (e.g. Hurricane Ridge) and back country (eg. Glacier Meadows), there is a high potential for goat - human interactions in OLYM. Most notable are the many areas where mountain goats are habituated to human presence have also become conditioned to seeking salts from humans. They can be a nuisance along trails and around wilderness campsites where they will persistently seek salt and minerals from human urine, packs and sweat on clothing. They will often paw and dig areas on the ground where hikers have urinated or disposed of cooking wastewater and chew unattended clothing. The nature of goat – human interactions in OLYM can vary widely, ranging from benign (observing goats from several hundred meters away across a ridge) to, from now what we know from the October 2010 fatality, extremely hazardous.

For further information on mountain goat behavior and biology and other material relevant to the formulation of this action plan, see the References section.

II. ACTION PLAN

The goal of this management plan is that goats in the park exhibit natural behaviors consistent with other portions of their range, to not have those natural behaviors altered by human use of their habitats (i.e. become habituated or conditioned), and to minimize the potential for hazardous goat human encounters.

Examples of **acceptable** mountain goat behavior include:

- Goat retreats at the sight of humans, stays at least 300 feet (100m) away from people at all times.
- When a surprise encounter occurs along a trail, the goat quickly retreats and either puts 100m distance between self and humans, or may seek escape terrain.
- If a human comes in-between a nanny and kid, nanny may display some aggressive postures, but does not make contact and quickly retreats with young.

Examples of **unacceptable** mountain goat behavior include:

- Goat does not retreat when comes in sight of people, lets people approach within 150 feet (50 m).
- Goat approaches and follows people on trails or at camp or rest sites.
- Goat aggressively seeks out areas where humans urinate and consumes soil and vegetation where human urine is deposited.
- Goat makes contact with clothing or equipment; chews gear seeking salt.
- Goat displays aggressive postures or behavior to people when encountered on or off trail.
- Goat attacks and makes contact with humans.

As with the other species management plans contained in this Hazard and Nuisance Animal Plan, mountain goat management in OLYM is an integrated effort between all park divisions, and the emphasis is on prevention. For roles of each division, see Section III.

An overview of the continuum of mountain goat-human interactions, and the appropriate park response, is presented on Table 1. For serious incidents (4 and greater on the table), the Wildlife Incident Team will make decisions about the appropriate response.

Table 1. Goat Management Continuum.

Occurrence	Responses to situation	Management Action Alternatives
1) Single and multiple observations of goats at > 100m (300f)	<ul style="list-style-type: none"> • Record observations on daily logs and pass onto RM when page is full. • All logs turned in at the end of the year. 	<ul style="list-style-type: none"> • Input observation data into database (RM) • Post level 1 signs at trailheads, distribute to back-country permittees (RP, WIC) • no further action needed
2) Reports of goats not moving off trail as hikers approach until people get within 100 feet; letting people get within 100 ft. but not less than 20 ft.; easily shooed away.	<ul style="list-style-type: none"> • Report on goat incident form and turn into district ranger and WB immediately 	<ul style="list-style-type: none"> • Input observation data into database (RM) • Inform Wildlife Incident team of situation • Post level 2 signs (RP) • NPS staff implement aversive conditioning on all goats exhibiting unacceptable behavior during regular patrols. • Record aversive conditioning incidents on log and pass information on to WB and Chief Ranger.

Occurrence	Responses to situation	Management Action Alternatives
3) Goats occasionally following people on trail, coming into campsites; not easily chased away; no aggressive postures in adult males	<ul style="list-style-type: none"> • Report on goat incident form and turn into district ranger and WB immediately 	<ul style="list-style-type: none"> • Input observation data into database (RM) • Inform Wildlife Incident team of situation • Post level 2 signs (RP) • NPS staff increase patrols in area; mark animals with paint balls; implement aversive conditioning on all goats exhibiting unacceptable behavior during regular patrols (RP) • Record aversive conditioning incidents on log and pass information on to WB and Chief Ranger.
4) Goats persistently following people on trail, repeatedly coming into campsites; obviously seeking salts; not easily chased away; aggressive postures in adult males	<ul style="list-style-type: none"> • Report on goat incident form and turn into district ranger and wildlife bio. immediately 	<ul style="list-style-type: none"> • Input observation data into database (RM) • Inform Wildlife Incident team of situation • Post level 2 signs (RP) • Evaluate need for area closure (WIT), implement closure if needed • NPS Aversive Conditioning team patrol area for at least one week; mark goats encountered; implement aversive conditioning on all goats exhibiting unacceptable behavior during regular patrols. (RP,WB) • Area closed for one week during aversive conditioning. • More intensive patrols when trail opened to assess goat response to aversive conditioning.
5) Goats aggressively seeking salt; exhibits threat posture when encountered on trail; will not leave area without aggressive hazing	<ul style="list-style-type: none"> • Report on goat incident form • Contact Park Dispatch • Dispatch Contact Wildlife Incident Team 	<ul style="list-style-type: none"> • Close trail for 2 weeks • Mark goats in area; consider use of permanent marks (ear tag or radio collar) (RP,WB) • Implement aversive conditioning with trained personnel for 1 week. • Patrol closed trail for 1 week to assess efficacy of aversive conditioning (not in uniform) • Consider lethal removal if behaviors are observed to continue after the actions taken above. Removal can occur during the patrol period following the week of conditioning or later if behavior is repeated following opening of the trail.
6) Goat attacks human; makes contact or corners people making egress impossible	<ul style="list-style-type: none"> • Contact Park Dispatch • Dispatch Contact Wildlife Incident Team, 	Lethal removal

RM=Resource Management; RP= Resource Protection; WB=Wildlife Biologist; WIC= Wilderness Information Center; WIT= Wildlife Incident Team

Management actions at levels 2 and 3 are extremely important, as aversive conditioning is much more effective and long lasting before an animal has gotten a reward for being in an area. Level 4 is often colloquially called the “point of no return” when our tools for discouraging the behavior are probably less of a negative incentive than the reward they get.

Education and Training:

Staff:

1. All affected employees will receive information on mountain goat interactions. Briefings by work group supervisors and staff training by the Natural Resources Management Division will be provided to answer questions and concerns of employees, advise of new information or research, etc. Such briefings and related training will normally be scheduled at the beginning of the summer season, but may be conducted at other times, as needed.

2. The staff of the park Dispatch Center will have an up-to-date SOP for reporting incidents, and all new communications center employees will be made familiar with the procedures.
3. Those involved with wildlife management (capture, hazing, handling etc.) will be current on all applicable animal-handling training (NPS-77).

Public:

Various safety and interpretive materials will be developed and widely distributed to park visitors. This will include a park handout describing mountain goats and recommendations for safe hiking and camping. It will emphasize need for not habituating wildlife to the close presence of people, the need to stay at least 150 feet or 50 yards away, salt and urine management, and that the potential for negative goat-human encounters can be minimized, but not eliminated, by controlling human behavior (Appendix 3). This handout will be available at all visitor centers, ranger stations, and concession facilities.

MANAGEMENT OPTIONS

In escalating order, the following management options are available in response to goat incidents. A combination of tactics [e.g. hazing combined with area closures] will most often be used.

Aversive Conditioning: When animals are openly frequenting an area where a number of people are present, an attempt may be made to scare or frighten the animal with aversive conditioning or hazing techniques. If a decision is made to haze a goat or a group of goats in an area, they should be marked if possible. If marking is not possible, information on the animal's behavior, degree of habituation and/ or conditioning, and detailed description of size/weight and identifying marks must be collected and photographs or video should be obtained if at all possible.

One consideration however is that although problem goats may be encouraged to leave an area with hazing techniques, they will probably return if whatever attracted them to the area remains. It is best if all possible attractants in the area are removed, but this is difficult to achieve in a situation where goats are seeking salts from human urine that are of necessity consistently and continually distributed throughout areas of high human use. What we seek to achieve is to re-instill a pattern of avoidance of humans by goats, and to have them seek salts when and where no humans are present.

Hazing techniques include noise stimuli (sirens, compressed air horns, cracker shells) and contact stimuli (thrown rocks, use of a slingshot, paintballs, or rubber projectiles or bean bags fired from specialty shotgun ammunition). A separate protocol on the use of specialty shotgun shells has been prepared, and reference should be made to that document for appropriate uses of such devices.

If hazing is used, field personnel will ensure the safety of non-involved bystanders and employees when performing hazing actions. When such hazing techniques are applied, the goat's behavior should be carefully noted and recorded on a wildlife hazing form (Appendix 1).

Animal Marking: If a goat or a group of goats is frequenting an area and are candidates for hazing, or if there has been a series of incidents in an area and there is uncertainty as to which goat is involved, the park should attempt to mark each animal to better evaluate 1) the situation, and 2) effectiveness of hazing (if animal returns), and 3) help identify the animal if it offends in another area.

There are 3 levels of animal marking that are available for use in goats:

- 1) Paint balls – relatively easy to deploy, no animal capture is needed, but marks are not permanent and care must be taken to a) mark different animals in groups in a manner that they are easy to distinguish between each other (e.g. paint ball color or placement combinations) and b) carefully record color and placement combinations used. An additional advantage of paintballs is that they also can serve as an aversive conditioning technique.
- 2) Ear tags – relatively inexpensive, long lasting, and through the use of different color and number combinations each animal is distinguishable. The disadvantage is that animals must be captured to deploy ear tags. For goat capture protocols, see Appendix 2.
- 3) Radio collar – Because a goats' home range can encompass several different areas where it can come in contact with humans, and can also move periodically to habitats not visible from trails (Jenkins et al 2011), radio-transmitting collars marked with distinct color bands can be used to both mark goats and monitor their activities. The advantage to this technique is that the animals are permanently marked and movements and activities in developed areas can be monitored. The disadvantage is that animals must be captured to deploy radio collars and radio-tracking is fairly expensive. For goat capture protocols, see Appendix 2.

Area Closure: Temporary closure of an area to public use and travel may be used to mitigate the hazard presented by a goat frequenting and exhibiting aggressive behaviors at a specific location. Closures invoked under 36 CFR 1.5(a) require written documentation from the Superintendent to the files and public notification. Emergency closure signs will be posted, access to the area controlled, and enforcement patrols routinely performed. Closures will be maintained for approximately 14 days, or until no unacceptable goat behavior is observed in an area that has been thoroughly searched in 3 consecutive patrols covering a period of at least 1 week.

Aversive Conditioning (e.g. hazing): The use of various noise and contact devices to frighten or haze mountain goats to modify their behavior [such as approaching and following hikers] will be employed when goat interactions reach level 2 - 5. With mountain goats a combination of noise and contact stimuli will be most effective (Chadwick, pers. comm.). To be effective, these techniques must be precisely and consistently applied. For guidelines for the use of specialty rounds refer to the protocol for use of specialty firearms in wildlife management.

Animal Destruction: Where warranted goats may be lethally removed from the Park using firearms or other means of humane euthanasia. For a list of situations in which goat destruction should be considered, see Table 1. Except for emergency situations, the recommendation to destroy a goat will be made by the Wildlife Incident Team with

final approval by the superintendent.

In cases where a goat attack occurs, responding personnel should treat incident site as if it was a crime scene: close the area and secure the scene to preserve evidence. A key goal is to authenticate the association between the specific goat and the victim. The Wildlife Incident ICS plan should be implemented (Chapter 1, Appendix 1). The incident commander will be the Chief Ranger.

Highlights are below:

- Contact Dispatch, Superintendent or acting superintendent, WIT, and WIC and advise of closure.
- Contact PIO who will work with the press.
- Gather all available information that will help interpret what actually happened and aid in identifying the offending individual.
- If lethal removal is approved, aim for heart area; the head needs to be saved for analysis.
- Preserve animal for necropsy (bag head and feet with paper bags covered by plastic), that should be done by a crime lab (i.e. Ashland). All people touching the animal must wear proper protection, due to risk of transmission of zoonotic diseases.

III. Roles and Responsibilities

In addition to responsibilities laid out in Section 1 of the Nuisance and Hazard Animal Plan, the following additional duties are associated with implementing the Mountain Goat action plan:

1. All employees:

- **The KEY action to prevent hazardous encounters with mountain goats is to not let them get habituated to human presence.** All staff must keep a safe distance between themselves and goats (optimal 300 feet, **minimum 150 feet or 50 yards**; visualize $\frac{1}{2}$ the length of a football field). If goats approach closer, encourage them to leave the area with loud noises, arm waving, snapping plastic bags, and rock throwing.
- All staff encountering visitors violating the 50 yard rule will communicate park policies and the rationale behind it, and encourage its enforcement to the best of their abilities. Encourage visitors to shout and wave arms and throw rocks to keep goats at a distance.
- In selected areas of high goat use (e.g. Hurricane Ridge) staff and visitors will be advised to **NOT** urinate on trails in backcountry. Urine deposits on the trail entice goats to use trail areas, and turn trails into long linear salt licks.
- In backcountry campsites in goat range, campers will be advised to seek sites 200 feet away from campsites on the trail for urination, or to urinate in the privies.
- Record all mountain goat observations, using back-country, ranger station, or

visitor center logs as appropriate. Turn in observation forms as soon as the page is filled out, or the end of the season –whichever comes first. Appendix 1.

- Record and report mountain goat incidents (observation class 2 to 6) on a mountain goat incident form, and turn in immediately to the district ranger and OLYM wildlife biologist. Examples of logs and forms are in Appendix 1.
 - **If there is a serious incident report immediately to Dispatch and District Ranger immediately (observation class 5 or above). Dispatch will contact the Wildlife Incident Management Team.**
2. **Resource Protection:** Under authority delegated by the Chief Ranger, District Rangers are responsible for implementing this action plan in their area. Specifically, District Rangers will:
- Investigate incidents in a timely manner. Thoroughly interview witnesses. Check for signs in the field to verify report and pass information on to the Wildlife Biologist and Chief Ranger. If the incident is class 5 or more severe, field personnel should be armed with a rifle or shotgun and personnel should travel in pairs.
 - Consult with the Wildlife Biologist for technical support and advice on mountain goat biology, management tools and options, field assistance, and information on goat activity in the area (from the observation database) as well as the collection, necropsy, and disposition of animals that are destroyed.
 - Ensure all signs related to goat education and warnings are properly installed, and modified as a change in the situation in the local area develops, following the signage instructions contained in this plan.
 - Ensure that if a situation develops (Level 3 and greater) proper information is distributed to visitors at ranger station, entrance booths, WIC, local concessions, etc.
 - Administer emergency area closures. Closures will be implemented and coordinated through the Chief Ranger's office. Closures will be made in consultation with the wildlife incident management team, and information passed, by the District Ranger, to the WIC and dispatch ASAP.
 - Identify and train members of Wildlife Incident Response Team. Participate in aversive conditioning bouts as needed.
3. **Natural Resource Management:** Staff of Natural Resource Management (specifically the wildlife biologist in charge of Nuisance and Hazard Animal management and/or the park practitioner) will:
- Keep the database on goat observations current. Look for patterns in goat incident activity, and inform resource protection if a trend appears to be developing.

- Keep current contacts with regional managers and biologists, and keep abreast of advances in goat management.
 - Maintain cache of wildlife capture and marking supplies, and wildlife incident investigation kits that are rapidly accessible and field ready on very short notice.
 - Assist in field investigations and operations; maintain staff proficiency with dart gun and aversive conditioning tools.
 - Support closure actions by assisting in determining the size and duration of the closure.
 - Identify and train members of Wildlife Incident Team. Participate in aversive conditioning bouts as needed.
4. **Interpretation:**
- Assist in the preparation and dissemination of messaging (signs, handouts).
 - Communicate mountain goat management message to visitors.
5. **Public Affairs Office**
- Coordinate press releases.
 - Communicate with media.

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6/29/2011
Date

Approved by: *Karen Burton*
Superintendent

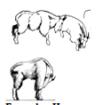
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- 19) Singer F. 1977. Dominance Leadership, and Group Cohesion of Mountain Goats at a Natural Lick, Glacier National Park, Montana. Pp 107-133 in W. Samuel and W. G. Macgregor eds. *Proceedings of the First International Mountain Goat Symposium*. B.C. Ministry of Receptions and Conservation.
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- 21) Wright, W. 1977. Ecology of the Cascade Mountain Goat, Mount Baker Snoqualmie National Forest. in W. Samuel and W. G. Macgregor eds. *Proceedings of the First International Mountain Goat Symposium*. B.C. Ministry of Receptions and Conservation.

4) Goat Incident Form

MOUNTAIN GOAT INCIDENT FORM		V1.11
<p><i>Prompt and Accurate information on the behavior of habituated and/or aggressive mountain goats is critical to mountain goat management in Olympic National Park. If you see or get reports of nuisance or hazardous goat-human interactions (eg. goats allowing people to approach <30 yds, following people, entering into campsites while people are present, refusing to yield the trail to hikers, exhibiting aggressive postures towards humans) please fill out this form as accurately as possible and turn in immediately to the wildlife biologist. For more information on goat biology, behavior and mountain goat management in OLNM please read the mountain goat action updated in 2011.</i></p>		
Recorder:		
Duty Station:		
OBSERVER INFORMATION		
Name:	Phone #:	
Address:		
Email:		
SUMMARY OF INCIDENT/OBSERVATION		
Date:	Time of Observation:	
Location of Observation (as exact as possible):		
Total # of animals:	# kids :	# yearlings : # adult males :
Activity of person/people when goat(s) seen (eg. hiking, camping, picnicking.):		
Activity of goats(s) when first seen (eg. walking, grazing, bedded):		
Response of goat(s) to people: (eg. stood ground, approached, horn threat, pitting) <i>describe</i>		
 <p>Examples: Horn Threat and Present Threat postures</p>		
Over →		

SUMMARY OF INCIDENT/OBSERVATION, CONTINUED
Was aversive conditioning used by person? Yes/ No If so, what type? (eg. loud noise, throwing items):
How did goat(s) react? (eg. ran away, walked away, stood ground, aggressive posture?):
Was human salts available to the goat? If so, what form? (eg. urine on ground, sweat soaked clothing.)
If so, did the goat (s) consume it?
Length of observation:
Closest distance to goat(s):
Markings on goat(s) (Ear Tags, paintmarks (color and location):
Additional notes that may help describe the incident/observation:
<p>Incident Type: 1 (close approach but easily scared away) 2 (close or following, reluctant to leave, no aggression) 3 (persistently following, not easily shooed away, some aggressive postures) 4 (aggressively seeking salts, threat postures, only will leave with aggressive hazing) 5 (aggression) 6 attack.</p>
<p>Thank You for your help! Please submit forms as soon as possible to either: Patti Happe, Olympic National Park Wildlife Biologist, Natural Resources Management Division (e-mail: patti_happe@nps.gov; phone: 360-565-3065). <i>6/2011</i></p>

5) Wildlife Hazing Form

Mountain Goat patrol log- 2011

Date	Observers	Weather	<u>Hrs on trail</u>	# Goats obs.	# hikers obs.
Describe route					
Describe location and behavior of goats observed Marked goats seen (?) Behavior and location of marked goats:					
Management Actions Taken – What and Where; Describe any marks given Goat response:					

Appendix 2.

Mountain Goat Snaring Protocol Olympic National Park

Introduction:

This protocol describes procedures that will be used to manually capture mountain goats in Olympic National Park by foot snaring. The method involves attracting habituated mountain goats to park staff using salt and catching them with a hand-held rope leg snare.

The method was used extensively in Olympic National Park during the 1970's and 1980's during investigations of mountain goat movements, dispersal, habitat selection, and reproductive biology (Stevens, Stevens, Hoffman, Houston et al. 1994), and again in 2005 and 2007 during development of a sightability model needed to refine census methodology. Advantages of the leg snare method are: (1) it is very safe for mountain goats – there is very little risk of capture-related injuries or deaths and (2) equipment and logistical requirements are minimal. Disadvantages of the method are that there is some injury risk to human field crews and it is not possible to obtain a representative sample of all mountain goats in the park using this method; some goats are not habituated or live in too inaccessible of areas to be sampled.

This protocol has been compiled from discussions with 4 experienced members of the capture crews that pioneered and used this capture method in the 70's and 80's (V. Stevens, R. Hoffman, E. Schreiner, R. Olson; Personal Comm.) and crews that used the method in the 2000's (P. Happe, D. Manson, K. Jenkins).

Selecting Sample Sites: This method will work in areas where there are consistent reports of mountain goats that are coming into human sources of salt – frequently human urine, sweat-soaked pack-straps or hiking boots, and salted cooking liquids.

Crew: Optimally a ground capture crew will consist of three members: a nooser, a primary restrainer and a secondary restrainer. Smaller female mountain goats can be handled by a two-person crew. Even with smaller goats a third person is often useful to talk with interested park visitors who may be drawn to the capture operation.

Establishing the snaring site: After a specific group of goats is targeted, the crew will select a site for the noosing operation. The site should have a vegetation-free area for applying the salts (i.e., sites that won't be damaged by goat pawing and eating) surrounded by relatively smooth terrain for setting the snares. Either human urine and/or chips from a salt block will be used as bait. First the nooses are established; then the site is baited. After locating the specific site for the bait, 3-4 snares will be set approximately 3-4 feet from the bait site. Generally we will set one rope snare for each member of the capture crew. Snares consist of a 25 foot segment of 5/16 or 3/8" braided poly cord with a loop tied or spliced on one end. The snare is created by feeding the rope through the loop to form a 12-18"-diameter noose. The noose is placed flat on the ground and the

pull-line is laid out to where the crew member will wait. There should be no kinks, loops in the pull-line. If a suitable anchor tree or log exists, the back end of the pull-line should be anchored by tying off to the tree. One variation of the set is to elevate the noose approximately 1-2” off the ground using a ‘campfire ring’ of small stones as a platform for the noose. After establishing all the nooses, apply the bait to the center of the site. If salt-block chunks are used, the salt should be offered in a 12”-diameter plastic container to prevent salt leaching into the soil.

Catching the goat: The crew will wait patiently until a goat steps into one of the set snares. The consensus of former goat ropers is to catch a rear foot, although the front foot is favored by one former roper and may also be used. The goat is caught by yanking suddenly on the pull cord. The benefit of using the hind foot is that once the goat is snared and tries to run away from the nooser it often stretches out low to the ground facing away from the nooser, a position in which the animal may be safely tackled. The disadvantage of using the front foot is that there may be a greater risk of leg or shoulder injury as the goat tries to twist away from the nooser.

Animal tackling is a dynamic and quick event—there is no text book formula. In general, the nooser will hold the rope while working his/her way down the rope to the animal and trying to stretch the animal out. The tackler will approach from the back, throw a flannel shirt over the goats head (blinding it) and grasping ahold of the goat’s horns and applying steady, heavy pressure to the upper shoulders and neck. While it is necessary to control the head, care should be taken to not pull the horn from its sheath. The tackler will wear impact resistant eye protection secured with a head band. The nooser or the third person will apply weight to the hind quarters from the back side of the animal, while helping to control the feet. The goat will be hobbled with leather buckled hobbles or hog-tied with the snaring rope. Once blindfolded and secured, the goat will generally ‘give up’ or at least reduce struggling to the point where former crews have been able to weigh, measure, and draw blood. If the goat struggles excessively, a female goat may be sedated using 25-30 mg xylazine (Jessup 1980)—a large male may require more but begin with 30mg. **(If this xylazine is used, all animal handlers must the have necessary training to handle wildlife pharmaceuticals).** All members of the capture crew should wear light, flexible leather gloves until the goat is secured.

Goat Procedures.

- A) Blindfold, hobble, place horn blunters on horns
 - a. sedate if necessary
 - i. **Females** 25-30 mg Xylazine (@300mg/ml = **0.9 ml**)
 - ii. **Males** 30-35mg Xylazine (@300mg/ml = **0.1 ml**)
- B) Apply Gentak to eyes
- C) Ready radio-collar (if used)
 - a. Test VHF
 - b. Record VHF frequency and S/N on field forms
- D) Place radio-collar on animal
- E) Install ear tags

- a. Unique color code for the area to each ear
- b. Record tag color and numbers on data sheet
- c. If use hole punch, collect tissue sample
- F) Measure animal
 - a. Measure body weight if possible (using nylon sling)
 - b. Measure chest girth (cm)
 - c. Measure neck circumference (cm)
 - d. Measure total body length (contour) (cm)
 - e. Measure hind foot length (tip of hoof to tip of calcaneum)
 - f. Measure length of horns from base to tip along outer contour
 - g. Measure distance from tip of horn to 1st ring
 - h. Measure distance from tip of horn to 2nd ring
- G) Assess body condition
- H) Draw blood (two red tops, one purple)
- I) Collect hair
- J) Collect fecal
- K) Administer Yohimbine if animal has been sedated (IV if possible or else IM) wait 4 minutes for IV injection, 10 minutes for IM injection before releasing)
 - 0.3 mg/kg @ 10 mg/ml
 - a. **Yearlings @ 32 kg =1 ml**
 - b. **Sub-adult Males @ 60 kg = 1.8 ml**
 - c. **Sub-adult females @ 50 kg=1.5 ml**
 - d. **Adult males @ 110 kg=3.5 ml**
 - e. **Adult females @ 60 kg= 1.8 ml**
- L) Release Animal.

Emergency Procedures. We anticipate no emergency procedures necessary due to the unobtrusive nature of the capture operation. In the unlikely event of a serious limb injury (dislocation, break), the procedure will be to euthanize the animal either through the use of a captive bolt or firearm with a shot to the center of the head in between the eyes.

**Mountain Goat Study
CAPTURE FORM**

Date ____/____/____
yyyy/ mm/ dd

Animal # _____
(yyyy/sex/###)

Capture

Team: _____

General Location: _____

Specific Location (GPS) LAT _____ Long _____

Weather: temp (f) _____ precip: _____ cloud cover _____

Time on _____

Time off _____

Collar# _____ VHF Freq _____ Color_ Magnet OFF

Ear Tag R (#/ Color) _____ / _____ Ear Tag L (#/Color) _____

DRUGS USED (military time):

	#1	#2	#3	#4
Drug Name				
Mg used				
Vol used				
Route (im, iv, subq)				
Site (hip, neck)				
Time of Injection				
Time down/up				
(time animal found)				
Induct/ReversalTime (minutes)				

Capture Notes: _____

Samples: Blood/Purple, Blood/Red Hair, Fecal, Ext. Parasites, Tissue

Treatments: (list)

Monitoring

<u>Time</u> _____	<u>Sign</u> _____	<u>Obs</u> _____		<u>Time</u> _____	<u>Sign</u> _____	<u>Obs</u> _____
_____	_____	_____		_____	_____	_____
_____	_____	_____		_____	_____	_____

Measurements: Estimated age _____Horns: Photo

Weight _____ kg

Chest girth _____ cm

Neck circumference _____ cm

Total length _____ cm HindFoot _____ cm

Lactating: Yes No

Horn Lengths (cm)	Left	Right
Total Length		
1 st ring		
2 nd ring		

Condition: Withers _____ inch pinch.

Equipment List for Field Capture Crew (go loaded for 2 goats)

<p><u>General</u> Ready supply of urine :) Salt block chunks Salt tray Rope snares (4) Hobbles Flannel shirt (blindfold) Horn guards (5" segments of garden hose) Impact resistant eye protection Leather gloves (each individual) Protocol First Aid Kit Park Radio Radio collars (2) MHz Receiver and Antenna (?)</p> <p><u>Drug Kit</u> Xylazine Gentak Yohimbine 4 1cc syringes 4 3cc syringes 2 10cc syringes 6 18 gauge needles Thermometer Stethoscope</p>	<p><u>Collaring Kit</u> Sharpie, fine tip (2) Pencil Captive Bolt Nutdriver Ear tag applier Measuring tape Latex gloves Collections Baggie (1 per animal) -field form -ear tags -20cc syringe -18 gauge needle -Redtop tubes (2) -Lavendar tube (1) -Hair bag -Fecal bag -Tissue vial</p> <p><u>Optional:</u> -Scale (what about weighting pole, can we use two hiking sticks together? I'll volunteer mine) -Weighing sling (4x4ft nylon)</p>
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Appendix 3. Goat outreach materials and signs. 3 level warning system (similar to what is used for cougar and bears). These can be found on I:\All\wildlife\Nuisance_Hazard_Animal\wildlife signs and the OLYM sharepoint site at

<http://www.olyshare.nps.gov/sites/nrm/NRM%20Documents/Forms/AllItems.aspx>

Level 1: General about goats (yellow). For use in areas where goats are seen but where we have no reports of habituation. Implementation: post at trailheads, distribute with backcountry permits, post on backcountry trip planning website.

Mountain Goats & Your Safety



Mountain goats are a non-native animal introduced to the Olympic Mountains in the 1920s. Like any wild animal, they can be dangerous, but some goat behaviors increase the risk to humans. Following the guidelines below can help you have a safe experience if you encounter a goat:



- Mountain goats can become very tolerant of people and allow very close approach.
- If habituated, goats are more apt to “stand off” than most other large mammals, and will hold their ground rather than move away.
- Male goats become more aggressive during the breeding season, which peaks in November, but can begin in October and run will into December.
- All goats use their potentially lethal sharp horns to defend their personal space.
- Mountain goats crave salts. In some areas they seek human salts in urine or sweat soaked clothing, leading to conflicts. Do not urinate on or near the trail. Please go off trail at least 50 yards and urinate on a rock or bare ground. Don't leave sweaty clothes unattended—goats may chew them.
- **Keep a safe distance—at least 50 yards (half a football field)—from mountain goats at all times.** Animals that are closely approached may lose their natural fear of people, and become habituated to humans. Once habituated, they may develop aggressive behaviors or attempt to assert dominance over people.

If a goat approaches you, slowly move away to keep a safe distance. If it follows you be prepared to chase it off by yelling, waving coats or other objects, or throwing rocks.

If you encounter a mountain goat within 50 yards, please report it to the closest ranger station.

Level 2 (Orange): For use in areas where there are reports of habituated and salt conditioned goats (not for use in situations where we have aggressive mature billy). Implementation: post at trailheads, distribute with backcountry permits, post on backcountry trip planning website.

WARNING 

Habituated Mountain Goats in Area



Goats in this area are closely approaching and following people or entering campsites. Habituated wildlife can become aggressive. Goats have sharp, lethal horns.

- Stay at least 50 yards (1/2 length of a football field) away from all wildlife. You may be cited under 36CFR1.5(f) if you are observed closer than 50 yards.
- If a goat approaches, be prepared to chase it off by yelling, waving coats, or throwing rocks!
- Goats crave salts. Urinate on rocks or snow at least 100 feet from the trail. Do not leave sweaty clothes unattended.
- Male goats become more aggressive in the autumn and early winter breeding season.
- **If these goat behaviors persist or deteriorate, this area may be closed and further actions taken.**

Following these guidelines will help protect you and park resources. If you encounter a mountain goat within 50 yards, please report it to the closest ranger station.

Level 3 (Red): Closure for NPS administered intense hazing or lethal removal.

Implementation: post at trailheads, distribute with backcountry permits, post on backcountry trip planning website, press release.

DANGER

**THIS AREA IS CLOSED DUE TO THE
PRESENCE OF AGGRESSIVE MOUNTAIN
GOATS.**

Removal of this sign is illegal under 36 CFR 1.5 and
may result in injury to you and others who follow you
into this area

**APPENDIX B: OLYMPIC NATIONAL PARK MOUNTAIN GOAT
MANAGEMENT CONTINUUM**

MOUNTAIN GOAT MANAGEMENT CONTINUUM (ADAPTED FROM DRAFT WORKING GROUP DOCUMENT)

Classification	Occurrence/ Assessment	Potential Management Actions	Responsibility
1) Single and multiple observations of goats at > 100 meters*	Observation: goats seen at a distance or on escape terrain; natural behaviors exhibited	<ul style="list-style-type: none"> • Provide informational material to visitors • Post regulatory signs (no feeding, minimum distance, advice on urine deposits etc.) • Record observations on daily logs and turn in to WM when page is full or end of season 	
2) Mildly to moderately habituated goats.	Reports of goats not moving off trail as hikers approach until people get within 50 meters; letting people get within 50 meters but not less than 20 meters; easily shoed away.	<p>All of the above, also consider:</p> <ul style="list-style-type: none"> • Fill out goat incident form and turn into district ranger and WB. • Post higher level regulatory and warning signs. • Inform Wildlife Incident Team of developing situation • Haze goats in area exhibiting habituated behavior. Record hazing actions and goat responses. 	<ul style="list-style-type: none"> • RE, LE, WM
3) Strongly habituated and mildly conditioned goats.	Goats occasionally following people on trail, coming into campsites; not easily chased away; not exhibiting natural behaviors. No aggressive postures in adult males.	<p>All of the above, also consider:</p> <ul style="list-style-type: none"> • Staff increase patrols in area; mark animals with paint balls; haze goats exhibiting unacceptable behavior during regular patrols. • Increased outreach to visitors about habituated and conditioned goats. 	<ul style="list-style-type: none"> • WM, LE, RE, PIO
4) Conditioned goats; some threatening or aggressive behavior	Goats persistently following people on trail, repeatedly coming into campsites; obviously seeking salts; not easily chased away; aggressive postures in adult males	<p>All of the above, also consider:</p> <ul style="list-style-type: none"> • Evaluate need for area closure, implement closure if needed • Dedicated trained staff implements hazing for several days; mark goats encountered and target hazing on goats exhibiting unacceptable behavior during regular patrols. • Continue more intensive patrols when trail opened to assess goat response to hazing. 	<ul style="list-style-type: none"> • WIT • LE, WM • LE, WM
5) Conditioned goats, aggressing behavior	Goats aggressively seeking salt; exhibits threat posture when encountered on trail; will not leave area without aggressive hazing	<p>All of the above, also consider:</p> <ul style="list-style-type: none"> • Contact park dispatch and inform WIT of incident • Close trail for longer duration. • Mark goats in area; consider use of permanent marks (ear tag or radio collar) • Patrol closed trail for several days to assess efficacy of aversive conditioning (not in uniform) • Consider lethal removal 	<ul style="list-style-type: none"> • Anyone • WIT, LE • WM, LE • WIT

APPENDICES

Classification	Occurrence/ Assessment	Potential Management Actions	Responsibility
6) Injury	Goat attacks human; makes contact or corners people making egress impossible	All of the above, also consider: <ul style="list-style-type: none"> • Lethal removal 	<ul style="list-style-type: none"> • WIT

WM = Wildlife Management staff, **RE** = Resource Education, **PIO** = Public Information Officer, **LE** = Law Enforcement, **VC** = Volunteer Coordinator, **SI** = Superintendent, **WIT**=Wildlife Incident Team (in OLYM consists of Superintendent or Deputy, Wildlife Biologist, Chief Ranger, and Chief of Resources)

*Previously established acceptable distances between humans and ungulates vary by national park system unit and typically range between 25 and 100 meters. NPS units identify acceptable distances for their respective unit and the species being managed.

APPENDIX C: USDA FOREST SERVICE AQUATIC CONSERVATION STRATEGY

New project National Environmental Policy Act (NEPA) decisions must be consistent with the nine Aquatic Conservation Strategy (ACS) objectives, as described in the 1994 *Northwest Forest Plan Record of Decision* on page B-10 (FS 1994).

The nine ACS objectives are listed below along with how the preferred alternative meets them.

1. *Maintain and restore the distribution, diversity, and complexity of watershed and landscape scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

The action alternatives would not prevent attainment of ACS objective 1. Augmentation of existing mountain goat populations would not affect aquatic systems.

2. *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

The action alternatives do not include activities that would obstruct passage of chemical and physical processes to critical areas for fulfilling life history requirements of aquatic and riparian dependent species. Translocation, lethal removal, or moving goats into the high elevation release sites would not affect spatial or temporal connectivity between watersheds. *The action alternatives would not prevent the attainment of ACS objective #02.*

3. *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Translocation or lethal removal of mountain goats in the Olympic National Forest, or releasing mountain goats, a species native to the North Cascades ecosystem, would not affect the physical integrity of aquatic systems. *The action alternatives would not prevent the attainment of ACS objective #03.*

4. *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Translocation or lethal removal of mountain goats in the Olympic National Forest, or releasing mountain goats, a species native to the North Cascades ecosystem, would not affect the physical integrity of aquatic systems. *The action alternatives would not prevent the attainment of ACS objective #04.*

5. *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate and character of sediment input, storage, and transport.*

Translocation or lethal removal of mountain goats in the Olympic National Forest, or releasing mountain goats, a species native to the North Cascades ecosystem, would not affect the physical integrity of aquatic systems. Local sediment transport processes would not be altered. *The action alternatives would not prevent the attainment of ACS objective #05.*

6. *Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

No management actions in the any of the action alternatives would involve work in water, or required water extraction, therefore *the action alternatives would not prevent attainment of ACS Objective #06.*

7. *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

Activities are not located in areas of floodplain inundation. *The action alternatives would not prevent the attainment of ACS Objective #07.*

8. *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

Translocation or lethal removal of mountain goats in the Olympic National Forest, or releasing mountain goats, a species native to the North Cascades ecosystem, would not adversely affect the composition or structural diversity of plant communities in riparian areas or wetlands. *The action alternatives would not prevent the attainment of ACS objective #08.*

9. *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Translocation or lethal removal of mountain goats in the Olympic National Forest, or releasing mountain goats into high elevation alpine habitat would not adversely affect habitat for riparian-dependent species. *The action alternatives would not prevent the attainment of ACS objective #09.*

REFERENCES

USDA Forest Service (FS)

- 2014 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. April 13, 1994
<https://reo.gov/riec/newroda.pdf>

**APPENDIX D: OLYMPIC, MT. BAKER-SNOQUALMIE, AND
OKANOGAN-WENATCHEE NATIONAL FORESTS FOREST PLAN
STANDARDS AND GUIDELINES**

Olympic National Forest – Forest Plan Standards and Guidelines

This EIS is tiered to the 1990 Olympic Land and Resource Management Plan (forest plan), as amended. Site-specific objectives and guidelines are identified in the plan. The 1990 Forest Plan was amended, in part, by the April 1994 ROD for *Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA Forest Service and USDI Bureau of Land Management 1994). The ROD and associated Standards and Guidelines, provides additional standards and guidelines (USDA Forest Service and USDI Bureau of Land Management, 1994b). These two documents are commonly referred to collectively as the Northwest Forest Plan (NWFP). The 1994 ROD added land allocations that overlay many of the allocations in the 1990 Land and Resource Management Plan. The standards and guidelines it established for these new land allocations supersede management direction in the 1990 Forest Plan unless the 1990 Forest Plan is more restrictive or provides greater benefits to late-successional forest related species. The key elements of the Northwest Forest Plan are a system of Riparian and Late Successional Reserves, the Aquatic Conservation Strategy, and various standards and guidelines affecting each of the land allocations.

Forest-Wide Standards and Guidelines

Goals, Desired Future Condition elements and Standards and Guidelines relevant to the project are listed below.

Recreation

Goals (pg. IV-2)

Provide a range of undeveloped recreation opportunities aimed at maximizing user satisfaction while minimizing user conflicts, overcrowding, and the need for law enforcement intervention.

Desired Future Condition (pg. IV-34)

The Forest's interpretative and educational facilities and programs will have accomplished management goals, and will continue to provide the visitor with the information needed to ensure an enjoyable and safe visit to the Forest. Increasing the visitor's understanding and awareness of natural and cultural resources and their management will continue to be a high priority.

Project Consistency: Consistent with the goal and Desired Future Condition, the proposed purpose and need for the project is to reduce potential public safety issues associated with the presence of mountain goats, along with managing exotic species. Public education is ongoing on this issue.

Wilderness

Goals (pg. IV-3)

1. Manage Wildernesses in accordance with the Wilderness Act of 1964.

Project Consistency: A minimum requirements analysis was conducted to ensure proposed project's consistency with the Wilderness Act of 1964.

Wildlife

Wildlife Habitat

Goals (pg. IV-3)

Emphasize contacts with Olympic Peninsula Indian Tribes and Federal and State agencies to provide for coordinated wildlife habitat management.

Project Consistency: Olympic NP has been conducting Tribal government coordination prior to start of NEPA process; Olympic NF will conduct follow-up consultation with the Peninsula tribes specific to activities on NFS lands.

Wildlife, Fish and Threatened, Endangered, and Sensitive Species

Forest-wide Standards and Guidelines (IV-46)

1. Threatened, Endangered, and Sensitive Species

a. Consultation shall be initiated with the USDI Fish and Wildlife Service whenever an action may affect a Federally-listed threatened or endangered species. Protection of essential habitat for sensitive species should be coordinated with the State.

b. In all areas where threatened, endangered, or sensitive species of plants or animals may occur, surveys shall be performed prior to any major project design. If a threatened, endangered, or sensitive species is found, a biological evaluation shall be performed to determine the effect of the project on the species.

c. Federally listed endangered and threatened species shall be identified, inventoried, and managed in cooperation with the USDI Fish and Wildlife Service. Management of sensitive species should be coordinated with the Washington Department of Wildlife (animals), and Washington Department of Natural Resources (plants).

d. Where management activities or other agents threaten the continued viability of threat-ened, endangered, or sensitive plants, the threatening activity or agent shall be controlled, removed, or terminated.

Project Consistency: Consultation with the USDI Fish and Wildlife Service is currently being completed in compliance with the Endangered Species Act. A review of species within the project areas and potential impacts is listed in the Environmental Consequences chapter of the EIS. The purpose of the project is to remove non-native mountain goats negatively impacting vegetation and wildlife habitat.

Human and Community Development

Standards and Guidelines (LRMP, IV-55)

1. The public, including minorities and the physically challenged, shall be informed of the availability of Forest programs and opportunities.

2. The Forest shall involve American Indians in Forest planning processes.

3. If during the scoping phase for project analyses it is determined that American Indian rights are an issue, the potentially affected tribes should be involved in the project planning process.

4. The Treaty rights and privileges of affected Indian tribes shall be considered and appropriately provided for in all Forest activities. Information about proposed project activities should be shared with tribal groups whose traditional religious practices, sites, or resources may be affected.

Project Consistency: Olympic NP has been conducting Tribal government coordination prior to start of NEPA process; Olympic NF will follow-up consultation with the Peninsula tribes specific to activities on NFS lands.

Relevant Olympic National Forest Plan Land Management Allocations

Proposed project activities include lands within land management allocations listed in the table below. Relevant goals and standards and guidelines are noted below for each management allocation.

Site #	Type	Translocation Patch	Name	Management Allocation	Description of Management Allocation	Ownership	Wilderness
1	Staging	N/A	Hamma Hamma Gravel Pit (NFS Road 2500-011) (<5 acres)	LSR E1	Late Successional Reserve Timber Management	Olympic NF	No
2	Staging	N/A	Mt. Ellinor Trailhead (<5 acres)	LSR E1	Late Successional Reserve Timber Management	Olympic NF	No
3	Staging	N/A	NFS Road 2419014 (opening adjacent to Mt. Ellinor Trailhead) (<5 acres)	LSR E1	Late Successional Reserve Timber Management	Olympic NF	No
4	Capture and Removal	N/A	Buckhorn Wilderness	B1	Wilderness	Olympic NF	Buckhorn Wilderness
5	Capture and Removal	Areas within and adjacent to Buckhorn Wilderness	The Brothers Wilderness	B1	Wilderness	Olympic NF	The Brothers Wilderness
6	Capture and Removal	N/A	Mt. Skokomish Wilderness	B1	Wilderness	Olympic NF	Mt. Skokomish
7	Capture and Removal	N/A	Wonder Mountain Wilderness	B1	Wilderness	Olympic NF	Wonder Mountain
8	Release	N/A	Colonel Bob Wilderness	B1	Wilderness	Olympic NF	Colonel Bob

9	Capture and Removal	N/A	Additional area adjacent to wilderness areas	LSR	Late Successional Reserve	Olympic NF	No
				F1	Municipal Watersheds		
				A4B	River Corridors		
				F2	Riparian Areas		
				J3	Botanical Areas		

B1 - Wilderness

Goals

To preserve and protect in perpetuity the primeval character and influence of the Wilderness. The area's naturalness and opportunities for solitude, challenge, risk, and inspiration will be key features. Opportunities for recreational, scenic, scientific, educational, conservation, and historical uses will be consistent with Wilderness values.

Standards and Guidelines (pg. IV-83-IV-84)

A. Recreation

1. Motorized vehicles, motorized equipment, motorboats, aircraft landings, or other forms of mechanical transport (including mountain bicycles) shall be prohibited except as necessary to meet minimum requirements for the administration of the area for the purpose of the Wilderness Act, including measures required in emergencies involving the health and safety of persons within the area.

C. Wildlife and Fish

4. Wildlife and fish populations should be managed to prevent damage to habitat that affects Wilderness values. Unacceptable changes shall be determined through the LAC process.

Project Consistency: A minimum requirements analysis was conducted to ensure proposed project's consistency with the Wilderness Act of 1964 and these associated Standards and Guidelines.

A1A - Undeveloped Recreation (Non-motorized)

Standards and Guidelines (pg. IV-63)

1. Motorized vehicles should not be permitted except under the following management situations: aerial fish stocking, habitat improvement, trail maintenance, construction, and reconstruction, transporting facilities necessary for public safety and health, and emergency situations involving search and rescue and firefighting.

Project Consistency: The project purpose is to improve habitat conditions and public safety.

Late Successional Reserve

Standards and Guidelines (NWFP ROD, pg. C-17)

Existing developments in Late-Successional Reserves such as campgrounds, recreation residences, ski areas, utility corridors, and electronic sites are considered existing uses with respect to Late-Successional Reserve objectives, and may remain, consistent with other standards and guidelines. Routine maintenance of existing facilities is expected to have less effect on current old-growth conditions than development of new facilities. Maintenance activities may include felling hazard trees along utility rights-of-way, trails, and other developed areas.

Project Consistency: Consistent with this standard and guideline, Mountain goat staging will take place within the existing, developed Hamma Hamma rock pit and will not impact lands outside of the existing development.

Some capture and removal activities may occur on LSR adjacent to wilderness. These actions are not in conflict with LSR standards and guidelines.

Riparian Reserves

Standards and Guidelines (NWFP ROD, pg. B-12)

As a general rule, standards and guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives.

Project Consistency: Some capture and removal activities may occur within Riparian Reserves adjacent to wilderness. These actions are not in conflict with RR standards and guidelines and will not retard or prevent attainment of Aquatic Conservation Strategy objectives.

E1 - Timber Management, F1 – Municipal Watershed, A4B – River Corridors (General and Natural Level), J3 – Botanical Areas

Project Consistency: Some capture and removal activities may occur within parts of these four management allocations adjacent to wilderness. There are no project-relevant standards and guidelines that would apply for these allocations. Therefore, the project activities would not conflict with the goals, desired future conditions, or standards and guidelines for these allocations.

F2 – Riparian Areas

Project Consistency: See Project Consistency with Riparian Reserve management allocation above.

Wild and Scenic Rivers

Mt. Baker-Snoqualmie National Forest – Forest Plan Standards and Guidelines

Forest-Wide Standards and Guidelines

Wild and Scenic Rivers

- Recommended wild and scenic rivers shall be managed to protect those characteristics that contribute to the eligibility of these rivers at their highest potential classification until Congress formally determines their status. Mt. Baker-Snoqualmie National Forest Plan at 4-95.

Wilderness

- Administration
 - All administrative activity shall be conducted to minimize impacts on the social and biological resource. Mt. Baker-Snoqualmie National Forest Plan at 4-107.
 - Coordination should be maintained with all state, county, and federal agencies as well as private landowners that use, or influence use of the wilderness, to promote understanding of the purposes of wilderness. Mt. Baker-Snoqualmie National Forest Plan at 4-107.
- Vegetation:
 - Non-native plant species should not be introduced. Mt. Baker-Snoqualmie National Forest Plan at 4-108.
- Fish and Wildlife:
 - The Forest Service should continue to work closely with the Washington Departments of Wildlife and Fisheries in all aspects of fish and wildlife management. Forest recommendations will be predicated on need for protection and maintenance of the wilderness resource, including fish and wildlife and their respective habitats. Mt. Baker-Snoqualmie National Forest Plan at 4-111.
 - Native species shall be maintained, with special emphasis on the preservation of threatened or endangered species, plus designated management indicator species and their habitats. Fish or wildlife indigenous to an area, maybe re-established if previously eliminated by the influence of man. Mt. Baker-Snoqualmie National Forest Plan at 4-112.
- Aircraft: The landing of aircraft within the wilderness is prohibited. Air dropping supplies is also prohibited. Exceptions may be granted for emergencies, significant administrative purposes, and fish stocking. Mt. Baker-Snoqualmie National Forest Plan at 4-116.

Wildlife Habitat Management

- Introduction of fish and wildlife species shall be carefully coordinated with the various State and Federal wildlife agencies and considered on a case-by-case basis through NEPA analysis. Mt. Baker-Snoqualmie National Forest Plan at 4-124.
- Activities that adversely affect mountain goats on their spring and summer range shall be identified and mitigated.

Land Uses

- Special use evaluation, permit issuance, fees and administration will be in accordance with Forest Service Manual 2700 or as revised, and 36 CFR 251. Mt. Baker-Snoqualmie National Forest Plan at 4-137.

Okanogan National Forest – Forest Plan Standards and Guidelines

North Cascades Scenic Highway, Management Area 07

Forest Wide Standards and Guidelines

6-8 Manage disturbing activities so they occur outside of critical periods to protect wildlife. Olympic National Forest at 4-35.

8-4 Potential conflicts between recreation users shall be considered in project planning. Users should be involved in creating solutions. 8-15 Seasonal trail closures may be used for safety, resource protection, and to meet Management Area goals. Olympic National Forest at 4-38.

12-3 Emphasis on noxious weed control shall be on the prevention of infestations especially into unroaded and wilderness. Olympic National Forest at 4-45.

Wenatchee National Forest – Forest Plan Standards and Guidelines

Wilderness

Standards and Guidelines

Trampled area of vegetation with season recovery should not exceed 400 square feet. Wenatchee Forest Plan at IV-69

No noticeable modification of natural plan succession due to stock grazing or human activity. Wenatchee Forest Plan at IV-69.

Posting of information and regulations regarding this class will be located at trail heads. Wenatchee Forest Plan at IV-70.

Wildlife and Fisheries

Standards and Guidelines

- Coordinate and cooperate with the Washington Department of Wildlife in relocation of animals. Add additional animals where habitat is under-utilized and remove animals where habitat is over utilized. Wenatchee Forest Plan at IV-81.

Alpine Lakes Management Plan

The 1981 Alpine Lakes Management Plan Final Environmental Impact Statement.

Relevant Management Direction

Recreation

- The landing of aircraft within the wilderness is prohibited. Air dropping supplies is also prohibited. Exceptions may be granted for administrative purposes and fish stocking. ALMP/FEIS at 162.

Fish and Wildlife

- The Forest Service will continue to work closely with the Washington Department of Game in all aspects of fish and wildlife management. Forest recommendations will be predicated on need for protection and maintenance of the Wilderness resource, including fish and wildlife and their respective habitats. Hunting, fishing and trapping will be permitted in accordance with State law under the same restrictions as other recreation use of the Wilderness. ALMP/FEIS at 163.
- Native animal species will be maintained, with special emphasis on the preservation of threatened or endangered species and their habitats. Wildlife may be reestablished in the area if eliminated by the influence of man. ALMP/FEIS at 163.

This plan/EIS is tiered to the final environmental impact statements for the 1990 *Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan*, as amended, the 1989 *Okanogan National Forest Land and Resource Management Plan* as amended, and the 1990 *Wenatchee National Forest Land and Resource Management Plan* as amended. Site-specific objectives and guidelines are identified in the plan. Forest plan management allocations and accompanying standards and guidelines provide the direction for the proposed action. Table 1 identifies the management allocations associated with the mountain goat translocation alternatives (staging and release), land ownership, and whether or not the actions are in wilderness. Two sites (one staging and one release) managed by the Seattle Public Utility District (PUD) are also included in this table for information, but are not guided by Forest Plan direction.

TABLE 1. MANAGEMENT ALLOCATIONS

Name	Management Allocation	Description of Management Allocation	Ownership	Wilderness
Release Sites				
Tower Mountain	34	Administratively withdrawn, Management Area 07 North Cascades Scenic Highway Corridor	OWNF (Okanogan NF LRMP)	No
Chikamin	WI	Wilderness	OWNF (Wenatchee NF LRMP)	Alpine Lakes
Kaleetan	10C	Wilderness - General Trailless	MBSNF	Alpine Lakes
Preacher Mountain	28DRLSR	28/Late Successional Reserve	MBSNF	Alpine Lakes
Upper White Chuck Basin	10D	Wilderness - Dedicated Trailless	MBSNF	Glacier Peak
Buckindy	10D	Wilderness -Dedicated Trailless	MBSNF	Glacier Peak
Snowking Meadow	10C	Wilderness - General Trailless/Late Successional Reserve	MBSNF	Glacier Peak
Cadet Lake Ridge	10C	Wilderness - General Trailless	MBSNF	Henry M. Jackson
Mt. Stillaguamish	1BLSR	Semi-Primitive Nonmotorized/Late Successional Reserve	MBSNF	No
Mt. Index	1B	Semi-Primitive Nonmotorized	MBSNF	No
Vesper Sperry	22B	Sultan River Municipal Watershed	DNR/MBSNF	No
Goat Meadow	N/A	N/A	Seattle Public Utilities	No

Name	Management Allocation	Description of Management Allocation	Ownership	Wilderness
Staging Areas				
Swamp Creek	34	Administratively withdrawn, Management Area 07 North Cascades Scenic Highway Corridor	OWNF (Okanogan NF LRMP)	No
Alpental parking area	27D	Alpine Lakes Management Area - Developed Site	MBSNF/private	No
Forest Road 49	LSR	Late Successional Reserve	MBSNF	No
Independence Lake Trailhead	LSR	Late Successional Reserve	MBSNF	No
CERCLA site	LSR	Late Successional Reserve	MBSNF	No
Proctor Creek	N/A	N/A	Private	No
Green Mountain Pasture	6	Skagit Wild and Scenic River	MBSNF	No
Irene Creek Rock Pit	LSR	Late Successional Reserve	MBSNF	No
150 pit	N/A	N/A	Seattle Public Utilities	No

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980

DNR = Department of Natural Resources

LRMP = Land and Resource Management Plan

MBSNF = Mt. Baker-Snoqualmie National Forest

OWNF = Okanogan-Wenatchee National Forest

APPENDIX E: OLYMPIC NATIONAL PARK MINIMUM REQUIREMENTS ANALYSIS

<p style="text-align: center;">Olympic National Park</p> <p style="text-align: center;">Wilderness Project Proposal Form and Minimum Requirements Worksheet</p>	
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PART ONE: Wilderness Project Proposal Information	
Project Originator(s):	Christina Miller
Division:	Superintendent's (Planning and Compliance Office)
MRW Preparer:	Christina Miller
Date:	December 14, 2016 (Revised March 6, 2017; and March 2, 2018)
PEPC #:	49246
What is the <u>issue</u> or <u>problem</u> to be solved?	<p>The presence of exotic mountain goats in Olympic National Park (the park), including the Daniel J. Evans Wilderness, has resulted in impacts to park and wilderness resources, visitors' wilderness experience, and potential safety issues for visitors.</p>
What is the underlying need for the project?	<p>Mountain goats are not native to the Olympic Peninsula. They were introduced to the Olympic Mountains prior to the formation of the park, and have since colonized the entire range, with the majority of the population residing within the park (Noss et al. 2000) and almost all the population within the park's Daniel J. Evans Wilderness. The original need to manage this exotic species was driven by ecological concerns related to the impacts that mountain goats impose on natural resources at the park, particularly sensitive vegetation communities (NPS 1995; Houston, Schreiner, and Moorhead 1994). New concerns were raised in 2010 when a visitor was fatally gored by a mountain goat while hiking on a park trail. Mountain goats have a high affinity for salts and natural sources of salt within their native range. There are no natural sources of salt in the Olympic Mountains and mountain goats have learned to seek salts from humans. In high visitor use areas within the park, mountain goats have become habituated to the point that they are a nuisance and may be hazardous to park visitors. The Olympic National Park Nuisance and Hazardous Animal Management Plan includes the <i>Mountain Goat Action Plan</i>, which addresses mountain goat behavior and seeks to minimize the potential for hazardous goat-human encounters. This action plan focuses mainly on the management of individual mountain goats which have been identified as potentially hazardous. Additional planning and compliance is needed to address overall management of the mountain goat population within the park.</p> <p>As a result of the above stated concerns, and based on National Park Service (NPS) policy, the Olympic National Park Mountain Goat Management Plan/Environmental Impact Statement (plan/EIS) has</p>

	been developed with a range of alternatives to address the impacts of exotic mountain goats in the park, which includes the interference with natural processes, native species, natural habitats, wilderness character, and impacts to visitor safety.
Location (attach map and/or photos):	See figures 1 and 2 in the plan/EIS.
Is resolution of this issue addressed in an approved NEPA document: Categorical Exclusion (CE); Environmental Assessment, Finding of No Significant Impact (FONSI); or Environmental Impact Statement, Record of Decision (ROD)? If so, please name:	The resolution of this issue is currently being addressed in the Olympic National Park Mountain Goat Management Plan/Draft Environmental Impact Statement (plan/EIS) that this MRA is an appendix to. Desired conditions for ecosystem management, exotic species, and wilderness in relation to the management of nonnative species were addressed in the 2008 General Management Plan/Final Environmental Impact Statement (GMP) and subsequent Record of Decision (ROD) and were vetted with the public at that time. See GMP pages 21, 29, 31-32; ROD pages 9-13. The GMP notes that several program management plans would follow to include wildlife management plans and/or recovery plans, to examine the future management direction for wildlife (including extirpated species), fish, exotic species (plant and animal), and nuisance animals within the park (page 153).
What would happen if the need were not met? (NO ACTION)	If actions are not taken to address the wilderness resource, visitor experience impacts, and potential safety issues to wilderness visitors due to the presence of exotic mountain goats, the mountain goats would continue to adversely affect the natural quality of wilderness character. The mountain goats would also continue to adversely affect opportunities for solitude or a primitive and unconfined type of recreation (through incessantly seeking salts from humans and actions taken to haze or remove nuisance goats) and also the undeveloped quality of wilderness character (through the use of helicopters or the use of guns or other Wilderness Act 4(c) prohibited uses/means to capture or lethally remove nuisance mountain goats). The untrammelled quality of wilderness character would be adversely impacted through continued hazing and collaring operations.

Wilderness Minimum Requirement Analysis (MRA)
STEP ONE: Determine if action is necessary or appropriate

1	Is the resolution of this issue covered by an existing Wilderness Plan or other NEPA decision document that includes wilderness minimum requirement considerations?	Answer: Yes____ No __X__
Yes ↓	No ↓	If "Yes" provide name of document and approval date:
Implement action as approved	Continue PPF/MRA	

2	Has Superintendent determined this is an emergency in accordance with law & policy?	Answer: Yes _____ No <u> X </u>
No 		Yes, Follow approved emergency SOPs/management plans. If they do not exist or have not gone through MRA, continue MRA.
3	List guidance provided in law and policy for resolution of the issue	See Management Policies Chapter 6, Director's Order #41 and other applicable laws, policies and directives. Add additional policy guidance as appropriate.

WILDERNESS MINIMUM REQUIREMENT

Wilderness Act of 1964 – Section 2(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as “wilderness areas”, and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness; and no Federal lands shall be designated as “wilderness areas” except as provided for in this Act or by a subsequent Act.

Wilderness Act of 1964 - Prohibition Of Certain Uses Section 4(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

NPS Management Policies 2006, § 6.3.5 Minimum Requirement

All management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative actions, projects, or programs undertaken by the Service or its agents and affecting wilderness character, resources, or the visitor experience are necessary, and if so how to minimize impacts. The minimum requirement concept will be applied as a two-step process that determines whether the proposed management action is appropriate or necessary for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character, in accordance with the Wilderness Act; and the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized.

In accordance with this policy, superintendents will apply the minimum requirement concept in the context of wilderness stewardship planning, as well as to all other administrative practices, proposed special uses, scientific activities, and equipment use in wilderness. The only exception to the minimum requirement policy is for eligible areas that the Service has not proposed for wilderness designation. However, those lands will still be managed to preserve their eligibility.

When determining minimum requirements, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable.

Although park managers have flexibility in identifying the method used to determine minimum requirement, the method used must clearly weigh the benefits and impacts of the proposal, document the decision-

making process, and be supported by an appropriate environmental compliance document. Parks must develop a process to determine minimum requirement until the plan is finally approved. Parks will complete a minimum requirement analysis on those administrative practices and equipment uses that have the potential to impact wilderness resources or values. The minimum requirement concept cannot be used to rationalize permanent roads or inappropriate or unlawful uses in wilderness.

Administrative use of motorized equipment or mechanical transport will be authorized only

- if determined by the superintendent to be the minimum requirement needed by management to achieve the purposes of the area, including the preservation of wilderness character and values, in accordance with the Wilderness Act; or
- in emergency situations (for example, search and rescue, homeland security, law enforcement) involving the health or safety of persons actually within the area.

Such management activities will also be conducted in accordance with all applicable regulations, policies, and guidelines and, where practicable, will be scheduled to avoid creating adverse resource impacts or conflicts with visitor use.

While actions taken to address search and rescue, homeland security and law enforcement issues are subject to the minimum requirement concept, preplanning or programmatic planning should be undertaken whenever possible to facilitate a fast and effective response and reduce paperwork.

For more detailed guidance, see Director's Order #41 and the National Wilderness Steering Committee Guidance Paper #3: "What Constitutes the Minimum Requirements in Wilderness?"

ADDITIONAL POLICY GUIDANCE AS APPROPRIATE

NPS Organic Act of 1916 – The Organic Act of 1916 is the legislation that established the National Park Service. It states, "The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purposes of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

NPS Management Policies 2006, § 4.1.5 Restoration of Natural Systems – The Service will reestablish natural functions and processes in parks unless otherwise directed by Congress. Impacts on natural systems resulting from human disturbances include the introduction of exotic species...and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological community structure and function. Efforts may include, for example...removal of exotic species.

NPS Management Policies 2006, § 4.4.4.2 Removal of Exotic Species Already Present – All exotic plant and animal species that are not maintained to meet an identified park purpose will be managed – up to and including eradications – if (1) control is prudent and feasible, and (2) the exotic species

- interferes with natural processes and the perpetuation of natural features, native species or natural habitats, or
- disrupts the genetic integrity of native species, or
- disrupts the accurate presentation of a cultural landscape, or
- damages cultural resources, or
- significantly hampers the management of park or adjacent lands, or
- poses a public health hazard as advised by the U.S. Public Health Service (which includes the Centers for Disease Control and the NPS public health program), or
- creates a hazard to public safety.

NPS Management Policies 2006, § 6.3.7 – Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and influences originating outside of

wilderness boundaries. Management actions, including the restoration of extirpated native species, the alteration of natural fire regimes, the control of invasive alien species, the management of endangered species, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals.

Executive Order 13112, “Invasive Species” – The NPS is required to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

4	Is resolution of this issue necessary or appropriate to meet wilderness management objectives or the requirements of other laws, policies and directives?	Answer: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<p style="text-align: center;">Yes No</p> <p style="text-align: center;">↓ ↓</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">Carry out visitor education</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Do not proceed with action</div> </div>		<p>Explain:</p> <p>Please see Section 3 above in regard to the Wilderness Act and additional policy guidance. It was determined that action in wilderness is necessary for the administration of the area as wilderness specifically for the preservation of wilderness character. In particular, this action would lead to the long-term enhancement of the four universal qualities of wilderness character (untrammled, natural, undeveloped, and opportunities for solitude and primitive or unconfined recreation).</p>
5	Can the issue be resolved through visitor education?	Answer: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<p style="text-align: center;">Yes No</p> <p style="text-align: center;">↓ ↓</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">Carry out visitor education</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Do not proceed with action</div> </div>		<p>Explain:</p> <p>Visitor education has been an important part of the Mountain Goat Management Plan implementation. Park staff has provided information and warnings regarding hiking safely with mountain goats, and education to the public through interpretive programs and visitor interactions regarding the management of mountain goats in the park. Interpretation has also included efforts to increase the public's awareness of the current mountain goat situation within the park and on the Olympic Peninsula, as well as associated management activities. Visitor education alone however has not and would not resolve the impacts of the exotic mountain goats on wilderness resources, the visitors' wilderness experience and potential safety issues.</p> <p>The population of exotic mountain goats that currently exists within the park is estimated to be 625 individuals. Visitors are currently asked to assist in hazing activities if/when mountain goats are within range of visitors. Hazing activities (e.g., shouting, throwing rocks, etc.) are merely an attempt to create a negative association/fear of humans by mountain goats in an effort to encourage goats to refrain from approaching humans. Hazing activities, however, do not eliminate the impacts of exotic mountain goats on the park's wilderness.</p>
6	Can the issue be resolved through actions outside of wilderness?	Answer: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Yes ↓ Conduct actions outside wilderness	No ↓	Explain: The exotic mountain goats reside within the Daniel J. Evans Wilderness as well as within adjacent U.S. Forest Service (USDA Forest Service) wilderness areas: Buckhorn, The Brothers, and Mount Skokomish. Therefore, actions must take place within wilderness to resolve the issue. However, all the alternatives in the plan/EIS, to the greatest extent practicable, consider and incorporate actions outside of wilderness or measures to reduce the amount and type of actions that must take place within wilderness in order to reduce impacts on wilderness character from plan implementation.
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I have reviewed this project proposal and have determined that it meets the overall goals of Olympic National Park and can be included in my divisional work plan. I have designated a project coordinator below to represent my division and present the proposal to the Compliance Council.

Project Manager:	<i>Christina Miller</i>	
Division Chief Signature:	<i>[Signature]</i>	Date: <i>3/8/18</i>

Next step:
Contact the Planning & Compliance Office to schedule the issue for discussion by the Olympic National Park Compliance Council.

I have reviewed this project proposal and have determined that the proposed management action is appropriate or necessary for administration of the park, if in wilderness it is appropriate and necessary for the administration of the area as wilderness, in accordance with the Wilderness Act. I recommend that alternatives be developed to ensure that actions taken would not cause a significant impact to wilderness resources or character, and to develop techniques and types of equipment needed to ensure that impacts on park resources and values, and wilderness resources and character are avoided or minimized. Complete Part Two (next page).

Deputy Superintendent:	<i>[Signature]</i>	Date: <i>3/8/18</i>
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PART TWO: Evaluate Alternatives, as appropriate determine the minimum tools, techniques and actions that would effectively resolve the issue while avoiding or minimizing adverse effects.

8 Describe in detail alternative ways to resolve the issue (include use of minimum tools as appropriate)	Questions to answer for each alternative: <ul style="list-style-type: none"> • What is proposed? • Does the proposed action involve new construction or repair/rehab to existing structures/utilities/assets? • Does the project take place in the same location/footprint/trench used before, or in a previously undisturbed area? • Would the project involve ground disturbance (cut or fill)? If so, how many cubic yards and where will materials be deposited (both temporarily and permanently)? If fill materials are taken, identify the specific site fill taken from and if the materials are native to the park. How would fill be "stored"? • How much excavation would be necessary (quantify by width, length, depth, cubic feet, number or lines, etc.)
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	<ul style="list-style-type: none"> • Would the proposal involve work in or near a known archeological site or other historic property? • Would a staging area be required? If so, identify staging area(s), include map, what type of materials and/or equipment and for how long? What would be the estimated square footage of the staging area? • How/where would construction debris be disposed of? • How much surface area would be disturbed, cleared, or denuded of vegetation (quantify by square footage, # of trees removed, etc.) • Would the project involve any geologic or hydrologic features/alter stream courses, surface or ground water flow? • Would the proposal involve structures, fill, or discharge into water (example: bridge crossing, boardwalk, gravel, culverts, etc.)? • Would the proposal affect water quality or quantity? • What changes would occur in land/facility use? • What changes would occur to traffic flow or visitor circulation? • Would the proposal require aerial operations? • Would the proposal alter visitor services, activities, or experiences? • Where would the action take place? • When would the action take place? • What design and standards would apply? • What methods, tools and techniques would be used? • How long would it take to complete the action? • What mitigation would be taken to minimize action impacts on park resources and values, and wilderness resources and character (where applicable)?
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Alternative A: No Action	
<ul style="list-style-type: none"> • What is proposed? <ul style="list-style-type: none"> ○ Under the no action alternative, options for the management of mountain goats in the park would be limited to those actions outlined in the <i>Mountain Goat Action Plan</i> which was revised by an NPS workgroup in 2015. The goal of the action plan is “that mountain goats in the park exhibit natural behaviors consistent with other portions of their range, to not have those natural behaviors altered by human use of their habitats (i.e., become habituated or conditioned), and to minimize the potential for hazardous mountain goat-human encounters.” Unacceptable mountain goat behaviors include the following: failing to retreat when coming in sight of people; allowing people to approach within 150 feet; approaching and following people on trails or at camp or rest sites; aggressively seeking out areas where humans urinate and consuming soil and vegetation where human urine is deposited; making contact with clothing or equipment, chewing gear, seeking salt; displaying aggressive postures or behavior to people when encountered on or off trail; attacking and making contact with humans. ○ Management under the <i>Mountain Goat Action Plan</i>, and therefore under alternative A, would be an integrated effort between all park divisions with an emphasis on preventing unacceptable mountain goat behavior. Management according to the action plan is set up according to the continuum of mountain goat-human interactions and the appropriate park response. ○ The management actions include the following, listed in order of increasing intensity, based on an increasing (worsening) classification of goat behavior (i.e., as goats become more habituated or aggressive): <ul style="list-style-type: none"> ▪ Providing informational material to visitors. 	

- Posting regulatory signs (no feeding, minimum distance, advice on urine deposits, etc.). These signs would be posted at trailheads and bulletin boards. Very few would be in the wilderness. Signs would be posted in wilderness when goat behavior reaches level 2 (aggressive), which is a higher level regulatory warning for visitors in regard to goat behavior. Signs are not posted in wilderness when they are providing just general advisory information. If signs are posted in wilderness they would be placed on either established bulletin boards or existing trail signs, no new holes would be dug. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary.
 - Recording observations on daily logs and turn in to the wildlife manager when the page is full or at the end of the season.
 - Filling out goat incident forms and turning them in to the district ranger and wildlife manager.
 - Informing the Wildlife Incident Team of developing situations.
 - Hazing goats in the area(s) that are exhibiting habituated behavior. Recording hazing actions and goat responses. Hazing actions include, but are not limited to; yelling, throwing rocks, banging hiking sticks, hitting habituated animals with projectiles propelled via slingshot and paint ball gun (CO2 charges) and rubber slugs and bean bag rounds propelled by a shot gun.
 - Increasing staff patrols in the area(s), marking animals with paint balls; hazing goats exhibiting unacceptable behavior during regular patrols.
 - Increasing outreach to visitors about habituated and conditioned goats.
 - Evaluating the need for area closure(s) and implementing the closure(s) if needed.
 - Dedicating trained staff to implement hazing for several days, and marking goats encountered and target hazing on goats exhibiting unacceptable behavior during regular patrols.
 - Continuing more intensive patrols when the trail is opened to assess goat response to hazing.
 - Contacting park dispatch and inform Wildlife Incident Team of incident.
 - Closing trails for longer durations.
 - Marking goats in the area, consider the use of permanent marks (ear tag or radio collar).
 - Patrolling closed trail(s) for several days to assess efficacy of aversive conditioning (not in uniform).
 - Consider lethal removal.
 - Conduct lethal removal.
- Management elements that could be employed under alternative A are as follows:
 - **Interpretive Tools** - Park staff would continue to provide information and warnings regarding hiking safely with mountain goats, and educational opportunities to the public through interpretive programs and visitor interactions regarding the management of mountain goats in the park. Interpretation would include efforts to increase the public's awareness of the current mountain goat situation within the park and on the Olympic Peninsula, as well as associated management activities.
 - **Nuisance Control** - In the *Mountain Goat Action Plan*, aversive conditioning consists of immediate and short-term hazing activities intended to modify mountain goat behavior and to drive mountain goats away from visitor use areas. Under the no-action alternative, nuisance control tools would vary from hazing actions, such as shouting and throwing rocks at mountain goats, to lethal removal (by shooting) as described above under management actions.
 - **Access** - Park staff would primarily access mountain goat management areas on foot. Management activities under the no-action alternative would take place primarily in high visitor use areas that are accessed via hiking, but could also occur in more remote areas utilizing helicopters as needed to complete necessary management actions such as in emergency response (i.e., response to an attack by a goat – get staff in there quickly; haul out.) Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given that mountain goat removal would generally need to take place in alpine habitats. The alpine environment of the Olympics where goats reside during the summer is remote and rugged terrain,

making goat management activities without a helicopter challenging to impossible and posing safety risks to personnel.

- **Park Closures** - It would occasionally be necessary to close *areas of the park including areas within the wilderness for hazing activities associated with the no-action alternative. Often when hazing, park staff work to involve park visitors in the process of shouting and throwing rocks at the mountain goats. If it is determined that lethal removal actions are required for a habituated mountain goat, then that particular *area of the park would be temporarily closed for the duration of the process. Closures for management may last from a few hours to a few weeks. *Area is going to vary based on how well we understand just where the goat or goats in question are roaming, and where the interactions may occur. It can be as small as on top of Victor Pass (as was the case in the 2010 fatality), to the upper Royal Basin (as was the case in 2011) to the whole Seven Lakes Basin if we have an attack by an unmarked goat in that area.
 - **Firearms (Lethal Removal)** - Under the no-action alternative, there would be the potential for lethal removal of mountain goats. This would involve using firearms such as high-powered rifles for the removal of mountain goats that have exhibited habitual aggressive behavior or have presented a clear threat to human safety. As necessary, park staff would be involved with lethal removal activities, including the field activities directly related to the reduction efforts (assisting with enforcing temporary closures of management area, patrolling, shooting, carcass handling). Contracted sharpshooters or designated hunters (e.g. volunteers who have gone through training and are approved by the NPS) would also likely be involved with lethal removal activities. Each individual's role would be identified prior to reduction and could include any of the actions noted above. The process for identifying mountain goats for lethal removal is described above under management actions. Specific protocols for lethal removal under the no-action alternative are described in the *Mountain Goat Action Plan*. Carcasses may be left in place or hauled out via helicopter for necropsy.
 - Under this alternative there would be periodic (every 5 years) helicopter-based surveys to track goat abundance, population trends, and distribution. Flights would occur over 6-7 days, 4-5 hours a day.
- **Does the proposed action involve new construction or repair/rehab to existing structures/utilities/assets?**
 - No
- **Does the project take place in the same location/footprint/trench used before, or in a previously undisturbed area?**
 - Hazing and marking would continue to occur throughout the mountain goat range.
 - If the management action leads to lethal removal, this could occur in or outside of previously disturbed areas. This could entail the use of helicopter for sharpshooting and the on-the-ground removal (moving the goat carcass to an area outside of immediate public sight (>100m and out of sight) – some areas may be visible but unsafe to access; or on-the-ground operations to assist with removal by helicopter).
 - The action(s) would take place in same footprint as all prior mountain goat management actions, which is potentially the entirety of mountain goat range.
- **Would the project involve ground disturbance (cut or fill)? If so, how many cubic yards and where will materials be deposited (both temporarily and permanently)? If fill materials are taken, identify the specific site fill taken from and if the materials are native to the park. How would fill be “stored”?**
 - This project does not involve cut or fill ground disturbance. The signs would not be on new posts, and therefore no holes would be dug. Signs would be placed on either established bulletin boards or existing trail signs.
 - There could be limited or no ground disturbance associated with park actions. The ground disturbance would be in the form of duff removal through moving goats out of visibility of visitors (i.e., off trails, away from campsites, etc.).
- **How much excavation would be necessary (quantify by width, length, depth, cubic feet, number or lines, etc.)**
 - None
- **Would the proposal involve work in or near a known archeological site or other historic property?**

- Exotic mountain goat management activities could occur in or near known archeological sites or other historic properties. Also, under this alternative, the expanding goat population would continue to wallow in potential archeological sites.
- **Would a staging area be required? If so, identify staging area(s), include map, what type of materials and/or equipment and for how long? What would be the estimated square footage of the staging area?**
 - Staging areas would be located outside of wilderness and likely be identified in existing visitor parking areas (such as Hurricane Hill and Deer Park as identified in the plan/EIS for the preferred alternative) or in Sweets Field (where there's currently a designated helicopter landing area outside of wilderness in the Elwha Valley).
- **How/where would construction debris be disposed of?**
 - N/A
- **How much surface area would be disturbed, cleared, or denuded of vegetation (quantify by square footage, # of trees removed, etc.)**
 - None to very little if there's a need to move (by dragging) a lethally removed goat out of sight of visitors/out of high use areas. The disturbance to vegetated areas would consist of damage from trampling by staff as well as by goats. Vegetation would be denuded by goat herbivory and wallowing behavior.
- **Would the project involve any geologic or hydrologic features/alter stream courses, surface or ground water flow?**
 - No
- **Would the proposal involve structures, fill, or discharge into water (example: bridge crossing, boardwalk, gravel, culverts, etc.)?**
 - No
- **Would the proposal affect water quality or quantity?**
 - No
- **What changes would occur in land/facility use?**
 - None
- **What changes would occur to traffic flow or visitor circulation?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use, and parking areas (including some trailhead parking areas) utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Would the proposal require aerial operations?**
 - A helicopter may be needed to facilitate lethal removal of a nuisance or hazardous goat when/where access by foot is not reasonably possible (i.e., sites accessible by trail or non-technical cross-country travel: without the use of crampons, ice axes, rope or other specialized equipment). If it is determined that a necropsy is necessary on a lethally removed goat, then a helicopter may be utilized to facilitate the physical removal of the goat carcass from the backcountry/wilderness to the frontcountry to conduct the procedure. Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given that mountain goat removal would generally need to take place in alpine habitats. The alpine environment of the Olympics where goats reside during the summer is remote and rugged terrain, making goat management activities without a helicopter challenging to impossible and posing safety risks to personnel. Helicopters would also be needed to conduct aerial surveys, emergency response to an attack by a goat, and carcass removal for necropsy. They also may be necessary to assist with on-the-ground removal (moving goat carcasses >100m from visitor use areas).
- **Would the proposal alter visitor services, activities, or experiences?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use, and some trailhead parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Where would the action take place?**
 - Wherever there are human-goat encounters occurring – both in wilderness and frontcountry areas.
- **When would the action take place?**

- The timing of management actions would be based on the need for action, but would likely occur primarily during times of high visitor use within the park when there is greater potential for mountain goat-human interactions.
- **What design and standards would apply?**
 - Helicopter safety, which would be developed in a Helicopter Safety Plan. Staff and visitor safety protocols would also be applied.
- **What methods, tools, and techniques would be used?**
 - See the Wilderness 4(c) Prohibitions Worksheet for alternative A below.
 - Signs, hazing, staff patrols, area/trail closures, paintball marking of goats, firearms to lethally remove goats, and a helicopter to remove goats requiring necropsy.
- **How long would it take to complete the action?**
 - The frequency of management actions would vary depending on the level of mountain goat-human interactions observed at a given time within the park. If mountain goat-human interactions are occurring often, then the frequency of management activities would increase. The short-term duration of management activities would vary depending on mountain goat responses to management activities. If management activities are effective, then the duration may last long enough to only haze the mountain goat(s) out of an area. If mountain goats are not responsive to management activities, then the duration could increase to longer than one week or would occur sporadically throughout the spring and summer as mountain goats change their seasonal areas of concentrated use. The long-term duration of management activities would continue indefinitely into the future and would likely increase because the mountain goat population within the park would continue to increase.
- **What mitigation would be taken to minimize action impacts on park resources and values, and wilderness resources and character (where applicable)?**
 - Research and monitoring activities would continue opportunistically according to current park operations and based on available funding. Park staff would continue to collect information on the population of mountain goats in the park including topics such as goat population levels and visitor interactions. Aerial monitoring every 5 years and goat collaring would continue as funding allows.
 - Project staff would access the wilderness area by foot or pack stock, where reasonably possible without risking life or limb, to conduct lethal removal (i.e., sites accessible by trail or non-technical cross-country travel (e.g. without the use of crampons, ice axes, rope or other specialized equipment). Otherwise, lethal removal would be conducted through the use of helicopters (see aerial operations above).
 - Public notification of activities affecting wilderness would be provided, and appropriate information would be distributed at visitor centers.
 - Duration and geographic scope of actions and disturbances would be minimized in the wilderness area.
 - Any 4(c) prohibited tool used would be the minimum requirement necessary for administering wilderness, and all other tools would be the ones that cause the least amount of disturbance to wilderness while successfully resolving the issue.
 - “Leave No Trace” principles would be applied to all management actions.
 - Helicopter operations would not be conducted within a minimum of 500 feet from marbled murrelet and northern spotted owl habitat.
 - Helicopter flight paths to and from staging areas would be designed to minimize noise impacts to wildlife and visitors to the greatest extent practicable.
 - Area closures in the immediate vicinity of mountain goat hazing and lethal removal operations would minimize noise impacts to wilderness visitors.
 - Previously agreed upon travel corridors and flight altitudes for helicopters during lethal removal, census, hazing, or other goat management operations would be used.
 - Contractors and other project workers would properly store and dispose of food and garbage while working on site.
 - Staging areas would be located in areas that are previously disturbed and outside of wilderness, and would necessitate the least amount of affect to wildlife and wildlife habitat.
 - Lead-free ammunition would be used for lethal removal activities to prevent contamination.
 - Project staff would be properly trained regarding adherence to safety protocols identified in the Olympic National Park *Mountain Goat Action Plan*.

ALTERNATIVE A: No Action	
4(c) QUESTION	4(c) EXPLANATION
What 4(c) prohibition(s) is (are) being proposed for use?	<ul style="list-style-type: none"> • Helicopters • Signs • Collars and Tags
What is the 4(c) being proposed to be used for?	<ul style="list-style-type: none"> • Helicopters: Lethal removal of nuisance or hazardous goats, emergency response to an attack by a goat, assist with on-the-ground removal (move goat carcasses >100m from visitor use areas), carcass removal for necropsy, hazing, conducting aerial goat surveys, and other goat management actions as noted in the alternative description above. • Signs: To provide visitors with regulatory warnings regarding nuisance or hazardous goats • Collars and Tags: Would be utilized to monitor and track nuisance goats.
Why won't a non-4(c) use be successful?	<ul style="list-style-type: none"> • Helicopters: Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given that mountain goat removal would generally need to take place in alpine habitats. The alpine environment of the Olympics where goats reside during the summer is remote and rugged terrain, making goat management activities without a helicopter challenging to impossible and posing safety risks to personnel. Under this alternative there would be periodic (every 5 years) helicopter-based surveys to track goat abundance, population trends, and distribution; survey flights would occur over 6-7 days, 4-5 hours a day. • Signs: Signs would be posted in wilderness when goat behavior reaches level 2 (aggressive), which is a higher level regulatory warning for visitors in regard to goat behavior. Signs would not be posted in wilderness when they provide just general advisory information. If signs are posted in wilderness they would be placed on either established bulletin boards or existing trail signs, no new holes would be dug. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary. • Collars and Tags: There are no non-4(c) methods available to effectively and safely track and monitor nuisance or hazardous goats.
How does this alternative reduce use of 4(c) compared to other alternatives?	Under this alternative there would be much less helicopter use as there wouldn't be any capture and translocation activities occurring. There could still be some lethal removal operations but those activities would be limited to only hazardous goats, which is generally a rare and random occurrence.
How will use of the 4(c) be mitigated?	Staff would fly to lethally remove a hazardous goat if it is absolutely necessary, otherwise travel to the removal site would occur by foot unless a necropsy is determined necessary.

Alternative B: Capture and Translocation Only
<ul style="list-style-type: none"> • What is proposed? <ul style="list-style-type: none"> ○ Alternative B would utilize only capture and translocation tools to reduce (to the point capture is no longer safe or feasible) mountain goats from the park including the Daniel J. Evans Wilderness. Lethal removal (by shooting) would continue to be used for the removal of nuisance goats which is a management tool under the <i>Mountain Goat Action Plan</i>, as well as for mountain goats that may be injured during capture and translocation activities. Under this

alternative approximately 50% of the projected 2018 mountain goat population, or approximately 325-375 mountain goats would be removed. Approximately 50% of the mountain goat population would remain following initial management. These goats would be subject to maintenance activities of ground- and helicopter-based capture and translocation on an opportunistic or periodic basis if and when the mountain goat population increases, which is expected to be as early as 5 to 15 years following initial management.

- Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool for actions under this alternative given that mountain goat removal would generally take place in remote and rugged alpine habitats where goats reside during the summer; the need to capture as many goats as possible so we can subsequently release as many goats as possible for each translocation event in an effort to reduce impacts on wilderness character as well as reduce pressure on available resources (time, staff, and funding); and the safety risks posed to personnel by the terrain. Under this alternative there would be periodic (every 4-6 years) helicopter-based surveys to track goat abundance, population trends, and distribution. Survey flights would occur over 6-7 days, 4-5 hours a day. A maximum of 384 flight hours could occur over 48 days across a 2-year period on the Olympic Peninsula.
- To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would likely still be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources.
- The specific management elements and actions that could be used for capture and translocation are as follows:
 - **Personnel Access** – Management activities for capture and translocation would involve several tools for accessing remote areas either for ground-based capture or aerial capture. Park staff would access the wilderness area via foot in order to bait and trap mountain goats in more accessible terrain. Fixed-wing aircraft or helicopters could be used to identify areas for aerial capture operations. Helicopters would be used to facilitate capture of mountain goats and to transport them to specific staging areas for transfer of ownership to the Washington Department of Fish and Wildlife (WDFW). 95-100% of all goat capture would be via helicopter as it is the only safe way to get to where the majority of the goats are, dart them, and get them out of goat terrain. Goats are best captured by darting in most cases – and the best drug is lethal to humans – so safety protocols require a helicopter be on site for evacuation purposes whenever that drug is used. One cannot hike a goat out in a backpack. People would not be flown in and dropped off to conduct capture operations. Any ground-based capture operations would be done by staff hiking into backcountry/wilderness areas and ground-darting the animals, and even then the goats must be flown out.
 - **Capturing Mountain Goats** – Mountain goats would be captured either through the use of helicopter capture operations or ground-based capture techniques followed by transport to specified staging areas via helicopter for transfer to WDFW.
 - Each year, for 3-5 years, there would be a maximum of two 2-week operations (occurring in July and in August or September) of up to 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is that there would be only one helicopter at a time. The purpose for two helicopters is that there would be one conducting capture operations and the other would act as a spotter).
- Long-term maintenance activities under this alternative would take place opportunistically and periodically if and when mountain goats increase in population, which is expected to be as early as 5 to 15 years following initial management. The timing of maintenance activities would depend on the recovery of the mountain goat population following the estimated 50% population reduction. The timing of maintenance-phase capture and translocation activities would be cyclical (e.g., every 5-10 years) and the duration during a given year would involve 2-week management periods, using helicopters and other management elements as under initial maintenance activities. The amount of time needed for capture operations would likely increase over time, as the mountain goat population decreases and mountain goats move to increasingly

remote areas where capture operations would require greater effort. As with the no-action alternative, future surveys to monitor the abundance and distribution of mountain goats on the Olympic Peninsula would continue with the use of helicopters approximately every 4-6 years for approximately 6-7 days, for 4-5 hours per day to conduct goat surveys.

- **Interpretive Tools:**
 - Park staff would provide information and educational opportunities to the public through interpretive programs and visitor interactions regarding the management of mountain goats in the park.
 - Interpretation would include efforts to increase the public's awareness of the current mountain goat situation within the park and on the Olympic Peninsula, as well as about management activities that would be undertaken under this alternative.
 - Interpretive tools could include enhanced outreach to media outlets, expanded website resources, additional wilderness notices, and informational handouts. These signs would be posted at trailheads, on established bulletin boards, or on existing trail signs. Very few would be posted in the wilderness. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary.
- **Park Closures:**
 - There would be the potential for closing limited park areas while undertaking various management actions including lethal removal and capture operations (there's the potential to close Seven Lakes Basin, Lake of the Angels, and Klahhane Ridge for ~5-12 days, not all at once); and Hurricane Hill would be closed while that staging area is in use and Deer Park Campground may be closed while the Deer Park staging area is in use. Park closures would include areas within the vicinity of active management activities and surrounding staging areas.
 - No parkwide closures would occur.
 - Closures in specific areas could last for several days while management activities are taking place. The closure schedule and geographic areas impacted by closures would be coordinated with the park's Wilderness Information Center that issues wilderness use permits to ensure that no permits are issued for areas undergoing management activities. Closures would also be coordinated with wilderness and law enforcement rangers, volunteer staff, and all other park staff that could potentially be working in closed areas.
- **Staging Areas:**
 - Staging areas would not be located in designated wilderness, however, helicopter noise at staging areas would carry into the wilderness and would affect the solitude quality of wilderness character. Also, there could be trailhead closures due to the use of those areas for staging and these closures would affect opportunities for unconfined recreation.
- **Baiting:**
 - Salt blocks may be temporarily (up to one year) placed in remote areas of the park to attract mountain goats to suitable areas for carrying out management activities. Research has demonstrated that pre-baiting with salt and trace mineral blocks up to one year prior to removal actions can significantly increase effectiveness. Locations for salt block placement would either be located away from public use areas or closed to public access to minimize human-mountain goat conflicts. The maximum number of areas would be five. Salt blocks would be placed in impermeable containers to prevent salt from leaching into soils and would be removed once management activities are complete to limit effects to other wildlife species.
- **Firearms:**
 - High-powered rifles would be used in all lethal actions. Personnel involved, which could include NPS or other federal or state personnel, or other authorized agents would have the appropriate skills and proficiencies in the use of firearms to maximize public safety, including experience in the use of firearms for the removal of wildlife. Any lethal action would be completed as humanely as possible. Under all alternatives, mountain goats injured during management activities would be dispatched as quickly as possible to minimize suffering. The specific management elements and actions that could be used for the lethal removal of mountain goats are as follows: Helicopters and fixed-wing aircraft would be used to access areas where goats need to be dispatched and high-

powered firearms would be used to dispatch mountain goats in and adjacent to the park.

- **Animal Welfare:**
 - The NPS would adhere to guidelines from the American Veterinary Medical Association on euthanasia of animals to ensure that management actions are conducted as humanely as possible to minimize mountain goat suffering. When capturing mountain goats for translocation, management actions would be designed to maximize the humane treatment of animals including capturing nannies with dependent “kids” together in order to enhance the likelihood of survival. NPS would use a variety of techniques to improve the survival rates of nannies with dependent kids. These include but are not limited to: trapping nannies with kids in clover traps and transporting them together to holding areas, if the kids did not enter traps they could be caught adjacent to nannies with either net guns or immobilized with drugs. When using helicopters the same techniques could be used and every effort made to secure the dependent kids with the nannies. This could be done by separating nannies with kids during pursuit and keeping the groups together and then using net guns to capture both animals in one net. If using drugs then similar techniques would be applied: capturing the nannies first and then the kids if they stayed near the immobilized adult or once the adult is caught pursuing the dependent kid. If drive traps are used they would be implemented following the methods described by Smith 2010. Nannies and their kids would be transported together. When using lethal removal with firearms, consideration would be given to the choice of firearm, non-lead ammunition, and shot placement to ensure the humaneness of the action.
- **Carcass Handling and Disposal:**
 - Mountain goat carcasses resulting from management activities would be left in the field but would be relocated away from trails, campsites, or where visible from high visitor use areas. If feasible, carcasses may be provided to interested tribes, to obtain hides and horns, and may be flown out by helicopter.
- **Does the proposed action involve new construction or repair/rehab to existing structures/utilities/assets?**
 - No
- **Does the project take place in the same location/footprint/trench used before, or in a previously undisturbed area?**
 - Capture and any necessary lethal removal actions would take place range-wide.
 - If the management action leads to lethal removal, this could occur in or outside of previously disturbed areas. This could entail the use of a helicopter for sharpshooting and on-the-ground carcass removal (moving the goat carcass to an area outside of immediate public sight (>100m and out of sight) – some areas may be visible but unsafe to access or may need on-the-ground operations to assist with carcass removal by helicopter).
 - As many goats would be captured as possible. There would be no hazing of goats while capture is still an option as hazing would make capture operations more difficult. Once the capture operations are complete, if goats show up in an area where there are visitors and the goats are habituated, then they would be hazed. Therefore, hazing and marking would continue to occur throughout the entire mountain goat range.
- **Would the project involve ground disturbance (cut or fill)? If so, how many cubic yards and where would materials be deposited (both temporarily and permanently)? If fill materials are taken, identify the specific site fill taken from and if the materials are native to the park. How would fill be “stored”?**
 - This project does not involve cut or fill ground disturbance. Signs would not be placed on new posts, and therefore no holes would need to be dug. Signs would be placed at trailheads, on established bulletin boards, or on existing trail signs.
- **How much excavation would be necessary (quantify by width, length, depth, cubic feet, number or lines, etc.)**
 - None
- **Would the proposal involve work in or near a known archeological site or other historic property?**
 - Exotic mountain goat removal activities could occur in or near known archeological sites or other historic properties. Remaining goats would continue to wallow in potential archeological sites.

- **Would a staging area be required? If so, identify staging area(s), include map, what type of materials and/or equipment and for how long? What would be the estimated square footage of the staging area?**
 - Staging areas for capture and lethal removal operations are described above. They would not be located in designated wilderness.
- **How/where would construction debris be disposed of?**
 - N/A
- **How much surface area would be disturbed, cleared, or denuded of vegetation (quantify by square footage, # of trees removed, etc.)**
 - None to very little – there may be a need to move (by dragging) a lethally removed goat out of sight of visitors/out of high use areas. The disturbance to vegetated areas would be damage from trampling by staff as well as trampling, grazing, and wallowing by the remaining goats – estimated to be 50% of the population.
- **Would the project involve any geologic or hydrologic features/alter stream courses, surface or ground water flow?**
 - No
- **Would the proposal involve structures, fill, or discharge into water (example: bridge crossing, boardwalk, gravel, culverts, etc.)?**
 - No
- **Would the proposal affect water quality or quantity?**
 - No
- **What changes would occur in land/facility use?**
 - None
- **What changes would occur to traffic flow or visitor circulation?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use and parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Would the proposal require aerial operations?**
 - Translocation operations require aerial operations to identify areas for aerial capture operations, drop off capture equipment and capture/translocate goats. Each year, for the first 3-5 years, there would be a maximum of two 2-week operations (in July and in August or September) of up to 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is that there would be only one helicopter at a time. The purpose for two helicopters is that there would be one conducting capture operations and the other would act as a spotter). Under this alternative there would also be periodic (every 4-6 years) helicopter-based surveys to track goat abundance, population trends, and distribution. Survey flights would occur over 6-7 days, 4-5 hours a day. Lethal removal operations, if necessary, may also require aerial operations (as a sharpshooting base, for carcass removal to the frontcountry for interested tribes or moving the carcass out of public sight and >100m). If it is determined that a necropsy is necessary on a lethally removed goat, then a helicopter may also be utilized to facilitate in the physical removal of the goat from an area in the backcountry/wilderness to the frontcountry. Note: People would not be flown in or dropped off to conduct capture: ground-based capture and darting would be accomplished by hiking in/out and ground darting. A maximum of 384 flight hours could occur over 48 days across a 2-year period on the Olympic Peninsula.
- **Would the proposal alter visitor services, activities, or experiences?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use and parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation. Goat populations would likely rebound within 10-15 years and at that time there would be additional closures for goat removal operations.
- **Where would the action take place?**
 - The translocation and any necessary lethal removal operations would take place in areas where goats are located.
- **When would the action take place?**
 - For two weeks during the month of July and again in August/September for at least 2-3 years for initial management actions. Long-term maintenance activities under this alternative would be

cyclical and may occur approximately every 5-10 years for approximately 6-7 days, for 4-5 hours per day. Maintenance activities would likely occur indefinitely.

- **What design and standards would apply?**
 - Helicopter safety, which would be developed in a Helicopter Safety Plan. Staff and visitor safety protocols would also be implemented.
- **What methods, tools, and techniques would be used?**
 - See the Wilderness 4(c) Prohibitions Worksheet for alternative B below.
 - Nuisance control measures: Nuisance control measures would be employed minimally as needed on a case-by-case basis and the specific actions would be the same range from hazing to lethal removal as identified under the no action alternative.
 - Interpretive tools: Increased interpretation including media outreach and website resources, detailed information would be provided regarding areas of potential closure.
 - Access tools: Hiking into and out of areas for ground-based capture operations; a helicopter would be used to drop off equipment (e.g., nets), to capture mountain goats in remote areas and to transport them out to staging areas for transfer to WDFW for translocation to receiving locations; if lethal removal is necessary, it would be conducted by either hiking into and out of areas for ground-based lethal removal or through the use of a helicopter or fixed-wing airplane for lethal removal of mountain goats from the air in remote areas as well as those that are otherwise difficult to access by foot.
 - Tools for capturing mountain goats: Ground-based capture methods including drop nets, foot snares, darting, and clover traps; air-based capture methods including net guns and darting; as applicable, use of methods in 351DM2-351DM3 "Aerial Capture, Eradication and Tagging of Animals (ACETA) Handbook" (DOI 1997).
 - Park closure tools: Short-term closures of limited areas for ground capture, hazing, and lethal removal actions; short-term closures of areas surrounding staging areas for takeoff and landing of helicopters (outside of wilderness).
 - Baiting tools: Salt blocks could be used as a tool to attract mountain goats for capture.
 - Lethal removal firearms: Lethal dispatch of mountain goats injured during management activities in the park.
 - Animal welfare tools and considerations: All humane management methods and regulations would be taken into consideration and implemented as applicable.
- **How long would it take to complete the action?**
 - Approximately two to three years for initial capture and translocation actions. Long-term maintenance activities would be cyclic and would likely occur approximately every 5-10 years, indefinitely.
- **What mitigation would be taken to minimize action impacts on park resources and values, and wilderness resources and character (where applicable)?**
 - Research and monitoring activities would take place opportunistically based on available funding. Possible research and monitoring efforts could involve management efficacy analysis and mountain goat population studies. Mountain goat population surveys would be conducted in a similar nature as under the no-action alternative.
 - Helicopter staging area preparation, if necessary, would occur prior to the proposed action, preferably during the early to late fall, unless otherwise agreed.
 - Project staff would coordinate flight schedules and paths with Naval Air Station Whidbey Island to ensure operations on the Olympic Peninsula and in the North Cascades forests do not interfere with active military training flight routes.
 - During management activities at staging areas, staging areas that are not already behind gates would be otherwise secured.
 - Capture and translocation efforts would strive to minimize stress and to protect the welfare of individual animals, including attempts to keep nannies and kids together.
 - Public notification of activities affecting wilderness would be provided, and appropriate information would be distributed at visitor centers.
 - Project staff would access the wilderness area via foot or by riding stock where possible, without risking life or limb. This would be considered for travel to sites accessible by trail or non-technical cross-country foot travel (e.g. without the use of crampons, ice axes, rope or other specialized equipment).
 - Foot travel would be considered for accessing sites for both baiting mountain goats ahead of time and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from

	<p>helicopter operations. If staff and contractors can safely carry the load in, they would. Salt blocks may be carried in on our backs to Klahhane Ridge and Heart Lake.</p> <ul style="list-style-type: none"> ○ If staff and contractors can safely carry the load in, they would. Salt blocks may be carried in on our backs to Klahhane Ridge and Heart Lake. ○ Any 4(c) prohibited tool used would be the minimum requirement necessary for administering wilderness, and all other tools would be the ones that cause the least amount of disturbance to wilderness while successfully resolving the issue. ○ “Leave No Trace” principles would be applied to all management actions. ○ Helicopter operations would not be conducted within a minimum of 500 feet from marbled murrelet and northern spotted owl habitat. ○ Helicopter flight paths to and from staging areas would be designed to minimize noise impacts to wildlife and visitors to the greatest extent practicable (e.g., such as not flying directly over or low over known sensitive wildlife habitat areas or camping areas). Previously agreed upon travel corridors and flight altitudes for helicopters would be used during operations. ○ Area closures in the immediate vicinity of mountain goat capture and any necessary lethal removal operations would minimize noise impacts to wilderness visitors. ○ Contractors and other project workers would properly store and dispose of food and garbage (per Leave No Trace guidelines) while working on site. ○ Lead-free ammunition would be used for any necessary lethal removal activities to prevent contamination. ○ Exotic invasive plant management measures would be taken. If existing invasive plant infestations are documented, or if management activities introduce any invasive plants into the project area, they would be treated with appropriate herbicide, mechanical, or manual methods following Integrated Pest Management guidelines and when practical. Also, all equipment and tools shall be cleaned completely and free of weeds, seed, debris, and mud to prevent the introduction or spread of exotic, invasive plants. Prior to entering the wilderness, all workers shall check boots, backpacks, and tools for weed seeds, mud that could harbor weed seeds, and plant parts to prevent the spread and introduction of invasive plants. ○ If any individual spotted owl or marbled murrelet is observed during project operations, a wildlife biologist would be notified and measures to minimize or eliminate take would be applied. ○ If subsurface archaeological evidence or previously unidentified cultural resources are located during implementation of the project, activities would cease pending an evaluation of cultural eligibility by a qualified archaeologist, who would determine appropriate mitigation measures. Project staff would fulfill its consultation requirements in accordance with 36 CFR 800.11. ○ A communication plan would be developed by the NPS, USDA Forest Service, and WDFW that would include information on the ecological purpose and need of the activity and any area closures for visitors. News releases, signage, website, and other forms of communication would be prepared well in advance. ○ Project staff would be properly trained regarding adherence to safety protocols identified in the Olympic National Park <i>Mountain Goat Action Plan</i>.
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WILDERNESS ACT 4(C) PROHIBITIONS WORKSHEET

ALTERNATIVE B: Capture and Translocation Only	
4(c) QUESTION	4(c) EXPLANATION
What 4(c) prohibition(s) is (are) being proposed for use?	<ul style="list-style-type: none"> • Helicopters • Signs • Collars and Tags • Tools (salt blocks)
What is the 4(c) being proposed to be used for?	<ul style="list-style-type: none"> • Helicopters: Would be used for dropping off capture equipment, goat capture and delivery to staging areas both initially and during maintenance phase; spotting for goats to identify areas for aerial capture; when lethal removal is necessary as a sharpshooting base, flying out carcasses for necropsy or for interested tribes; and moving goat carcasses >100m from visitor use areas; and aerial goat surveys every 4-6 years.

	<ul style="list-style-type: none"> • Signs: Signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues (human-goat encounters) • Collars and Tags: Monitoring and tracking nuisance goats • Tools: These tools would be utilized to facilitate the capture of mountain goats
<p>Why won't a non-4(c) use be successful?</p>	<ul style="list-style-type: none"> • Helicopters: Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool for actions under this alternative given that mountain goat removal would generally take place in remote and rugged alpine habitats where goats reside during the summer; the need to capture as many goats as possible for each translocation event in an effort to reduce impacts on wilderness character as well as reduce pressure on available resources (time, staff, and funding); and the safety risks posed to personnel by the terrain. To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would still likely be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources. • Signs: There would be signs posted outside of the wilderness area on established trailhead bulletin boards and information may be provided at the Wilderness Information Centers; however, in instances of regulatory warnings regarding nuisance or hazardous goats or goat removal (capture) processes, signs may be posted on established bulletin boards or existing trail signs in the wilderness area for visitor safety to remind visitors to be aware of either goat issues within the area or of project activities. • Collars and Tags: There are no non-4(c) methods available to effectively and safely track and monitor nuisance or hazardous goats. • Tools (salt blocks): If salt blocks are not used, the goat removal (capture) process would not be as effective or efficient and would require further impacts on wilderness character.
<p>How does this alternative reduce use of 4(c) compared to other alternatives?</p>	<p>Under this alternative there would be much less helicopter use than under alternatives C and D. Initial management activities of capture and translocation would reduce the population by 50%, and there would be no lethal removal actions as part of initial management. There would still be some lethal removal operations but, similar to alternative A, those activities would be limited to only hazardous goats, which is generally a rare and random occurrence.</p>
<p>How will use of the 4(c) be mitigated?</p>	<p>Foot travel would be considered for accessing sites for both baiting mountain goats ahead of time and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from helicopter operations. Staff would fly to lethally remove a hazardous goat if it is absolutely necessary, otherwise access to the removal site would occur by foot unless a necropsy is determined necessary.</p>

Alternative C: Lethal Removal Only

- **What is proposed?**
 - Alternative C would utilize only lethal removal (by shooting) tools to reduce (to the point that the population cannot survive) or eliminate mountain goats from the park. Under this alternative at least 90% of the projected 2018 mountain goat population, or approximately 625 to 675 mountain goats would be removed; a maximum of 400-500 mountain goat carcasses would be left on the landscape. Approximately 10% of the mountain goat population may remain following initial management, or between 50 and 100 mountain goats based on the projected 2018 population size. These goats would be subject to maintenance activities of ground- and helicopter-based lethal removal in proximity to areas where human use has been high.
 - Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given the importance that mountain goat lethal removal take place in remote and rugged alpine habitats that goats require and reside in during the summer; as well as the need to reduce pressure on wilderness resources (as well as time, staff, and funding) by expediting lethal removal before populations have a chance to rebound and further impact wilderness character. Also, due to the safety risks posed to personnel by the terrain. A maximum of 384 flight hours could occur over 48 days across a 2-year period on the Olympic Peninsula. Helicopters may land up to 904 times during capture operations (approximately 2 or 3 times per mountain goat during capture activities and up to 40 times for carcass removal).
 - To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would still likely be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources.
 - The specific management elements and actions that could be used for lethal removal are as follows:
 - **Personnel Access** – Management activities under alternative C could include several methods for accessing remote areas of the park and adjacent NFS lands for lethal removal actions. Helicopters may be used as the primary method for lethally removing mountain goats from remote areas of the Olympic Peninsula, potentially with the assistance of spotter aircraft (fixed-wing aircraft or small helicopters, depending on the contractor). Helicopters may also be used to drop off or pick up ground-based crews that would be entering the wilderness to lethally remove mountain goats or to move carcasses; generally, helicopters would touch down briefly to unload and retrieve ground-based crews, although this would be infrequent.
 - In the fall of year 1, only ground-based lethal removal activities would be conducted. Ground-based lethal removal activities would peak in the fall when park visitation is low, but could take place opportunistically at any time during the year as needed. Each subsequent year, starting with year 2 and up to year 5, there would be a maximum of two 2-week operations (occurring in July and in August or September) of up to 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is that there would be only one helicopter at a time. The purpose for two helicopters is that there would be one conducting lethal removal operations and the other would act as a spotter). Ground-based lethal removal would take place opportunistically at any time during the year as needed, with peak management in summer and fall.
 - There would be a desired eventual population goal of zero mountain goats within the park. The desired population goal may be difficult to obtain; however, the intent of the action would be to reduce the population to a level where maintenance activities (e.g., shooting any remaining goats if and when they re-appear after initial management actions) would prevent the population from rebounding to pre-reduction numbers.
 - **Initial Management Activities:** would involve lethally removing as many mountain goats as possible. The intent of initial management would be to reduce the population of mountain goats to a level where only limited population growth would be expected following initial reduction, and implementation of maintenance activities would eventually reduce the mountain goat

population to zero. Lethal removal would be significantly more efficient and effective than mountain goat captures under alternative B, because lethal removal could take place more quickly than capturing mountain goats. It is expected that approximately 90% of the projected 2018 mountain goat population, or approximately 625 to 675 mountain goats, could be removed during the initial management phase and a maximum of 400-500 carcasses would be left on the landscape.

- **Maintenance Activities:** Approximately 10% of the mountain goat population may remain following initial management. Maintenance activities under alternative C would involve opportunistic lethal removal of mountain goats by park staff, other federal personnel, hired contractors from APHIS or USDA Wildlife Services, state personnel, or trained volunteers who would enter the wilderness primarily on foot during the summer and fall seasons; however, helicopter-based lethal removal would also be necessary to target any mountain goats remaining in remote areas that are inaccessible due to steep and rugged terrain. It is anticipated that maintenance activities could eventually reduce the number of mountain goats to zero.
- **Interpretive Tools:**
 - Park staff would provide information and educational opportunities to the public through interpretive programs and visitor interactions regarding the management of mountain goats in the park.
 - Interpretation would include efforts to increase the public's awareness of the current mountain goat situation within the park and on the Olympic Peninsula, as well as about management activities that would be undertaken under this alternative.
 - Interpretive tools could include enhanced outreach to media outlets, expanded website resources, additional wilderness notices, and informational handouts. These signs would be posted at trailheads, on established bulletin boards, or on existing trail signs. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary.
- **Park Closures:**
 - There would be the potential for closing limited park areas while undertaking various lethal removal operations (there's the potential to close Seven Lakes Basin, Lake of the Angels, and Klahhane Ridge for approximately 5-12 days, not all at once; or there may be no closures at all); and Hurricane Hill would be closed while that staging area is in use and Deer Park Campground may be closed while the Deer Park staging area is in use. Park closures would include areas within the vicinity of active management activities and surrounding staging areas.
 - No parkwide closures would occur.
 - Closures in specific areas could last for several days while management activities are taking place. The closure schedule and geographic areas impacted by closures would be coordinated with the Wilderness Information Center that issues wilderness use permits to ensure that no permits are issued for areas undergoing management activities. Closures would also be coordinated with wilderness and law enforcement rangers, volunteer staff, and all other park staff that could potentially be working in closed areas.
- **Staging Areas:**
 - Staging areas would not be located in designated wilderness, however, helicopter noise at staging areas would carry into the wilderness and would affect the solitude quality of wilderness character. Also, there could be trailhead closures due to the use of those areas for staging and these closures would affect opportunities for unconfined recreation.
- **Baiting:**
 - Salt blocks may be temporarily (up to one year) placed in remote areas of the park to attract mountain goats to suitable areas for carrying out management activities. Research has demonstrated that pre-baiting with salt and trace mineral blocks up to one year prior to removal actions can significantly increase effectiveness. Areas would either be located away from public use areas or closed to public access to minimize human-mountain goat conflicts. The maximum number of areas would be five. Salt blocks would be placed in impermeable containers to prevent salt from leaching into soils and would be removed once management activities are complete to limit effects to other wildlife species.

- **Firearms:**
 - High-powered rifles would be used in all lethal actions. Personnel involved, which could include NPS or other federal or state personnel, or other authorized agents would have the appropriate skills and proficiencies in the use of firearms to maximize public safety, including experience in the use of firearms for the removal of wildlife. Any lethal action would be completed as humanely as possible. The specific management elements and actions that could be used for the lethal removal of mountain goats are as follows: Helicopters and fixed-wing aircraft would be used to access areas where goats need to be dispatched and high-powered firearms would be used to dispatch mountain goats in and adjacent to the park.
- **Animal Welfare:**
 - The NPS would adhere to guidelines from the American Veterinary Medical Association on euthanasia of animals to ensure that management actions are conducted as humanely as possible to minimize mountain goat suffering. When using lethal removal with firearms, consideration would be given to the choice of firearm, non-lead ammunition, and shot placement to ensure the humaneness of the action.
- **Carcass Handling and Disposal:**
 - Mountain goat carcasses resulting from management activities would be left in the field but would be relocated away from trails, campsites, or where visible from high visitor use areas. Skilled public volunteers would be asked to pack out as much of the remains as they safely can. If feasible, carcasses could be provided to interested tribes, mainly for hides and horns, and may be transported out by helicopter depending on the location of the carcass if it's in remote and rugged terrain.
- **Does the proposed action involve new construction or repair/rehab to existing structures/utilities/assets?**
 - No
- **Does the project take place in the same location/footprint/trench used before, or in a previously undisturbed area?**
 - Lethal removal operations would take place range-wide and could occur in or outside of previously disturbed areas. This could entail the use of a helicopter for sharpshooting and the on-the-ground carcass removal (moving the goat carcass to an area outside of immediate public sight (>100m and out of sight) – some areas may be visible but unsafe to access or may need on-the-ground operations to assist with removal by helicopter).
 - As many goats would be lethally removed as possible. There would be no hazing of goats while lethal removal is still an option as hazing would make lethal removal operations more difficult. Once the lethal removal operations are complete, if goats show up in an area where there are visitors and the goats are habituated, then they would be hazed. Therefore, hazing and marking would continue to occur throughout the entire mountain goat range, if or as needed.
- **Would the project involve ground disturbance (cut or fill)? If so, how many cubic yards and where would materials be deposited (both temporarily and permanently)? If fill materials are taken, identify the specific site fill taken from and if the materials are native to the park. How would fill be “stored”?**
 - This project does not involve cut or fill ground disturbance. Signs would not be placed on new posts, and therefore no new holes would need to be dug. Signs would be placed at trailheads, on established bulletin boards, or on existing trail signs. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary.
- **How much excavation would be necessary (quantify by width, length, depth, cubic feet, number or lines, etc.)**
 - None
- **Would the proposal involve work in or near a known archeological site or other historic property?**
 - Exotic mountain goat removal activities could occur in or near known archeological sites or other historic properties.
- **Would a staging area be required? If so, identify staging area(s), include map, what type of materials and/or equipment and for how long? What would be the estimated square footage of the staging are?**
 - Staging areas for lethal removal operations are described above. They would not be located in designated wilderness.
- **How/where would construction debris be disposed of?**

- N/A
- **How much surface area would be disturbed, cleared, or denuded of vegetation (quantify by square footage, # of trees removed, etc.)**
 - None to very little – there may be a need to move (by dragging) a lethally removed goat out of sight of visitors/out of high use areas. The disturbance to vegetated areas would be damage from trampling by staff as well as by goats.
- **Would the project involve any geologic or hydrologic features/alter stream courses, surface or ground water flow?**
 - No
- **Would the proposal involve structures, fill, or discharge into water (example: bridge crossing, boardwalk, gravel, culverts, etc.)?**
 - No
- **Would the proposal affect water quality or quantity?**
 - No
- **What changes would occur in land/facility use?**
 - None
- **What changes would occur to traffic flow or visitor circulation?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. In areas where lethal removal operations are being conducted, those areas would be closed to visitor use and parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Would the proposal require aerial operations?**
 - Lethal removal operations, at the scale of this proposed action in remote and rugged terrain, require aerial operations as a helicopter would be utilized as a shooting platform. Each year there would be a maximum of two 2-week operations (in July and in August or September) of 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is much less), one helicopter would be used as a spotter. If a goat falls in or near developed areas (e.g., campsites or trails) or in a marmot colony, the helicopter would land if it is safe and either move the goat at least 100m away or sling it out of the wilderness for donation to tribes or other willing recipients. The park would be removing goats from these areas so as to not artificially draw in predators or scavengers (i.e., bears and cougars) that would pose a threat to visitors or other wildlife. Helicopters may also be used to drop off/pick up of ground crews during project implementation and to conduct aerial reconnaissance flights prior to maintenance operations to search for remnant goats; likely over one to two mornings (4-8 hours over 2 days). A maximum of 384 flight hours could occur over 48 days across a 2-year period on the Olympic Peninsula.
- **Would the proposal alter visitor services, activities, or experiences?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. In areas where lethal removal operations are being conducted, those areas would be closed to visitor use and parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Where would the action take place?**
 - Lethal removal operations would take place in areas where goats are located.
- **When would the action take place?**
 - For two weeks during the month of July or August/September for at least 2-3 years, depending on the success of the initial lethal removal operations.
- **What design and standards would apply?**
 - Helicopter safety, which would be developed in a Helicopter Safety Plan. Staff and visitor safety protocols would also be implemented.
- **What methods, tools, and techniques would be used?**
 - See the Wilderness 4(c) Prohibitions Worksheet for alternative C below.
 - Nuisance control measures: Nuisance control measures would be employed minimally as needed on a case-by-case basis and the specific actions would be the same range from hazing to lethal removal as identified under the no action alternative.
 - Interpretive tools: Increased interpretation including media outreach and website resources, detailed information would be provided regarding areas of potential closure.
 - Access tools: Hiking into and out of areas (for ground-based lethal removal); helicopter (as a shooting platform and to drop off and pick up ground-based lethal removal crews), or helicopter

- and fixed-wing airplane use (as a spotter for lethal removal of mountain goats from the air) in remote areas as well as those that are otherwise difficult to access by foot.
- Park closure tools: Short-term closures of limited areas for hazing and lethal removal actions; short-term closures of areas surrounding staging areas for takeoff and landing of helicopters (outside of wilderness).
- Baiting tools: Salt blocks could be used as a tool to attract mountain goats for lethal removal.
- Lethal removal firearms: Firearms would be used for lethal removal of exotic mountain goats.
- Animal welfare tools and considerations: All humane management methods and regulations would be taken into consideration and implemented as applicable.
- **How long would it take to complete the action?**
 - Initial management activities under alternative C could last 3 to 5 years, with most of the activity in years 1 to 3. Lethal removals would be conducted only if necessary in years 4 and 5.
- **What mitigation would be taken to minimize action impacts on park resources and values, and wilderness resources and character (where applicable)?**
 - Research and monitoring activities would take place opportunistically based on available funding. Possible research and monitoring efforts could involve management efficacy analysis and mountain goat population studies.
 - Helicopter staging area preparation, if necessary, would occur prior to the proposed action, preferably during the early to late fall, unless otherwise agreed.
 - Project staff would coordinate flight schedules and paths with Naval Air Station Whidbey Island to ensure operations on the Olympic Peninsula and in the North Cascades forests do not interfere with active military training flight routes.
 - During management activities at staging areas, staging areas that are not already behind gates would be otherwise secured.
 - Public notification of activities affecting wilderness would be provided, and appropriate information would be distributed at visitor centers.
 - Project staff would access the wilderness via foot or by riding stock where possible, without risking life or limb. This would be considered for travel to sites accessible by trail or non-technical cross-country foot travel (e.g. without the use of crampons, ice axes, rope or other specialized equipment).
 - Foot travel would be considered for accessing sites for baiting mountain goats ahead of time and during the lethal removal period and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from helicopter operations. If staff and contractors can safely carry the load in, they would. Salt blocks may be carried in on our backs to Klahhane Ridge and Heart Lake.
 - Any 4(c) prohibited tool used would be the minimum requirement necessary for administering wilderness, and all other tools would be the ones that cause the least amount of disturbance to wilderness while successfully resolving the issue.
 - “Leave No Trace” principles would be applied to all management actions.
 - Helicopter operations would not be conducted within a minimum of 500 feet from marbled murrelet and northern spotted owl habitat.
 - Helicopter flight paths to and from staging areas would be designed to minimize noise impacts to wildlife and visitors to the greatest extent practicable. (e.g., such as not flying directly over or low over known sensitive wildlife habitat areas or camping areas). Previously agreed upon travel corridors and flight altitudes for helicopters would be used during operations.
 - Area closures in the immediate vicinity of mountain goat lethal removal operations would minimize noise impacts to wilderness visitors.
 - Contractors and other project workers would properly store and dispose of food and garbage (per Leave No Trace guidelines) while working on site.
 - Lead-free ammunition would be used for lethal removal activities to prevent contamination.
 - Exotic invasive plant management measures would be taken. If existing invasive plant infestations are documented, or if management activities introduce any invasive plants into the project area, they would be treated with appropriate herbicide, mechanical, or manual methods when practical. Also, all equipment and tools shall be cleaned completely and free of weeds, seed, debris, and mud to prevent the introduction or spread of exotic, invasive plants. Prior to entering the wilderness, all workers shall check boots, backpacks, and tools for weed seeds, mud that could harbor weed seeds, and plant parts to prevent the spread and introduction of invasive plants.

<ul style="list-style-type: none"> ○ If any individual spotted owl or marbled murrelet is observed during project operations, a wildlife biologist would be notified and measures to minimize or eliminate take would be applied. ○ If subsurface archaeological evidence or previously unidentified cultural resources are located during implementation of the project, activities would cease pending an evaluation of cultural eligibility by a qualified archaeologist, who would determine appropriate mitigation measures. Project staff would fulfill its consultation requirements in accordance with 36 CFR 800.11. ○ A communication plan would be developed by the NPS, USDA Forest Service, and WDFW that would include information on the ecological purpose and need of the activity and any area closures for visitors. News releases, signage, website, and other forms of communication would be prepared well in advance. ○ Project staff would be properly trained regarding adherence to safety protocols identified in the Olympic National Park <i>Mountain Goat Action Plan</i>.
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WILDERNESS ACT 4(C) PROHIBITIONS WORKSHEET

ALTERNATIVE C: Lethal Removal Only	
4(c) QUESTION	4(c) EXPLANATION
What 4(c) prohibition(s) is (are) being proposed for use?	<ul style="list-style-type: none"> • Helicopters • Signs • Collars and Tags • Tools (salt blocks)
What is the 4(c) being proposed to be used for?	<ul style="list-style-type: none"> • Helicopters: Lethal removal of goats (as a shooting platform); spotting for goats; flying ground-based crews in/out; flying out carcasses; assisting with on-the-ground removal (to move goat carcasses >100m from visitor use areas), and aerial goat reconnaissance flights. • Signs: Signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues (human-goat encounters) • Collars and Tags: Monitoring and tracking nuisance goats • Tools: Salt blocks would be utilized to facilitate the lethal removal of mountain goats by concentrating goats in certain areas
Why won't a non-4(c) use be successful?	<ul style="list-style-type: none"> • Helicopters: Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given the importance that mountain goat lethal removal take place in remote and rugged alpine habitats that goats require and reside in during the summer; as well as the need to reduce pressure on wilderness resources (as well as time, staff, and funding) by expediting lethal removal before populations have a chance to rebound and further impact wilderness character. Also, due to the safety risks posed to personnel by the terrain. To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would still likely be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources. • Signs: There would be signs posted outside of the wilderness area on established trailhead bulletin boards and information may be provided at the Wilderness Information Centers; however, in instances of regulatory warnings regarding nuisance

	<p>or hazardous goats or goat removal (lethal removal) processes, signs may be posted in the wilderness area for visitor safety to remind visitors to be aware of either goat issues within the area or of project activities.</p> <ul style="list-style-type: none"> • Collars and Tags: There are no non-4(c) methods available to effectively and safely track and monitor nuisance or hazardous goats. • Tools (salt blocks): If this tool is not used, the goat removal (lethal removal) process would not be as effective or efficient and would require further impacts on wilderness character.
<p>How does this alternative reduce use of 4(c) compared to other alternatives?</p>	<p>Under this alternative there would be slightly less helicopter use than under alternative D, however, this would greatly reduce any future need for helicopters for goat removal as 90% of the goats would be removed from the park. The first year of lethal removal would occur by foot rather than by helicopter.</p>
<p>How will use of the 4(c) be mitigated?</p>	<p>Foot travel would be utilized for accessing sites, and for baiting mountain goats ahead of time and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from helicopter operations.</p>

Alternative D: Combination of Capture and Translocation and Lethal Removal (Preferred Alternative)

- **What is proposed?**
 - Alternative D (the Preferred Alternative) would utilize a combination of capture and translocation and lethal removal (by shooting) tools to eliminate or greatly reduce mountain goats from the park including the Daniel J. Evans Wilderness and adjacent areas in Olympic National Forest. The objective of alternative D is to eliminate goats, however, in terrain as remote and steep as the Olympics, a goal of zero may be difficult to attain. The intent of alternative D is to prioritize capture and translocation activities prior to focusing on lethal removal activities, however, ground-based lethal removal could begin in the fall of year two after capture operations cease – this would help minimize the number of helicopter use needed for lethal removal. Some lethal removal could be scheduled as early as the second capture operation in year 1, but only for those mountain goats that are determined to be uncatchable.
 - Under this alternative approximately 90% of the projected 2018 mountain goat population, or approximately 625 to 675 mountain goats would be removed (it is estimated that approximately 50% of the mountain goat population could be captured and translocated, or approximately 325-375 animals based on projected 2018 population size. It is expected that the remaining goats, at least 40% of the original mountain goat population or approximately 275-325 animals, could be lethally removed). Approximately 10% of the mountain goat population would remain following initial management, or between 50 and 100 mountain goats based on the projected 2018 population size. These goats would be subject to maintenance activities of ground- and helicopter-based lethal removal in proximity to areas where human use has been high.
 - Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given the importance that mountain goat removal take place in remote and rugged alpine habitats that goats require and reside in during the summer; the need to capture as many goats as possible so we can subsequently release as many goats as possible for each translocation event in an effort to reduce impacts on wilderness character; as well as the need to reduce pressure on available resources (time, staff, and funding) by expediting goat removal (whether via capture and translocation or lethal removal) before populations have a chance to rebound; and the safety risks posed to personnel by terrain. A maximum of 768 flight hours could occur over 96 days across a 4-year period on the Olympic Peninsula.
 - To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would still likely be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased

issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources.

- The specific management elements and actions that could be used for capture and translocation removal are as follows:
 - **Personnel Access** – Management activities for capture and translocation would involve several tools for accessing remote areas. Park staff would access the wilderness via foot in order to bait and trap mountain goats. Fixed-wing aircraft or helicopters could be used to identify areas for aerial capture operations. The use of fixed-wing aircraft for spotting in unsafe and steep wilderness terrain would help reduce impacts from the capture operation by not having the helicopter fly around as much searching for goats, using fixed-wing aircraft for spotting purposes helps to expedite the process and minimizes helicopter flight hours. Helicopters would be used to facilitate capture of mountain goats and to transport them to specific staging areas for transfer of ownership to the Washington Department of Fish and Wildlife (WDFW).
 - **Capturing Mountain Goats** – Mountain goats would be captured either through the use of helicopter capture operations or ground-based capture techniques followed by transport to specified staging areas via helicopter for transfer to WDFW.
 - Each year, for 3-5 years, there would be a maximum of two 2-week operations (occurring in July and in August or September) of up to 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is that there would be only one helicopter at a time. The purpose for two helicopters is that there would be one conducting capture operations and the other would act as a spotter).
- Capture and translocation would occur in most areas prior to direct reduction activities.
- **Initial Management Activities:** Once a point of diminishing returns for capture operations is reached, management would stop live capture and use lethal removal activities until the vast majority of goats are either translocated or lethally removed. However, ground-based lethal removal could occur as soon as immediately after the first round of capture operations.
- **Maintenance Activities:** Under this alternative there would be a desired eventual population goal of zero mountain goats within the park. The desired population goal may be difficult to obtain; however, the intent of the action would be to reduce the population to a level where maintenance activities (e.g., shooting any remaining goats if and when they re-appear. Activities could be conducted either through ground-based or aerial operations) would prevent the population from rebounding to pre-reduction numbers.
- **Lethal Removal:** When goats become too difficult to capture, the park would switch to lethal removal. In this alternative, it is anticipated that the majority (90-100%) of operations in year 1 would be live capture. Ground-based lethal removal activities could be scheduled as early as the second capture bout in year 2. Staff and skilled public volunteers would hike in to conduct ground-based lethal removal. In year 2, as the mountain goats get sparser and more wary, situations would develop where the crew (of about 4-5 staff in 1-2 helicopters; and 99% of the operations would be in wilderness) would encounter goats that are determined to be uncatchable – meaning that either goats are in areas where it was determined in the prior year to be unworkable terrain, or when there is a goat that has been involved in prior capture attempts and is extremely elusive. In those situations, mountain goats would be removed lethally. It is estimated that in year 2 the majority of the mountain goats would be live captured, but a lower percentage than in year 1 (75-95% live capture, 5-25% lethal removal). If capture efforts are completed by the end of year 2, lethal removal via ground operations would start in the fall of year 2. In year 3, aerial operations would be almost solely for lethal removal of the remaining goats. The park would continue mountain goat capture operations as long as it is safe and feasible, and there are still areas available to receive mountain goats and partners able to transport them. Capture operations may continue into year 3.
- Maintenance activities (as explained above) under this alternative would be prioritized in areas of high visitor or mountain goat use and areas experiencing high levels of resource damage, and would primarily be done through lethal removal.
- **Interpretive Tools:**
 - Park staff would provide information and educational opportunities to the public through interpretive programs and visitor interactions regarding the management of mountain goats in the park.

- Interpretation would include efforts to increase the public's awareness of the current mountain goat situation within the park and on the Olympic Peninsula, as well as about management activities that would be undertaken under this alternative.
- Interpretive tools could include enhanced outreach to media outlets, expanded website resources, additional wilderness notices, and informational handouts. These signs would be posted at trailheads and bulletin boards. Very few would be in the wilderness. Signs would not be posted in wilderness when they are providing just general advisory information. If signs are posted in wilderness they would be placed on either established bulletin boards or existing trail signs, no new holes would be dug. The signs would be laminated 8.5x11 printer paper notices and would be in place for only as long as they are necessary.
- **Park Closures:**
 - There would be the potential for closing limited park areas while undertaking various management actions including lethal removal and capture operations (there's the potential to close Seven Lakes Basin, Lake of the Angels, and Klahhane Ridge for approximately 5-12 days, not all at once; or there may be no closures at all); and Hurricane Hill would be closed while that staging area is in use and Deer Park Campground may be closed while the Deer Park staging area is in use. Park closures would include areas within the vicinity of active management activities and surrounding staging areas; this could include areas within the wilderness and at trailheads that provide access to the wilderness.
 - No parkwide closures would occur.
 - Closures in specific areas could last for several days while management activities are taking place. The closure schedule and geographic areas impacted by closures would be coordinated with the Wilderness Information Center in the park that issues wilderness use permits to ensure that no permits are issued for areas undergoing management activities. Closures would also be coordinated with wilderness and law enforcement rangers, volunteer staff, and all other park staff that could potentially be working in closed areas.
- **Staging Areas:**
 - Staging areas would not be located in designated wilderness, however, helicopter noise at staging areas would carry into the wilderness and would affect the solitude quality of wilderness character. Also, there could be trailhead closures due to the use of those areas for staging and these closures would affect opportunities for unconfined recreation.
- **Baiting:**
 - Salt blocks may be temporarily (up to one year) placed in remote areas of the park (i.e., most sites would likely be within the wilderness) to attract mountain goats to suitable areas for carrying out management activities. Research has demonstrated that pre-baiting with salt and trace mineral blocks up to one year prior to removal actions can significantly increase effectiveness. Locations would be identified to provide for the greatest efficacy of either capture or lethal removal actions. Areas would either be located away from public use areas or closed to public access to minimize human-mountain goat conflicts. The maximum number of areas would be five. Salt blocks would be placed in impermeable containers to prevent salt from leaching into soils and would be removed once management activities are complete to limit effects to other wildlife species.
- **Firearms:**
 - High-powered rifles would be used in all lethal actions. Personnel involved, which could include NPS or other federal or state personnel, or other authorized agents (including skilled public volunteers) would have the appropriate skills and proficiencies in the use of firearms to maximize public safety, including experience in the use of firearms for the removal of wildlife. Any lethal action would be completed as humanely as possible. Under all alternatives, mountain goats injured during management activities would be dispatched as quickly as possible to minimize suffering. The specific management elements and actions that could be used for the lethal removal of mountain goats are as follows: Helicopters and fixed-wing aircraft would be used to access areas where goats need to be dispatched and high-powered firearms would be used to dispatch mountain goats in and adjacent to the park.

- **Animal Welfare:**
 - The NPS would adhere to guidelines from the American Veterinary Medical Association on euthanasia of animals to ensure that management actions are conducted as humanely as possible to minimize mountain goat suffering. When capturing mountain goats for translocation, management actions would be designed to maximize the humane treatment of animals including capturing nannies with dependent “kids” together in order to enhance the likelihood of survival. The NPS would use a variety of techniques to improve the survival rates of nannies with dependent kids. These include but are not limited to: trapping nannies with kids in clover traps and transporting them together to holding areas, if the kids did not enter traps they could be caught adjacent to nannies with either net guns or immobilized with drugs. When using helicopters the same techniques could be used and every effort made to secure the dependent kids with the nannies. This could be done by separating nannies with kids during pursuit and keeping the groups together and then using net guns to capture both animals in one net. If using drugs then similar techniques would be applied: capturing the nannies first and then the kids if they stayed near the immobilized adult or once the adult is caught pursuing the dependent kid. Nannies and their kids would be transported together. When using lethal removal with firearms, consideration would be given to the choice of firearm, non-lead ammunition, and shot placement to ensure the humaneness of the action.
- **Carcass Handling and Disposal:**
 - Mountain goat carcasses resulting from management activities would be left in the field but would be relocated away from trails, campsites, or where visible from high visitor use areas. If feasible, carcasses could be provided to interested tribes, mainly for the hides and horns, and may be transported out by helicopter.
- **Does the proposed action involve new construction or repair/rehab to existing structures/utilities/assets?**
 - No
- **Does the project take place in the same location/footprint/trench used before, or in a previously undisturbed area?**
 - Capture and lethal removal action would take place range-wide and could occur in or outside of previously disturbed areas. This could entail the use of a helicopter for sharpshooting and on-the-ground carcass removal (moving the goat carcass to an area outside of immediate public sight (>100m and out of sight) – some areas may be visible but unsafe to access or may need on-the-ground operations to assist with removal by helicopter).
 - As many goats would be captured as possible. There would be no hazing of goats while capture is still an option as hazing would make capture operations more difficult. Once the capture operations are complete, if goats show up in an area where there are visitors and the goats are habituated, then they would be hazed. Therefore, hazing and marking would continue to occur throughout the entire mountain goat range.
- **Would the project involve ground disturbance (cut or fill)? If so, how many cubic yards and where would materials be deposited (both temporarily and permanently)? If fill materials are taken, identify the specific site fill taken from and if the materials are native to the park. How would fill be “stored”?**
 - This project does not involve cut or fill ground disturbance. Signs would not be placed on new posts, and therefore no new holes would need to be dug. Signs would be placed at trailheads, on established bulletin boards, or on existing trail signs.
- **How much excavation would be necessary (quantify by width, length, depth, cubic feet, number or lines, etc.)**
 - None
- **Would the proposal involve work in or near a known archeological site or other historic property?**
 - Exotic mountain goat removal activities could occur in or near known archeological sites or other historic properties.
- **Would a staging area be required? If so, identify staging area(s), include map, what type of materials and/or equipment and for how long? What would be the estimated square footage of the staging area?**
 - Staging areas for capture and lethal removal operations are described above. They would not be located in designated wilderness.

- **How/where would construction debris be disposed of?**
 - N/A
- **How much surface area would be disturbed, cleared, or denuded of vegetation (quantify by square footage, # of trees removed, etc.)**
 - None to very little – there may be a need to move (by dragging) a lethally removed goat out of sight of visitors/out of high use areas. The disturbance to vegetated areas would be damage from trampling by staff as well as by goats.
- **Would the project involve any geologic or hydrologic features/alter stream courses, surface or ground water flow?**
 - No
- **Would the proposal involve structures, fill, or discharge into water (example: bridge crossing, boardwalk, gravel, culverts, etc.)?**
 - No
- **Would the proposal affect water quality or quantity?**
 - No
- **What changes would occur in land/facility use?**
 - None
- **What changes would occur to traffic flow or visitor circulation?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use and parking areas utilized as staging areas would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Would the proposal require aerial operations?**
 - Translocation operations require aerial operations to identify areas for aerial capture operations, drop off capture equipment and capture/translocate goats. Lethal removal operations, at the scale of this proposed action in remote and rugged terrain, would also require aerial operations as a sharpshooting base, for carcass removal to the frontcountry for interested tribes, or moving the carcass out of public sight and >100m). Each year there would be a maximum of two 2-week operations (in July and in August or September) of up to 8 flight hours per day. There may be up to 2 helicopters in the air at one time, weather and funding dependent (this is the maximum, the actual likelihood is that there would be only one helicopter at a time. The purpose for two helicopters is that there would be one conducting lethal removal operations and the other would act as a spotter). If it is determined that a necropsy is necessary on a lethally removed goat, then a helicopter may also be utilized to facilitate in the physical removal of the goat from the backcountry/wilderness to the frontcountry. There would be no need for aerial surveys, but there may be a need to conduct reconnaissance flights prior to maintenance operations to search for remnant goats; likely over one to two mornings (4-8 hours over 2 days). A maximum of 768 flight hours could occur over 96 days across a 4-year period on the Olympic Peninsula.
- **Would the proposal alter visitor services, activities, or experiences?**
 - If area closures are implemented, visitors would not be able to enter those areas/hike those trails. If there is a need to conduct a lethal removal operation, those areas would be closed to visitor use and parking areas utilized as staging areas (including the wilderness trailheads at those parking areas) would also be closed to visitor use. These closures would be temporary, only long enough to conduct the operation.
- **Where would the action take place?**
 - The translocation and lethal removal operations would take place in areas where goats are located, primarily within the Daniel J. Evans Wilderness.
- **When would the action take place?**
 - For two weeks during the month of July or August/September for 3-5 years.
- **What design and standards would apply?**
 - Helicopter safety, which would be developed in a Helicopter Safety Plan. Staff and visitor safety protocols would also be implemented.
- **What methods, tools, and techniques would be used?**
 - See the Wilderness 4(c) Prohibitions Worksheet for alternative D below.
 - Nuisance control measures: Nuisance control measures would be employed minimally as needed on a case-by-case basis and the specific actions would be the same range from hazing to lethal removal as identified under the no action alternative.

- Interpretive tools: Increased interpretation including media outreach and website resources, detailed information would be provided regarding areas of potential closure.
- Access tools: Hiking into and out of areas for ground-based capture operations; helicopter use to drop off equipment (e.g., nets), to capture mountain goats in remote areas (primarily within the park wilderness) and to transport them out to staging areas for transfer to WDFW for translocation to receiving locations; hiking into and out of areas primarily within the wilderness for ground-based lethal removal; helicopter use for lethal removal of mountain goats from the air in remote areas as well as those that are otherwise difficult to access by foot. The use of fixed-wing aircraft for spotting in unsafe and steep wilderness terrain would help reduce impacts from the capture operation by not having the helicopter fly around as much searching for goats, using fixed-wing aircraft for spotting purposes helps to expedite the process and reduces helicopter flight hours.
- Tools for capturing mountain goats: Ground-based capture methods including drop nets, foot snares, darting, and clover traps; air-based capture methods including net guns and darting; as applicable, use of methods in 351DM2-351DM3 “Aerial Capture, Eradication and Tagging of Animals (ACETA) Handbook” (DOI 1997).
- Park closure tools: Short-term closures of limited areas for ground capture, hazing, and lethal removal actions (primarily within the wilderness); short-term closures of areas surrounding staging areas for takeoff and landing of helicopters (outside of wilderness but may affect wilderness trailheads).
- Baiting tools: Salt blocks could be used as a tool to attract mountain goats for capture.
- Lethal removal firearms: Lethal dispatch of mountain goats injured during management activities, as well as in the lethal removal of non-injured goats in the park.
- Animal welfare tools and considerations: All humane management methods and regulations would be taken into consideration and implemented as applicable.
- **How long would it take to complete the action?**
 - Approximately 3-5 years with lethal removal occurring as needed until the goat population is at zero.
- **What mitigation would be taken to minimize action impacts on park resources and values, and wilderness resources and character (where applicable)?**
 - Research and monitoring activities would take place opportunistically based on available funding. Possible research and monitoring efforts could involve management efficacy analysis and mountain goat population studies.
 - Project staff would coordinate flight schedules and paths with Naval Air Station Whidbey Island to ensure operations on the Olympic Peninsula and in the North Cascades forests do not interfere with active military training flight routes.
 - Capture and translocation efforts would strive to minimize stress and to protect the welfare of individual animals, including attempts to keep nannies and kids together.
 - Public notification of activities affecting wilderness would be provided, and appropriate information would be distributed at visitor centers.
 - Project staff would access the wilderness area via foot or by riding stock where possible, without risking life or limb. This would be considered for travel to sites accessible by trail or non-technical cross-country foot travel (e.g. without the use of crampons, ice axes, rope or other specialized equipment).
 - Foot travel would be considered for accessing sites for both baiting mountain goats ahead of time and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from helicopter operations. If staff and contractors can safely carry the load in, they would. Salt blocks may be carried in to Klahhane Ridge and Heart Lake.
 - Any 4(c) prohibited tool used would be the minimum requirement necessary for administering wilderness, and all other tools would be the ones that cause the least amount of disturbance to wilderness while successfully resolving the issue.
 - “Leave No Trace” principles would be applied to all management actions.
 - Helicopter operations would not be conducted within a minimum of 500 feet from marbled murrelet and northern spotted owl habitat.
 - Helicopter flight paths to and from staging areas would be designed to minimize noise impacts to wildlife and visitors to the greatest extent practicable (e.g., such as not flying directly over or low over known sensitive wildlife habitat areas or camping areas). Previously agreed upon travel corridors and flight altitudes for helicopters would be used during operations.

- Area closures in the immediate vicinity of mountain goat capture and lethal removal operations would minimize noise impacts to wilderness visitors.
- Contractors and other project workers would properly store and dispose of food and garbage (per Leave No Trace guidelines) while working on site.
- Lead-free ammunition would be used for lethal removal activities to prevent contamination.
- Exotic invasive plant management measures would be taken. If existing invasive plant infestations are documented, or if management activities introduce any invasive plants into the project area, they would be treated with appropriate herbicide, mechanical, or manual methods when practical. Also, all equipment and tools shall be cleaned completely and free of weeds, seed, debris, and mud to prevent the introduction or spread of exotic, invasive plants. Prior to entering the wilderness, all workers shall check boots, backpacks, and tools for weed seeds, mud that could harbor weed seeds, and plant parts to prevent the spread and introduction of invasive plants.
- If any individual spotted owl or marbled murrelet is observed during project operations, a wildlife biologist would be notified and measures to minimize or eliminate take would be applied.
- If subsurface archaeological evidence or previously unidentified cultural resources are located during implementation of the project, activities would cease pending an evaluation of cultural eligibility by a qualified archaeologist, who would determine appropriate mitigation measures. Project staff would fulfill its consultation requirements in accordance with 36 CFR 800.11.
- A communication plan would be developed by the NPS, USDA Forest Service, and WDFW that would include information on the ecological purpose and need of the activity and any area closures for visitors. News releases, signage, website, and other forms of communication would be prepared well in advance.
- Project staff would be properly trained regarding adherence to safety protocols identified in the Olympic National Park *Mountain Goat Action Plan*.

WILDERNESS ACT 4(C) PROHIBITIONS WORKSHEET

ALTERNATIVE D: Combination of Capture and Translocation and Lethal Removal (Preferred Alternative)	
4(c) QUESTION	4(c) EXPLANATION
What 4(c) prohibition(s) is (are) being proposed for use?	<ul style="list-style-type: none"> • Helicopters • Signs • Collars and Tags • Tools (blocks)
What is the 4(c) being proposed to be used for?	<ul style="list-style-type: none"> • Helicopters: Would be used for dropping off capture equipment and goat capture and delivery to staging areas; conduct lethal removal; spotting for goats for removal operations; flying out carcasses to interested tribes or for necropsy; assisting with on-the-ground removal (to move goat carcasses >100m from visitor use areas), and aerial goat reconnaissance flights. • Signs: Signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues (human-goat encounters) • Collars and Tags: Monitoring and tracking nuisance goats • Tools: These tools would be utilized to facilitate the capture or lethal removal of mountain goats
Why won't a non-4(c) use be successful?	<ul style="list-style-type: none"> • Helicopters: Helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool for actions under this alternative given that mountain goat removal would generally take place in remote and rugged alpine habitats where goats reside during the summer; the need to capture as many goats as possible so we can subsequently release as many goats as possible for each translocation event in an effort to reduce impacts on wilderness character as well as reduce pressure on available resources (time, staff, and funding); and the safety risks posed to personnel by the terrain. To remove nonnative mountain goats by ground-based efforts only would take a

	<p>tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would still likely be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources.</p> <ul style="list-style-type: none"> • Signs: There would be signs posted outside of the wilderness area on established trailhead bulletin boards and information may be provided at the Wilderness Information Centers; however, in instances of regulatory warnings regarding nuisance or hazardous goats or goat removal (capture or lethal removal) processes, signs may be posted in the wilderness area for visitor safety to remind visitors to be aware of either goat issues within the area or of project activities. • Collars and Tags: There are no non-4(c) methods available to effectively and safely track and monitor nuisance or hazardous goats. • Tools (salt blocks): If these tools are not used, the goat removal (capture or lethal removal) process would not be as effective or efficient and would require further impacts on wilderness character.
<p>How does this alternative reduce use of 4(c) compared to other alternatives?</p>	<p>Under this alternative there would be the most use of helicopters for both capture and translocation and lethal removal operations, however, this would greatly reduce any future need for helicopters for goat removal and other goat-related management activities as 90% of the goats would be removed from the park. Ground-based lethal removal would begin following capture operations in the fall of year two.</p>
<p>How will use of the 4(c) be mitigated?</p>	<p>Foot travel would be considered for accessing sites for both baiting mountain goats ahead of time and during the capture operational period. A helicopter would only be used when it would be the minimum necessary requirement and to limit impeding solitude/primitive recreation from helicopter operations.</p>

Alternatives Considered but Dismissed

A number of additional alternatives addressing mountain goat management within the Olympic Mountains were considered based on the results of internal discussion and public and agency scoping. These alternatives were not carried forward for detailed analysis because they would not meet the purpose, need, or objectives of the plan/EIS; would be inconsistent with NPS mandates; would be legally or technically infeasible; or would require a major change to a law, regulation, or policy. This section discusses those alternatives considered and why each was dismissed from further analysis.

<p>Increased Nuisance Control</p>	<p>An increase in the level of nuisance control within the park was considered as an alternative for the management of mountain goats within the park, particularly as it relates to bands of mountain goats in areas of high visitor use. However, this alternative would not meet plan objectives because there would still be impacts on sensitive resource areas and over time the mountain goat population would continue to increase within the park. As a result, this alternative would not meet the stated purpose, need, and objectives of this plan/EIS.</p> <p>In addition, increased nuisance control would be redundant with the no-action alternative. Under the no-action alternative, NPS would have the discretion to manage mainly individual mountain goats as well as bands of habituated mountain goats. NEPA does not require consideration of alternatives that are significantly similar to other alternatives. Since the no-action alternative would be similar in nature to an alternative that focused on increased nuisance control, increased nuisance control was dismissed as a stand-alone alternative.</p>
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<p>Fertility Control</p>	<p>The use of any form of fertility control was eliminated as an alternative to manage the mountain goat population in the park. Fertility control would not be effective in meeting the plan/EIS objectives for several reasons including the following: there is no registered chemical contraceptive technology available for use on mountain goats; surgical sterilization methods could present increased human safety concerns and would be extremely resource intensive; fertility control is not consistent with NPS policy for maintaining natural processes in wildlife populations; and the use of fertility control would not be consistent with maintaining wilderness character in the park. Additionally, this alternative would be inconsistent with NPS mandates related to the management of exotic species because mountain goat populations would not be reduced to a level at which impacts on natural resources and human safety would be alleviated.</p>
<p>Introduction of Wolves</p>	<p>The gray wolf (<i>Canis lupus</i>) was extirpated from the Olympic Peninsula in the 20th century. Consideration was given to reintroducing this apex predator to the park as a potential means for managing mountain goats since it is a native species. However, this alternative would be ineffective in meeting the plan/EIS objectives for two main reasons: predation by wolves would not play a significant role in limiting mountain goat populations, particularly where other prey species such as Roosevelt elk (<i>Cervus canadensis roosevelti</i>) are available; and reintroduction of wolves could result in a change in the distribution of mountain goats in areas of high visitor use due to predator avoidance behavior, exacerbating mountain goat-human interactions. As a result, this alternative would be inconsistent with NPS mandates for managing exotic species because mountain goat populations would not be reduced to a level at which impacts on natural resources and human safety would be alleviated.</p>
<p>Use of Salt Blocks as a Long-term Management Measure</p>	<p>This alternative would involve placing salt blocks strategically within the park in order to attract mountain goats away from areas with high visitor use as well as areas with high levels of endemic species. This alternative would not meet the plan/EIS objectives and would be inconsistent with NPS mandates because mountain goats would continue to impact natural resources and human safety within the park. Additionally, the use of salt blocks would not be consistent with maintaining wilderness character in the park. Although this alternative could result in concentration of impacts away from important park resources, it could result in impacts on species native to the park (e.g., deer, elk and marmots) that may be attracted to the salt blocks, which could make them more susceptible to predation or diseases. This was dismissed as a stand-alone alternative for the management of mountain goats within the park; however, it may be used as a management element within the action alternatives being considered.</p>
<p>Public Hunting in the Park</p>	<p>During public scoping for this plan/EIS, several comments were received advocating for public hunting within the park as a tool for managing mountain goats. An alternative that involved public hunting to manage mountain goats inside the park would be inconsistent with existing law and regulatory authority regarding public hunts in the park. The likelihood that Congress would change its longstanding policy regarding hunting in parks is remote and speculative (Natural Resources Defense Council, Inc. v. Morton, 458 F.2d 827 (D.C.C. 1972); National Rifle Association v. Potter, 628 F. Supp. 903 (1986); Headwaters, Inc. v. Bureau of Land Management, 914 F.2d 1174, 1181 (9th Cir. 1990); Seattle Audubon Society v. Moseley, 80 F.3d 1401, 1404 (9th Cir. 1996); Kootenai Tribe of Idaho v. Veneman, 313 F.3d 1094 (9th Cir. 2002)). In 1984, after careful consideration of congressional intent with respect to hunting in national parks, the NPS promulgated a rule (236 CFR 2.2) that allows public hunting in national park areas only where “specifically mandated by federal statutory law.” The NPS has reaffirmed this approach in the NPS <i>Management Policies 2006</i> (NPS 2006).</p> <p>Congress has not authorized hunting in any legislation for the park. Therefore, to legally allow hunting in the park, Congress would need to specifically authorize hunting and the NPS would need to promulgate a new regulation to implement the congressional action.</p> <p>In conclusion, the NPS eliminated public hunting within the park as a reasonable alternative for managing mountain goats for the following reasons: allowing a recreational hunt would require changes to federal law; case law supports dismissing an alternative that would require a major change in long-standing basic policy; and other alternatives, such as using trained park staff, other federal personnel, hired contractors from APHIS or</p>

	USDA Wildlife Services, state personnel, or trained volunteers, would be more effective in adhering to NPS policy, meeting the plan/EIS objectives, and ensuring public safety.
Tribal Hunting in the Park	During public scoping for this plan/EIS, comments were received advocating for tribal hunting within the park as a tool for managing mountain goats. However, although tribes reserved hunting on “open and unclaimed” lands under various Stevens’ treaties, the park is not considered “open and unclaimed.” As such, any tribal hunting would need to be considered similarly to public hunting. Therefore, the NPS eliminated tribal hunting within the park as a reasonable alternative for managing mountain goats for the same reasons as eliminating public hunting within the park.
Hunting Outside the Park	An alternative that would increase hunting of mountain goats in areas surrounding the park was suggested as a way to decrease the mountain goat population on the Olympic Peninsula, potentially resulting in a decreased population within the park. Hunting of mountain goats on adjacent lands managed by tribes and the USDA Forest Service is currently authorized by tribes and by WDFW. The NPS has no authority to dictate management activities on these adjacent lands. The NPS would, however, coordinate with the USDA Forest Service and WDFW to identify potential opportunities for maximizing harvest of mountain goats within the adjacent Olympic National Forest. However, this would not address reducing goat populations inside the park.
Discontinue Management – Allow Mountain Goat Population to Fluctuate Naturally	During the public scoping process, comments were received suggesting that mountain goat populations within the park should not be actively managed and that they should be allowed to fluctuate naturally. This alternative would be inconsistent with NPS <i>Management Policies 2006</i> related to the removal of exotic species. These policies require that exotic species be managed “up to and including eradication” (NPS 2006). Additionally, impacts under this alternative would increase over time as the mountain goat population continued to increase within the park. As a result, discontinuing management of mountain goats would not meet the purpose and need of this plan/EIS.
Capture and Translocate Mountain goats within the Olympic Peninsula	An alternative that would capture mountain goats within the park and translocate them to other areas on the Olympic Peninsula was suggested. This alternative was eliminated from further consideration because it would be likely that mountain goats would return to the park and would continue to impact natural resources and human safety, given that the majority of mountain goat habitat on the Olympic Peninsula is within park boundaries. Additionally, once mountain goats returned to the park, impacts would increase over time as the mountain goat population continued to increase within the park. This alternative was also eliminated because WDFW does not want additional mountain goats on NFS lands on the Olympic Peninsula.
Capture and Euthanize Mountain Goats	An alternative that would capture mountain goats within the park and chemically euthanize them at the location of capture was eliminated from further consideration. This alternative would not be considered a good use of park resources, because it would be financially and technically more efficient to use other American Veterinary Medical Association approved euthanasia methods. Lethal removal would also align more closely to humane animal care standards due to the quickness of culling compared to a prolonged stress associated with capture.
Fencing	An alternative that would construct a fence around the boundaries of the park was eliminated from further consideration for many reasons including the following: a boundary fence would interfere with native wildlife species and ecosystem processes; a boundary fence would not address impacts on natural resources and visitor safety within the park; and a boundary fence would present issues associated with development within designated wilderness areas.

9	Evaluate the impacts of each alternative	<p>Potential impacts to evaluate under <u>each</u> alternative:</p> <ul style="list-style-type: none"> • Wilderness character effects • Effects on natural resources • Cultural resources considerations • Social/recreational/experiential effects • Societal/political effects • Health/safety concerns • Economic/timing/sustainability considerations
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Alternative A (No Action):

Wilderness character effects (untrammled, natural, undeveloped, solitude or a primitive & unconfined type of recreation)

Positive effects:

- Untrammled: Under this alternative trammeling from exotic mountain goat lethal removal would not occur to the same extent as in alternatives C and D; as well as in alternative B, though to a lesser degree.
- Natural: See “Effects on Natural Resources”, below.
- Undeveloped: Under the no action alternative there wouldn’t be as much helicopter use as under the preferred alternative for capture and translocation operations, as well as for lethal removal operations.
- Solitude or a Primitive & Unconfined Type of Recreation: Under the no action alternative there wouldn’t be any aircraft use for capture and translocation operations, and there would be much less aircraft use for lethal removal operations than alternative D affecting visitors’ solitude. There would be less management restrictions on visitors (i.e., area closures) due to goat removal activities than in all three action alternatives.

Negative effects:

- Untrammled: Aversive conditioning to modify goat behavior would continue, as would lethal removal of goats. Paintball marking and permanent marking of goats including placing ear tags and radio collars.
- Natural: Non-native mountain goats would still be present within the park and wilderness and their populations would continue to increase. Therefore, this would continue to have a negative and continually declining effect on the natural quality of wilderness character. See also, “Effects on Natural Resources”, below.
- Undeveloped: There would be helicopter use for lethal removal operations that follow the protocols in the *Mountain Goat Action Plan* as part of the park’s Hazard and Nuisance Animal Plan. Helicopters would also be used for annual aerial monitoring. Nuisance goats would continue to be marked with tags and radio collars. Salt blocks may be placed to attract goats and regulatory warning signs placed regarding nuisance or hazardous goats.
- Solitude or a Primitive & Unconfined Type of Recreation: Under this alternative, while there wouldn’t be as much helicopter use as under any of the three action alternatives, there would still be some helicopter use adversely affecting opportunities for solitude. There would still be some areas closed to visitor access during hazing or lethal removal.

See Chapter 4 in the plan/EIS, specifically the impacts to wilderness/wilderness character for more detailed information.

Effects on natural resources

Positive effects: The number of goat carcasses introduced into the natural environment would be much less than the preferred alternative, thus there would be less scavengers feeding on carcasses and altering their normal behavior. This alternative also involves less aircraft use and less high-powered rifle use, thus reducing impacts on the natural soundscape.

Negative effects: The majority of exotic mountain goats in the Olympic Mountains are found within the Daniel J. Evans Wilderness, thus most goat-related impacts occur there. Mountain goats would continue to directly compete for forage resources with native wildlife species and would continue to degrade habitat used by other wildlife species. As the mountain goat population continues to grow, it would increase the potential for heavier, sustained browsing and grazing on plant communities in existing mountain goat summer and winter range within the park including the wilderness area. Additionally, it is expected that mountain goat habitat use and associated herbivory could expand over a larger area. Grazing pressure would be especially likely to intensify in areas of habitat preferentially selected by goats, such as rocky outcrops and cliffs, leading to increased impacts on plant communities in those habitats. Olympic subalpine and alpine plant communities are particularly sensitive to soil disturbance, therefore, soil disturbance associated with wallowing or rutting behavior would be expected to compound the impacts on vegetation associated with herbivory. The use of helicopters and/or firearms during lethal removal activities may cause

short-term disturbance of some wildlife species causing them to flee or be flushed from their habitat. Noise from aircraft and firearm use would also impact the natural soundscape. Mountain goats would continue to disturb sensitive alpine and subalpine soils by wallowing, trailing, and trampling. These behaviors would continue to remove and eliminate surface rocks and vegetation, exposing the sensitive mineral soils beneath. Over time, these impacts would expand geographically and would increase in intensity as the mountain goat population continues to grow and disperse. Considering the slow development of these sensitive soils, it is likely that they would be unable to recover in the near future resulting in long-term impacts to soils. Also, there would be some negative impacts to nuisance goats from on-going capture for radio collaring and tagging (this is done through foot snares).

Cultural resources considerations

Positive effects: No salt blocks would be placed in locations that would attract goats and have the potential for concentrated goat disturbance on any known cultural resources that may be present.

Negative effects: Under the no action alternative, the park would continue nuisance control activities such as lethal removal and hazing of mountain goats exhibiting unacceptable behavior but these management activities are not anticipated to slow the projected growth of the mountain goat population. Instead, the population is expected to increase under the no action alternative. This increase would result in a higher likelihood of impacts to archeological resources from wallowing, trailing, and trampling behaviors. These impacts would expand geographically and in intensity as the population grows and disperses. Impacts to archeological sites in the project area would therefore be adverse and permanent in nature.

Social/recreational/experiential effects

Positive effects: Mountain goats would continue to be present in alpine and subalpine areas of the park where they are currently found, including the wilderness area, and national forest, and may both increase in number and expand their habitat use to additional areas. The likelihood that visitors to the wilderness could encounter mountain goats would persist and could potentially increase. Long-term beneficial impacts would result for visitors whose experience is enhanced by the presence of mountain goats. Visitors' experiences would not be affected by aircraft conducting goat operations during July and August or September for 3-5 years.

Negative effects: Mountain goats would continue to be present in alpine and subalpine areas of the park where they are currently found, including the wilderness area, and national forest, and may both increase in number and expand their habitat use to additional areas. The likelihood that visitors to the wilderness could encounter mountain goats would persist and would increase. Long-term adverse impacts would result for visitors who do not wish to encounter goats because of safety concerns or other reasons. Intermittent access restrictions and trail closures due to reports of negative human-mountain goat interactions would likely continue and could possibly become more frequent or widespread, resulting in long-term adverse impacts to visitor use and experience. Visitors would be adversely affected by helicopter and firearm noise disturbances during instances that warrant lethal removal of nuisance goats.

Societal/political effects

Positive effects: Some visitors, local citizens, and interest groups enjoy seeing the goats; these groups would be more amenable to having only nuisance goats being lethally removed as under the no action alternative rather than goats being translocated or lethally removed as in the preferred alternative. Individuals or groups with values that hold that an individual animal's right to life outweighs non-native species' lethal removal would be more amenable to this alternative over the preferred alternative.

Negative effects: Some visitors and local citizens are very frightened of the goats, especially after the goat-related death of a local area resident in 2010 who was hiking in the park, and want the goats completely removed from the park. Under the no action alternative, no goats would be removed from the park with exception of those that become nuisance animals and then are lethally removed, and the population would increase unhindered.

Health/safety concerns

Positive effects: The no action alternative would not have near as many helicopter flights as the preferred alternative and therefore would have a lesser risk of helicopter-related safety issues. Interpretive and educational materials would continue to be distributed to the public at NPS visitor facilities, and would be made available online. Regulatory warning signs would continue to be placed at trailheads and within the wilderness and the NPS would continue to conduct outreach to visitors regarding mountain goat safety and proper reporting of mountain goat interactions. These actions would somewhat mitigate the potential for adverse impacts on visitor safety, but would not eliminate it.

Negative effects: Under the no action alternative, the continued presence of mountain goats in Olympic National Park including the wilderness area would result in a long-term visitor safety risk because the potential would remain for negative interactions between humans and mountain goats. Trail closures and access restrictions would be implemented as necessary in the event of a conflict between a goat and a visitor. Over time, the increase of the mountain goat population and potential expansion of mountain goat distribution would offset the beneficial effects of outreach, education, and access restrictions. Overall, the no action alternative would have long-term adverse impacts on visitor safety.

There would be potential under the no action alternative for injuries to NPS employees during mountain goat management actions such as monitoring, aversive conditioning/hazing, animal marking, lethal removal of hazardous goats, and other mountain goat management activities. Actions associated with mountain goat management could at times involve the use of helicopters through dangerous high elevation terrain as well as the use of firearms in the wilderness, which would present additional safety risks. The potential for employee accidents and injuries would be mitigated through proper training of staff and adherence to safety protocols identified in the Olympic National Park *Mountain Goat Action Plan* (NPS 2011a). Employee safety risks would persist in the long term, however, because mountain goats would remain in the Olympic Mountains indefinitely and their populations would continue to increase unhindered. The continued growth of the mountain goat population and potential expansion of distribution in the long term would be likely to increase the need for aversive conditioning and lethal removal activities, which could exacerbate risks to employee safety. As a result, the no action alternative could have long-term adverse effects on employee safety.

Economic/timing/sustainability considerations

Positive effects: The no action alternative requires less financial resources in the short term to manage goats than the financial resources that would be required in the short term for alternative D.

Negative effects: The park does not have the level of fiscal and staffing resources to fully implement the *Mountain Goat Action Plan*. There are also costs associated with the on-going removal of nuisance animals. As goat populations remain and increase unhindered, in the long term the no action alternative could be more costly than the short term costs associated with alternative D.

Alternative B: Capture and Translocation Only

Wilderness character effects (untrammled, natural, undeveloped, solitude or a primitive & unconfined type of recreation)

Positive effects:

- Untrammled: With a focus on capture and translocation, there would be less trammeling from lethal removal under this alternative.
- Natural: The number of goat carcasses introduced into the natural environment would be much less than in alternatives C and D, thus there would be less scavengers feeding on carcasses and altering their normal behavior. See also, "Effects on natural resources," below.
- Undeveloped: Goat capture and translocation operations would reduce the goat population by at least 50%, eliminating the need for collars and tags on nuisance or hazardous goats as once captured they would be removed rather than collared and tagged. This alternative seeks to capture as many goats per translocation event as possible to reduce the amount of helicopter time.
- Solitude or a Primitive & Unconfined Type of Recreation: No positive effects.

Negative effects:

- Untrammled: A federally-authorized action would occur (removal of 50% of the exotic mountain goats on the Olympic Peninsula) that would manipulate the biophysical environment. Direct human

intervention from the air for goat capture operations would be done through either the use of immobilizing drugs or net guns, delivered from a helicopter; ground-based capture methods would include baiting, drop nets, foot snares, and darting. Since only 50% of the population would be removed from the Olympic Peninsula, there would continue to be a need for future capture and translocation operations as well as hazing operations during high visitor use season, paintballing and other marking (tags or radio collaring), or lethal removal of nuisance goats.

- **Natural:** This alternative would remove only 50% of the exotic mountain goat population on the Olympic Peninsula via capture and translocation, leaving 50% of the population in place which would continue to increase. This action would not support the recovery or enhancement of the natural quality of wilderness character, nor the recovery of natural conditions (soils and endemic plants). Exotic mountain goats would remain a vector for nonnative plant species dispersal on the Olympic Peninsula. Noise from helicopter use, as well as increase and concentrated staff presence may disturb wildlife and would impact the natural soundscape. Salt blocks may be used to bait goats and may also attract other wildlife. See Chapter 4 in the plan/EIS, specifically the impacts to wilderness/wilderness character for more detailed information. The goat population would not be fully eliminated nor decreased to a point of phasing out on its own, therefore, the natural quality of wilderness character would not be enhanced by this alternative. Exotic mountain goats would also remain a vector for nonnative plant species dispersal on the Olympic Peninsula. Continued damage to endemic plant species could lead to the eventual impairment of those resources. The exotic mountain goats would continue to persist on the Olympic Peninsula and given that they were purposely introduced to the Peninsula (they did not migrate here on their own accord), they would continue to represent the “work of man” in a wilderness area. See also, “Effects on natural resources,” below.
- **Undeveloped:** Use of helicopters for goat capture and translocation operations. Salt blocks would be placed, possibly up to a year in advance of capture events. These actions would occur on a continual intermittent basis as the remaining goat population continues to increase. Signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues. Salt blocks may be placed to attract goats and regulatory warning signs placed regarding nuisance or hazardous goats.
- **Solitude or a Primitive & Unconfined Type of Recreation:** Use of helicopters during capture and translocation operations would create noise disturbances and may disrupt visitor solitude; and temporary area closures during implementation would have a negative impact on unconfined recreation. There would also be continued needs for temporary (short-term) area closures due to mountain goat-human interactions/the presence of a nuisance goat, as well as for potential future capture and translocation operations as the remaining population continues to increase. Hazing and marking operations would continue indefinitely which could have adverse impacts on solitude.

See Chapter 4 in the plan/EIS, specifically the impacts to wilderness/wilderness character for more detailed information.

Effects on natural resources

Positive effects: Reducing the exotic mountain goat population on the Olympic Peninsula by capture and translocation *may* allow some natural resources and processes to return to pre-goat conditions to the extent practicable depending on the dispersal of the remaining goat population as well as given current climate conditions. There *may* also be less competition for habitat and food sources with other, native or endemic species, but the competition would not be fully eliminated. In the long term, the 50% reduction in the mountain goat population and the dispersal of the number of goats that may remain in the ecosystem *may* result in slightly lower pressure on alpine and subalpine plant communities from goat herbivory.

Negative effects: With 50% of the population remaining, the population would continue to increase eventually leading to future removal efforts and/or increased pressure on, and damage to, alpine and subalpine plant communities, as well as on competition for resources and habitat. Baiting with salt blocks could be used to concentrate mountain goats for easier capture, and these salt blocks could attract other unintended wildlife such as deer. Air-based capture operations could involve the use of immobilizing drugs or net guns which would have disturbance effects on other wildlife due to noise. Ground-based capture operations could involve drop nets, foot snares, and darting which would also disturb other wildlife due to increased presence of humans and human activity. Once captured, mountain goats would be subdued by animal handlers at which point they may or may not be sedated for transport. While capture efforts would

strive to minimize stress and to protect the welfare of individual animals (including attempts to keep nannies and kids together), there is potential for injury and death of animals from accidents and stress resulting from these capture efforts. Management activities in mountain goat habitat under alternative B would also involve continued hazing, paintballing and other marking activities (tags or radio collaring), and lethal removal of nuisance mountain goats using firearms. Hunting and the use of firearms is prohibited in the national park and therefore are not normal sounds wildlife are used to, therefore, noise from firearm use could cause disturbance to wildlife. Noise from hazing operations could also cause disturbance to wildlife. The use of aircraft in mountain goat habitat and in staging areas adjacent to wilderness would produce sound that could impact wildlife causing them to temporarily disperse or retreat into dens. Noise from aircraft and firearm use would also impact the natural soundscape. Short-term adverse impacts to vegetation from management activities in mountain goat habitat under alternative B would result from trampling or crushing of vegetation associated with management personnel entering mountain goat habitat on foot and handling of captured mountain goats on the ground. There would continue to be damage to soils and vegetation including endemic plants due to wallowing. There would continue to be competition for habitat and food sources with other, native or endemic species. Impacts related to capture and translocation would be intermittent and indefinite. Due to goats not being completely eliminated, impacts from hazing, marking, and lethal removal of nuisance goats would also be indefinite, and would occur on a more regular basis than capture and translocation operations.

Cultural resources considerations

Positive effects: The removal of 50% of the mountain goats would temporarily reduce the occurrence of wallowing in the park which has unearthed previously unknown archeological sites and would temporarily reduce the potential to disturb any other known or unknown archeological sites in the future until the mountain goat population begins to rebound.

Negative effects: Capture and translocation activities could occur where known or unknown archeological sites are present. Baiting, such as the use of salt blocks, would likely be used to attract mountain goats to suitable areas for carrying out management activities. There is the potential for baiting to impact archeological sites if salt blocks are placed in locations where sites are present and mountain goat activity is then concentrated. Mountain goats would be attracted to these areas and could trample archeological materials near the bait. However, given the low density of archeological resources and the small areas where the bait would be placed, there is a low potential for these impacts to occur. Previously unknown archeological sites could be inadvertently disturbed or damaged.

Social/recreational/experiential effects

Positive effects: With the goat population reduced by 50%, visitors may feel less concerned about recreating in the park, especially in areas where goats are currently known to inhabit.

Negative effects: Use of helicopters during capture and translocation activities as well as for the use of helicopters and firearms for infrequent lethal removal operations for hazardous goats would create noise disturbances and may disrupt visitor experience; and area closures would also have a negative impact on visitor use and experience. Some visitors enjoy seeing the goats and may be disappointed to see less goats in the park.

Societal/political effects

Positive effects: Some visitors, local citizens, and interest groups enjoy seeing the goats; these groups would not want to see the goats completely removed from the park, if at all. Individuals or groups with values that hold that an individual animal's right to life outweighs non-native species' lethal removal would be more amenable to this alternative over alternative C, and would prefer to see the selection and implementation of either alternative A or B.

Negative effects: Some visitors and local citizens are very frightened of the goats, especially after the goat-related death of a local area resident in 2010 who was hiking in the park, and would like the goats to be completely removed from the park.

Health/safety concerns

Positive effects: Under alternative B, areas where active capture and removal operations are ongoing would be temporarily closed to park visitors to enhance visitor safety. NPS park rangers would patrol public areas to ensure compliance with park closures and public safety measures. The public would be notified of closures in advance so they can properly plan their wilderness trip. Information regarding mountain goat management activities would be available at visitor centers and posted on the park's website to inform the public of mountain goat management actions. Mountain goat capture operations within the park would be carried out only by qualified, properly trained NPS employees and contractors. Employees would apply safety training and awareness measures designed to reduce safety risks, including adherence to safety protocols outlined in the Olympic National Park *Mountain Goat Action Plan* (NPS 2011a). The greatest potential for adverse impacts to employee and visitor safety under alternative B would be in the short term, during initial capture and translocation activities, especially with the use of helicopters. In the long term, with a decreased population size, the potential for hazardous interactions between humans and mountain goats would be substantially reduced, resulting in long-term beneficial impacts on visitor safety. The frequency with which employees would need to engage in aversive conditioning, animal marking and tracking, and other activities used to manage dangerous goats would also decrease, resulting in beneficial impacts on employee safety. While occasional mountain goat management actions may be necessary over the long term to continue reducing the mountain goat population to as close to zero as possible, these activities would be expected to take place on an increasingly infrequent basis.

Negative effects: Impacts on employee safety could result from potential injuries (kicks, bites, stabbing with horns) that may occur with the handling of live goats during capture. Helicopter-based capture operations would present risk of accidents or injuries to NPS employees and contractors during capture and translocation efforts. If an accident occurred, the adverse impact to employee safety could be substantial, even catastrophic; however, the likelihood of an accident occurring is considered to be minimal. NPS employees and contractors taking part in helicopter-based operations would be highly trained and qualified, and required to observe proper safety protocol. There could also be safety issues with the infrequent use of firearms as well as with the use of drugs to capture goats (which is lethal to humans).

Economic/timing/sustainability considerations

Positive effects: With the eventual removal of goats completely from the park, over the long-term this action would save the park significant costs from having to hire seasonal staff each year to perform hazing and potential lethal removal actions in the implementation of the *Mountain Goat Action Plan*.

Negative effects: The costs to implement this project are substantial in the short-term but would provide greater long-term benefits in costs once the exotic goats are completely removed from the park. However, there would likely be the need for future capture and translocation operations due to a lesser number of goats captured and translocated under initial management activities under alternative B than would occur under alternative D which also includes lethal removal of 40% of the goat population.

Alternative C: Lethal Removal Only

Wilderness character effects (untrammled, natural, undeveloped, solitude or a primitive & unconfined type of recreation)

Positive effects:

- **Untrammled:** While the removal of exotic mountain goats is a federally authorized action that would manipulate the biophysical environment, this action would eliminate the need to conduct indefinite trammeling from regular hazing operations during high visitor use season, paintballing and other marking (tags or radio collaring) of exotic mountain goats, and eliminate the need for indefinite intermittent lethal removal of individual hazardous goats.
- **Natural:** Removing exotic mountain goats from the park would support the recovery of natural conditions (soils and native plants, including endemic species) of the park, as well as remove the goat as vector for non-native plant species dispersal on the Olympic Peninsula. See also, "Effects on Natural Resources", below.
- **Undeveloped:** Once the goat population is eliminated, there would no longer be any need to conduct goat census flights (via helicopter), nor any need for use of helicopter to intermittently

lethally remove individual hazardous goats. Collars, tags, and salt blocks and signs for mountain goat management would also no longer be needed.

- Solitude or a Primitive & Unconfined Type of Recreation: With the goats eventually removed from the park, visitors may feel more freedom to travel in the wilderness throughout former goat range. There would also be no need for area closures due to mountain goat-human interactions/the presence of a nuisance goat. Following complete goat elimination there would no longer be helicopter use for removal operations, interrupting visitors' solitude.

Negative effects:

- Untrammelled: A federally-authorized action would occur (removal of exotic mountain goats) that would manipulate the biophysical environment. Direct human intervention from lethal removal operations would include the action of lethally removing goats using firearms, and leaving goat carcasses in the field.
- Natural: Noise from helicopter and firearm use, as well as an increase in and concentrated staff presence may disturb wildlife and has negative effects on the natural soundscape. See also, "Effects on Natural Resources", below.
- Undeveloped: Use of helicopters for lethal removal operations and aerial reconnaissance flights. During the lethal removal period, signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues and nuisance goats would continue to be marked with tags and radio collars. Salt blocks may be placed to attract goats.
- Solitude or a Primitive & Unconfined Type of Recreation: Use of helicopters and firearms during lethal removal operations would create noise disturbances and may disrupt visitor solitude; and temporary area closures during implementation would have a negative impact on unconfined recreation.

See Chapter 4 in the plan/EIS, specifically the impacts to wilderness/wilderness character for more detailed information.

Effects on natural resources

Positive effects: Mountain goat removal by lethal removal would allow natural resources and processes to return to pre-goat conditions to the extent practicable given current climate conditions. With the removal of all goats there would be no further damage to soils and native and endemic plants due to wallowing. With the removal of goats there would be less competition for habitat and food sources with other native, including endemic, species. In the long term, the eventual elimination of the mountain goat population would result the elimination of pressure on alpine and subalpine plant communities from goat herbivory. Lethal removal from aircraft would have limited, if any, adverse effects on vegetation.

Negative effects: Management activities in mountain goat habitat under alternative C would involve lethal removal of mountain goats using firearms. Hunting and the use of firearms is prohibited in the national park and therefore are not normal sounds wildlife are used to, therefore, noise from firearm use could cause disturbance to wildlife. Leaving goat carcasses in the field could have an adverse effect on other wildlife species – such effects could include increased predation on species that may feed on goat carcasses as the carcasses may draw in an increased amount of other predator species. The use of aircraft in mountain goat habitat and in staging areas that are adjacent to wilderness would produce sound that could impact wildlife causing them to temporarily disperse or retreat into dens. Noise from aircraft and firearm use would also impact the natural soundscape. Short-term adverse impacts to vegetation from management activities in mountain goat habitat under alternative C would result from trampling or crushing of vegetation associated with management personnel entering mountain goat habitat on foot and handling of mountain goat carcasses on the ground (carcasses would be moved away from trails, camping areas, and other locations of high visitor use). These impacts would be intermittent, localized, would occur most frequently during the initial phase of reduction, and would not be substantial.

Cultural resources considerations

Positive effects: The removal of mountain goats would eliminate the occurrence of wallowing in the park which has unearthed previously unknown archeological sites and would remove the potential to disturb any other unknown archeological sites in the future.

Negative effects: Lethal removal activities could occur where known or unknown archeological sites are present. Previously unknown archeological sites could be inadvertently disturbed or damaged. However, given the low density of archeological resources and the small areas where goats may be dragged away from trails, camping areas or other areas of high visitor use, there is a low potential for these impacts to occur.

Social/recreational/experiential effects

Positive effects: With the goats eventually removed from the park, visitors may feel less concerned about recreating in the park, especially in areas where goats are currently known to inhabit.

Negative effects: Use of helicopters and firearms during lethal removal operations would create noise disturbances and may disrupt visitor experience; and area closures would also have a negative impact on visitor use and experience. Some visitors enjoy seeing the goats and may be disappointed if goats are removed entirely from the park.

Societal/political effects

Positive effects: Some visitors and local citizens are very frightened of the goats, especially after the goat-related death of a local area resident in 2010 who was hiking in the park, and would like the goats to be completely removed from the park.

Negative effects: Some visitors, local citizens, and interest groups enjoy seeing the goats; these groups would not want to see the goats removed from the park. Individuals or groups with values that hold that an individual animal's right to life outweighs non-native species' lethal removal would be more amenable to either alternative A or B.

Health/safety concerns

Positive effects: Under alternative C, areas where active lethal removal operations are ongoing would be temporarily closed to park visitors to enhance visitor safety. NPS park rangers would patrol public areas to ensure compliance with park closures and public safety measures. The public would be notified of closures in advance so they can properly plan their wilderness trip. Information regarding mountain goat management activities would be available at visitor centers and posted on the park's website to inform the public of mountain goat management actions. Lethal removal of mountain goats within the park would be carried out only by qualified, properly trained NPS employees, contractors, or skilled public volunteers. Employees would apply safety training and awareness measures designed to reduce safety risks, including adherence to safety protocols outlined in the Olympic National Park *Mountain Goat Action Plan* (NPS 2011a). The greatest potential for adverse impacts to employee and visitor safety under alternative C would be in the short term, during lethal removal activities, especially with the use of helicopters. In the long term, with a reduced population size, the potential for hazardous interactions between humans and mountain goats would be substantially reduced, resulting in long-term beneficial impacts on visitor safety. The frequency with which employees would need to engage in aversive conditioning, animal marking and tracking, and other activities used to manage hazardous goats would also decrease, along with the eventual elimination of regular census flights, resulting in beneficial impacts on employee safety. While occasional mountain goat management actions may be necessary over the long term to continue reducing the mountain goat population as close to zero as possible, these activities would be expected to take place on an increasingly infrequent basis.

Negative effects: Ground-based and helicopter-based lethal removal operations would present risk of accidents or injuries to NPS employees, contractors, and skilled public volunteers during lethal removal efforts. Ground-based activities could lead to strains, sprains, or broken bones. During helicopter-based lethal removal efforts, if an accident occurred, the adverse impact to employee and contractor safety could be substantial, even catastrophic; however, the likelihood of an accident occurring is considered to be minimal. NPS employees and contractors taking part in helicopter-based operations would be highly trained and qualified, and required to observe proper safety protocol.

Economic/timing/sustainability considerations

Positive effects: With the removal of goats completely from the park, over the long-term this action would save the park significant costs from having to hire seasonal staff each year to perform hazing and potential lethal removal actions of individual hazardous goats in the implementation of the *Mountain Goat Action Plan*. It would also save the NPS in costs of conducting aerial census flights every 5 years as well as the costs associated with purchasing and installing radio collars and tags on goats.

Negative effects: The costs to implement this project are substantial in the short-term but would provide greater long-term benefits in cost reduction.

Alternative D: Combination of Capture and Translocation and Lethal Removal (Preferred Alternative)

Wilderness character effects (untrammled, natural, undeveloped, solitude or a primitive & unconfined type of recreation)

Positive effects:

- **Untrammled:** While the removal of exotic mountain goats is a federally authorized action that would manipulate the biophysical environment, this action would eliminate the need to conduct indefinite trammeling from regular hazing operations during high visitor use season, paintballing and other marking (tags or radio collaring) of exotic mountain goats, and eliminate the need for indefinite intermittent lethal removal of individual hazardous goats.
- **Natural:** Removing exotic mountain goats from the park would support the recovery of natural conditions (soils and native plants, including endemic species) of the park, as well as remove the goat as a vector for non-native plant species dispersal on the Olympic Peninsula. See also, "Effects on Natural Resources", below.
- **Undeveloped:** Once the goat population is eliminated, there would no longer be any need to conduct goat census flights (via helicopter), nor any need for use of helicopter to intermittently lethally remove individual hazardous goats. Collars, tags, salt blocks and signs for mountain goat management would also no longer be needed.
- **Solitude or a Primitive & Unconfined Type of Recreation:** With the goats eventually removed from the park, visitors may feel more freedom to travel in the wilderness throughout former goat range. There would also be no need for area closures due to mountain goat-human interactions/the presence of a nuisance goat. Following complete goat elimination there would no longer be helicopter use for capture and lethal removal operations, interrupting visitors' solitude.

Negative effects:

- **Untrammled:** A federally-authorized action would occur (removal of exotic mountain goats) that would manipulate the biophysical environment. Direct human intervention from the air for goat capture operations would be done through either the use of immobilizing drugs or net guns, delivered from a helicopter; ground-based capture methods would include the use of baiting, drop nets, foot snares, and darting. Direct human intervention from lethal removal operations would include the action of lethally removing goats using firearms, and leaving goat carcasses in the field.
- **Natural:** Noise from helicopter and firearm use, as well as an increase in and concentrated staff presence may disturb wildlife and has negative effects on the natural soundscape. Salt blocks may be used to bait goats and may also attract other wildlife. See also, "Effects on Natural Resources", below.
- **Undeveloped:** Use of helicopters for goat capture and translocation as well as lethal removal operations and aerial reconnaissance flights. Salt blocks would be placed, possibly up to a year in advance of capture events. Signs would be posted to warn visitors of capture activities as well as of any nuisance or hazardous goat issues and nuisance goats would continue to be marked with tags and radio collars. Salt blocks may be placed to attract goats.
- **Solitude or a Primitive & Unconfined Type of Recreation:** Use of helicopters and firearms during capture and translocation as well as lethal removal operations would create noise disturbances and may disrupt visitor solitude; and temporary area closures during implementation would have a negative impact on unconfined recreation.

See Chapter 4 in the plan/EIS, specifically the impacts to wilderness/wilderness character for more detailed information.

Effects on natural resources

Positive effects: Mountain goat removal by capture and translocation as well as by lethal removal would allow natural resources and processes to return to pre-goat conditions to the extent practicable given current climate conditions. With the removal of all goats there would be no further damage to soils and native and endemic plants due to wallowing. With the removal of goats there would be less competition for habitat and food sources with other native, including endemic, species. In the long term, the substantial or complete reduction in the mountain goat population and the dispersal of the small number of goats that may remain in the ecosystem would result in much lower pressure on alpine and subalpine plant communities from goat herbivory. Lethal removal from aircraft as a shooting platform would have limited, if any, adverse effects on vegetation.

Negative effects: Baiting with salt blocks could be used to concentrate mountain goats for easier capture, and these salt blocks could attract other unintended wildlife such as deer. Air-based capture operations could involve the use of immobilizing drugs or net guns which would have disturbance effects on other wildlife due to noise. Ground-based capture operations could involve drop nets, foot snares, and darting which would also disturb other wildlife due to increased presence of humans and human activity. Once captured, mountain goats would be subdued by animal handlers at which point they may or may not be sedated for transport. While capture efforts would strive to minimize stress and to protect the welfare of individual animals (including attempts to keep nannies and kids together), there is potential for injury and death of animals from accidents and stress resulting from these capture efforts. Management activities in mountain goat habitat under Alternative D would also involve some level of lethal removal of mountain goats using firearms. Hunting and the use of firearms is prohibited in the national park and therefore are not normal sounds wildlife are used to, therefore, noise from firearm use could cause disturbance to wildlife. Leaving goat carcasses in the field could have an adverse effect on other wildlife species – such effects could include increased predation on species that may feed on goat carcasses as the carcasses may draw in an increased amount of other predator species. The use of aircraft in mountain goat habitat would produce sound that could impact wildlife causing them to temporarily disperse or retreat into dens. Noise from aircraft and firearm use would also impact the natural soundscape. Short-term adverse impacts to vegetation from management activities in mountain goat habitat under alternative D would result from trampling or crushing of vegetation associated with management personnel entering mountain goat habitat on foot and handling of captured mountain goats on the ground. These impacts would be intermittent, localized, would occur most frequently during the initial phase of reduction, and would not be substantial.

Cultural resources considerations

Positive effects: The removal of mountain goats would eliminate the occurrence of wallowing in the park which has unearthed previously unknown archeological sites and would remove the potential to disturb any other unknown archeological sites in the future.

Negative effects: Capture and translocation activities could occur where known or unknown archeological sites are present. Baiting, such as the use of salt blocks, would likely be used to attract mountain goats to suitable areas for carrying out management activities. There is the potential for baiting to impact archeological sites if salt blocks are placed in locations where sites are present and mountain goat activity is then concentrated. Mountain goats would be attracted to these areas and could trample archeological materials near the bait. Previously unknown archeological sites could be inadvertently disturbed or damaged. However, given the low density of archeological resources and the small areas where the bait would be placed, there is a low potential for these impacts to occur.

Social/recreational/experiential effects

Positive effects: With the goats eventually removed from the park, visitors may feel less concerned about recreating in the park, especially in areas where goats are currently known to inhabit.

Negative effects: Use of helicopters and firearms during capture and translocation as well as lethal removal operations would create noise disturbances and may disrupt visitor experience; and area closures would also have a negative impact on visitor use and experience. Some visitors enjoy seeing the goats and may be disappointed if goats are removed entirely from the park.

Societal/political effects

Positive effects: Some visitors and local citizens are very frightened of the goats, especially after the goat-related death of a local area resident in 2010 who was hiking in the park, and would like the goats to be completely removed from the park.

Negative effects: Some visitors, local citizens, and interest groups enjoy seeing the goats; these groups would not want to see the goats removed from the park. Individuals or groups with values that hold that an individual animal's right to life outweighs non-native species' lethal removal would be more amenable to this alternative over alternative C, and would prefer to see the selection and implementation of either alternative A or B.

Health/safety concerns

Positive effects: Under alternative D, areas where active capture and removal operations are ongoing would be temporarily closed to park visitors to enhance visitor safety. NPS park rangers would patrol public areas to ensure compliance with park closures and public safety measures. The public would be notified of closures in advance so they can properly plan their wilderness trip. Information regarding mountain goat management activities would be available at visitor centers and posted on the park's website to inform the public of mountain goat management actions. Capture and translocation of mountain goats within the park would be carried out only by qualified, properly trained NPS employees and contractors. Employees would apply safety training and awareness measures designed to reduce safety risks, including adherence to safety protocols outlined in the Olympic National Park *Mountain Goat Action Plan* (NPS 2011a). The greatest potential for adverse impacts to employee and visitor safety under alternative D would be in the short term, during initial capture and translocation activities, especially with the use of helicopters. In the long term, with the eventual eradication of goats, the potential for hazardous interactions between humans and mountain goats would be eliminated, resulting in long-term beneficial impacts on visitor safety. The frequency with which employees would need to engage in aversive conditioning, animal marking and tracking, and other activities used to manage hazardous goats would also be eliminated, along with the eventual elimination of regular census flights, resulting in beneficial impacts on employee safety. While occasional mountain goat management actions may be necessary over the long term to continue reducing the mountain goat population to zero, these activities would be expected to take place on an increasingly infrequent basis.

Negative effects: Impacts on employee safety could result from potential injuries (kicks, bites, stabbing with horns) that may occur with the handling of live goats during capture. Helicopter-based capture operations would present risk of accidents or injuries to contractors during capture and translocation efforts. If an accident occurred, the adverse impact to employee safety could be substantial, even catastrophic; however, the likelihood of an accident occurring is considered to be minimal. NPS employees and contractors taking part in helicopter-based operations would be highly trained and qualified, and required to observe proper safety protocol. There could also be safety issues with the use of firearms and the use of drugs to capture goats (which is lethal to humans).

Economic/timing/sustainability considerations

Positive effects: With the removal of goats completely from the park, over the long-term this action would save the park significantly from having to hire seasonal staff each year to perform hazing and potential lethal removal actions of individual hazardous goats in the implementation of the *Mountain Goat Action Plan*. It would also save the NPS in costs of conducting aerial census flights every 5 years as well as the costs associated with purchasing and installing radio collars and tags on goats.

Negative effects: The costs to implement this project are substantial in the short-term but would provide greater long-term benefits in cost reduction.

Alternative D is also the alternative that best supports the following five of the six public purposes of wilderness as noted in section 4(3)(b) of the Wilderness Act: conservation, scenic, recreational, scientific, and educational.

- **Conservation:** The translocation and removal of exotic mountain goats out of the Olympic Peninsula would support conservation of the wilderness area through the prevention of further destruction of natural and cultural resources from goat herbivory and wallowing. Translocation of mountain goats to the North Cascades forests would also support conservation of the wilderness areas in the Cascades Range due to the reestablishment of mountain goat populations in areas of the range where goats no longer reside but have historically been present.
- **Scenic:** The translocation and removal of exotic mountain goats from the Olympic Peninsula would enhance scenic vistas and viewsheds of the wilderness areas to that of the era prior to the introduction of exotic mountain goats. Translocation of mountain goats to the North Cascades forests would also enhance the scenic vistas and viewsheds of the wilderness areas in the Cascades Range due to the reestablishment of mountain goat populations in areas of the range where goats no longer reside but have historically been present.
- **Recreational:** The translocation and removal of exotic mountain goats from the Olympic Peninsula would enhance recreational opportunities for visitors as there would no longer be area closures due to nuisance goats, hazing, or removal activities (of hazardous goats), there would no longer be any human-goat conflicts, and visitors who are currently less inclined to recreate in the Peninsula wilderness areas due to the presence of exotic mountain goats may begin to visit these areas once the goats are removed. Translocation of mountain goats to the North Cascades forests would also enhance the recreational opportunities in the Cascades Range for photographers and hunters and other visitors who would like to see and experience mountain goats in their native habitat.
- **Scientific:** The translocation and removal of exotic mountain goats from the Olympic Peninsula would provide an opportunity for researchers to conduct experiments on potential outcomes such as, but not limited to, the recovery of soils and vegetation as well as on wildlife responses, among other research topics, after the removal of an exotic species. Translocation of mountain goats to the North Cascades forests would provide researchers with opportunities to investigate potential outcomes such as, but not limited to, the recovery of goat populations, responses of translocated goats to new areas of native habitat, and so on.
- **Educational:** The translocation and removal of exotic mountain goats from the Olympic Peninsula would provide opportunities, such as but not limited to, educating visitors on the observation of recovery in the landscape from the removal of the exotic species, among other potential outcomes. Translocation of mountain goats to the North Cascades forests would provide opportunities for visitors, such as but not limited to, learning about the enhancement and importance of the native goat population in the Cascades Range, among other potential outcomes.

There are safety risks involved with alternative D and these include potential injuries (kicks, bites, stabbing with horns) that may occur during handling of live goats during capture. Helicopter-based capture operations would present some risk of accidents or injuries to NPS employees and contractors during capture and translocation efforts. If an accident occurred, the adverse impact to employee safety could be substantial and could result in death; however, the likelihood of an accident occurring is considered to be minimal. NPS employees and contractors taking part in helicopter-based operations would be highly trained and qualified, and required to observe proper safety protocols. There could also be safety issues with the use of firearms and the use of drugs to capture goats (which is lethal to humans). Areas where active capture and lethal removal operations are ongoing would be temporarily closed to park visitors. NPS park rangers would patrol public areas to ensure compliance with park closures and public safety measures. The public would be notified of closures in advance. Information regarding mountain goat management activities would be available at visitor centers and posted on the park's website to inform the public of mountain goat management actions. Capture and translocation of mountain goats within the park would be carried out only by qualified, properly trained NPS employees and contractors. Employees would apply safety training and awareness measures designed to reduce safety risks, including adherence to safety protocols outlined in the Olympic National Park *Mountain Goat Action Plan* (NPS 2011a). The greatest potential for adverse impacts to employee and visitor safety under alternative D would be in the short term, during initial capture and translocation activities. In the long term, with a reduced population size, the potential for hazardous interactions between humans and mountain goats would be substantially reduced, resulting in long-term beneficial impacts on visitor safety until the population has been fully eliminated. The frequency with which employees would need to engage in aversive conditioning, animal marking, and other activities used to manage nuisance goats would also decrease and would eventually be completely eliminated, resulting in

beneficial impacts on employee safety. While occasional mountain goat management actions may be necessary to continue over the long term until the mountain goat population is at zero, these activities would be expected to take place on an increasingly infrequent basis.

A number of actions proposed in alternative D are uses prohibited in Section 4(c) of the Wilderness Act. However, following analysis these were found necessary to meet minimum requirements for the administration of the area for the purpose of the Act, with a focus on the agency's responsibility for preserving wilderness character. The planning team considered and dismissed options that do not involve helicopter use, because those alternatives would not be feasible given that the majority of mountain goats reside in remote and rugged alpine habitats during the summer; the importance of capturing as many goats as possible so as many goats as possible can be released into each selected translocation area for each event in an effort to reduce impacts on wilderness character as well as reduce pressure on available resources (time, staff, and funding); and the safety risks posed to personnel by the remote and rugged terrain. The FEIS has incorporated options that reduce helicopter use in alternatives C and D in an effort to limit the impacts on wilderness character. Also, under alternatives C and D, park staff and other personnel, including skilled public volunteers, would access wilderness areas on foot to lethally remove exotic mountain goats in all areas that are reasonably accessible by foot.

To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and would likely be impossible; even with a tremendous amount of time and resources it would likely still be impossible. Without the use of helicopters to remove goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources.

While alternative C (lethal removal only) was determined to have the least amount of overall impacts on wilderness character (only due to less frequent and shorter duration of maintenance activities), the planning team determined that alternative D (combination of capture and translocation and lethal removal) within the plan/EIS would provide the park with the best direction for the overall management of exotic mountain goats and meet the plan's objectives while limiting impacts on wilderness character. This determination was made during an interdisciplinary team workshop with the project's Cooperating Agencies. A process was followed that identified whether and to what extent each alternative in the DEIS addressed the plan's seven objectives, one of which was, "Protect the wilderness character of Olympic National Park," as well as all relevant laws and policies, to include (but not limited to) the Organic Act, Wilderness Act, National Historic Preservation Act, and the Endangered Species Act.

The Organic Act of 1916, which established the National Park Service, states that, "[the] purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." By removing nonnative mountain goats from Olympic National Park, the opportunity for impairment of sensitive resources (such as alpine and subalpine plant communities and archeological resources) would be avoided. The removal of nonnative mountain goats would also reduce the impacts on visitor enjoyment of all the park's resources (i.e., no further hazing, lethal removal, or human-goat interactions). Also, as goats remain on the landscape and there continues to be human-goat encounters, habituated and aggressive goats would continue to be hazed and may eventually be lethally removed which may require the intermittent use of a helicopter and could take place in marbled murrelet or spotted owl habitat during nesting season. The protection of these species is directed by the Endangered Species Act. With the continued presence and increase in exotic mountain goat population, archeological resources have been and would continue to be unearthed and possibly damaged from wallowing. The protection of these resources is directed by the National Historic Preservation Act.

The Wilderness Act, Section 2(a), states, "...and these areas shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment of wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness..." Section 2(c) of the Wilderness Act provides a definition of wilderness, "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." The presence of exotic mountain goats within the Daniel J. Evans

Wilderness represent a "work of man" given they were purposely introduced to the Olympics in exchange for Roosevelt Elk in the 1920s. As exotic mountain goat populations increase, their presence becomes more widely distributed within the Daniel J. Evans Wilderness, as do their impacts on sensitive vegetation, archeological resources, and visitor enjoyment. An unchecked population of exotic mountain goats in the Daniel J. Evans Wilderness could eventually lead to the impairment of the park's natural, and consequently wilderness, resources. Impairment of these resources is prohibited by both the Organic Act of 1916 and the Wilderness Act.

Under the National Environmental Policy Act, a preferred alternative is the alternative that "would best accomplish the purpose and need of the proposed action while fulfilling [the NPS] statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors" (2015 NPS NEPA Handbook). These factors were also taken into consideration in alternative selection.

Reviewed by: Ruth Scott Date 3-6-18
Wilderness Specialist

Leadership Team Comments on Preferred Alternative (recommendation to Superintendent for final review and approval)

Administration Division comments/recommended mitigations:

Reviewed by Administrative Officer: [Signature] Date 3/6/18

Interpretation Division comments/recommended mitigations:

Reviewed by Chief of Interpretation: [Signature] Date 3-6-18

Cultural Resources comments/recommended mitigations (include next steps for compliance with NHPA, other applicable cultural resource law/policy):

Reviewed by Section 106 Specialist: [Signature] Date 3/6/18

Visitor and Resource Protection Division comments/recommended mitigations:

Reviewed by Chief Ranger: [Signature] Date 3-7-2018

Facilities Management Division comments/recommended mitigations:

Reviewed by Chief of Facilities Mgmt: [Signature] Date 3/6/18

Natural Resources Division comments/recommended mitigations:

[Signature] 3/6/18

T & E Species Determination of Effect (No Effect (NE), Not Likely to Adversely Affect (NLAA), Likely to Adversely Affect (LAA):

- Bull Trout: _____
- Marbled Murrelet: _____
- Northern spotted owl: _____
- Other: _____

Reviewed by Chief of NRM:



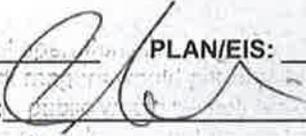
Date 3-6-18

Compliance Pathway Determination:

Categorical Exclusion: EA:

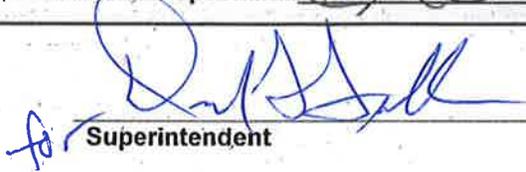
PLAN/EIS: X

Recommended by Env. Protection Specialist:



Date: 3/6/18

Approved by:


Superintendent

3/8/18
Date

**APPENDIX F: OLYMPIC, MT. BAKER-SNOQUALMIE, AND
OKANOGAN-WENATCHEE NATIONAL FORESTS MINIMUM
REQUIREMENTS ANALYSIS**



Minimum Requirements Analysis:

Mountain Goat Removal from Olympic National Forest Wilderness Areas



Responsible Official:
James M. Peña, Regional Forester

For More Information Contact:
Becky Blanchard, Wilderness Program Manager, Pacific Northwest Region

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Portland, OR 97204
503-808-2449

Susan Piper, Forest Wildlife Biologist, Olympic National Forest

Olympic National Forest
1835 Black Lake Blvd. SW
Olympia, WA 98512
360-956-2435

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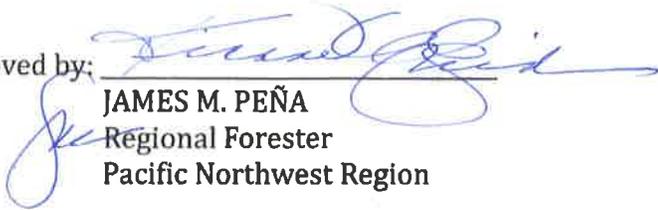
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I have selected Alternative 1 (capture and remove mountain goats using helicopter) as the minimum requirement for the administration of the wilderness areas on the Olympic National Forest for the purpose of the Wilderness Act.

I approve the following prohibited uses found in Section 4(c) of the Wilderness Act as described in Alternative 1:

- Mechanical transport: Use of fixed-wing aircraft and helicopters
- Landing of aircraft: Up to 144 landings
- Installations: Temporary installation of salt blocks

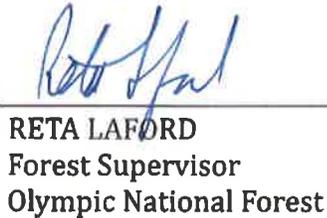
Approved by: _____


JAMES M. PEÑA
Regional Forester
Pacific Northwest Region

Date: _____

12 Mar 18

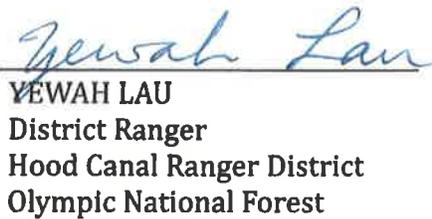
Reviewed by: _____


RETA LAFORD
Forest Supervisor
Olympic National Forest

Date: _____

3/12/18

Reviewed by: _____


YEWAH LAU
District Ranger
Hood Canal Ranger District
Olympic National Forest

Date: _____

3/12/18

Mountain Goat Removal from Olympic National Forest Wilderness Areas

Introduction

Olympic National Park proposes the reduction and future elimination of the mountain goat (*Oreamnos americanus*) populations in the Olympic Mountains. Mountain goats are not indigenous to the Olympic Peninsula (Festa-Bianchet, Côté 2012, 11-12). Populations on the Olympic Peninsula primarily reside in the Daniel J. Evans Wilderness in Olympic National Park (Noss et al. 2000). However, groups range from the Daniel J. Evans Wilderness into neighboring The Brothers, Buckhorn, Colonel Bob, Mount Skokomish, and Wonder Mountain wilderness areas in Olympic National Forest. Mountain goat migration between National Park Service (NPS) and Forest Service (FS) lands necessitates cooperative management action.

A **minimum requirements analysis (MRA)** is required by law whenever land managers are considering a use prohibited by Section 4(c) of the Wilderness Act of 1964:

...and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

Section 2(a) of the Wilderness Act states that wilderness areas

shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character.

Wilderness character is not explicitly defined in the Wilderness Act. An interagency effort to provide direction related to wilderness character monitoring developed the following definition in the Technical Report, *Keeping It Wild 2: An Updated Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2015), which was in turn adopted by the four federal wilderness management agencies.

Wilderness character is a holistic concept based on the interaction of (1) biophysical environments primarily free from modern human manipulation and impact, (2) personal experiences in natural environments relatively free from the encumbrances and signs of modern society, and (3) symbolic meanings of humility, restraint, and interdependence that inspire human connection with nature. Taken together, these tangible and intangible values define wilderness character and distinguish wilderness from all other lands.

Keeping It Wild 2 links the conceptual definition of wilderness character to a practical meaning of wilderness character by using a framework of five “qualities” derived from the statutory definition of wilderness in the Wilderness Act. Taken together, these five qualities represent the primary tangible aspects of wilderness character that link on-the-ground conditions in wilderness and the outcomes of wilderness stewardship to the statutory definition of wilderness.

Four of the wilderness character qualities occur in every wilderness: untrammeled, natural, undeveloped, and solitude or primitive and unconfined recreation. A fifth quality, other features of value, may or may not occur within a specific wilderness. The five qualities of wilderness character are described in the table below (Landres et al. 2015:10-12):

Table 1. Qualities of Wilderness Character (Landres et al. 2015)	
Untrammeled	<i>The Wilderness Act states that wilderness is “an area where the earth and its community of life are untrammeled by man,” that “generally appears to have been affected primarily by the forces of nature” and “retain[s] its primeval character and influence.” This means that wilderness is essentially unhindered and free from the intentional actions of modern human control or manipulation.</i>
Natural	<i>The Wilderness Act states that wilderness is “protected and managed so as to preserve its natural conditions.” This means that wilderness ecological systems are substantially free from the effects of modern civilization.</i>
Undeveloped	<i>The Wilderness Act states that wilderness is “an area of undeveloped Federal land... without permanent improvements or human habitation,” “where man himself is a visitor who does not remain” and “with the imprint of man’s work substantially unnoticeable.” This means that wilderness is essentially without permanent improvements or the sights and sounds of modern human occupation.</i>

<p>Solitude or Primitive and Unconfined Recreation</p>	<p><i>The Wilderness Act states that wilderness has “outstanding opportunities for solitude or a primitive and unconfined type of recreation.” This means that wilderness provides outstanding opportunities for recreation in an environment that is relatively free from the encumbrances of modern society, and for the experience of (continued) the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations.</i></p>
<p>Other Features of Value</p>	<p><i>The Wilderness Act states that wilderness “may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” This quality captures important elements or “features” of a particular wilderness that are not covered by the other four qualities. Typically these occur in a specific location, such as archaeological, historical, or paleontological features; some, however, may occur over a broad area such as an extensive geological or paleontological area, or a cultural landscape.</i></p>

The MRA will consider (1) if administrative action in wilderness is necessary to preserve wilderness character or meet other direction in the Act or the requirements of other federal laws, and then (2) if action in wilderness is necessary, the minimum method or tool. Discussions of advantages or disadvantages of the project, in general, are beyond the scope of this inquiry.

Background

Mountain goats, first introduced in 1925 on the Olympic Peninsula, have since colonized most of the suitable high-country habitat in the Olympic Mountains. Jenkins et al. (2016) estimated 625 goats in the Olympic Mountains based on helicopter surveys conducted during summer 2016. From their data, approximately 12 percent of the population is located in Olympic National Forest.

The NPS, in cooperation with the Washington Department of Fish and Wildlife (WDFW) and the Forest Service, is preparing a mountain goat management plan to address the issue of mountain goats within Olympic National Park and the adjacent Olympic National Forest. The purpose for the plan would be to allow the NPS to reduce or eliminate impacts on Olympic National Park resources from exotic mountain goats, while reducing potential public safety issues associated with the presence of mountain goats in the park (NPS DEIS 2017, 1). As part of the plan, the lead agencies, the NPS and WDFW, recommend the use of helicopters for the following actions to remove mountain goats from the Olympic Peninsula:

- Capture mountain goats and haul in nets to staging areas for transport
- Facilitate the lethal removal of animals by serving as a platform for sharpshooters
- Transport personnel and equipment to accomplish operations in a safe and timely manner

In the initial phase of the three- to five-year operation, up to 300 healthy mountain goats would be transported to sites in the northern Washington Cascades. Translocation activities would occur over two, two-week management periods in the summer months over a period of two to three years. Capturing and translocating Olympic mountain goats would benefit management efforts to repopulate indigenous mountain goat populations in the North Cascades. Local populations are unlikely to rebound and are also unlikely to maintain healthy genetic variability without intervention (Harris and Steele 2014). There are known salt licks in the North Cascades (Rice 2010). In addition to capture, lethal removal is also proposed as a tool to remove mountain goats that are not translocated.

NPS is the responsible agency for the proposed action. Proposed activities on the Olympic National Forest would be carried out by NPS and WDFW. While proposed project details originate from materials provided by Olympic National Park, the selection of alternatives and the subsequent analysis herein is independent.

Step 1: Is action necessary in wilderness?

Description of the situation

Mountain goats were introduced to the Olympic Peninsula in the 1920s and are not indigenous to wilderness areas in Olympic National Park and the Olympic National Forest. In 2016, there were approximately 625 mountain goats in the Olympic Mountains (NPS DEIS 2017, 74). Approximately 12 percent of the population is located in Olympic National Forest (NPS DEIS 2017, 46), including within wilderness areas (see “Options outside of wilderness” below). Mountain goat populations on the Olympic Peninsula are increasing, with an 8% average annual rate of increase from 2004 to 2016. At this rate, there could now be approximately 725 mountain goats on the Olympic Peninsula (NPS DEIS 2017, 74). Mountain goats on the Olympic Peninsula range in groups of one to 31 individuals (Rice 2012).

The Olympic Mountains have no natural sources of salt (NPS DEIS 2017, 4). Mountain goats have a high affinity for salt and have learned to seek it from humans. Mountain goats can be a nuisance along trails and campsites where they persistently seek salt and minerals from human urine, packs, and sweat on clothing. In October 2010, a visitor hiking on a trail in Olympic National Park was fatally gored by a mountain goat. The Park’s existing *Mountain Goat Action Plan* seeks to minimize the potential for hazardous mountain goat-human encounters by managing individual mountain goats that have been identified as potentially hazardous through actions ranging from tracking to hazing to lethal removal. The current and projected distribution of mountain goats overlaps with many areas of high visitor use in Olympic National Park and Olympic National Forest (NPS DEIS 2017, 74).

Mountain goats have directly and indirectly impacted the sensitive alpine and subalpine native plant communities on the Olympic Peninsula. Changes in the relative abundance of plant species has been observed as a result of mountain goat herbivory; this has altered competitive interactions among plant species. Wallowing by mountain goats has impacted plant species as a result of soil disturbance and subsequent creation of mineral substrates for colonization by disturbance-oriented plant species. Mountain goats often seek salt by pawing and digging areas on the ground where hikers have urinated or disposed of cooking wastewater, causing soil erosion. In the early 1980s, when the mountain goat population had grown to more than 1,000 individuals prior to a series of live capture efforts, their impacts on vegetation were substantial and caused concern for the protection of rare plant populations. (NPS DEIS 2017, 4).

Olympic National Forest contains five wilderness areas, totaling 88,256 acres. Established by the Washington State Wilderness Act of 1984, Public Law 98-339, these areas are contiguous with the Daniel J. Evans Wilderness in Olympic National Park.

The Brothers Wilderness

The Brothers Wilderness, totaling 16,343 acres, is located south of Buckhorn Wilderness and north of Mt. Skokomish Wilderness, between the Dosewallips and Hamma Hamma rivers (<http://www.wilderness.net>). There are seventeen miles of established trails within the wilderness (USFS 2016a). There is abundant mountain goat habitat in the vicinity of The Brothers peaks (the elevation of the higher of the two peaks is 6,866 feet) and Mount Jupiter (elevation 5,701 feet) to the north. The 2016 mountain goat survey identified a

group, estimated to be seven individual mountain goats, in the vicinity of a popular climbing route to the summit of South Brothers peak.

Buckhorn Wilderness

Buckhorn Wilderness totals 44,251 acres and is divided into northern and southern management units by the Dungeness River and an access road system (<http://www.wilderness.net>). There are 59 miles of trail that provide hiking, backpacking, and stock access to the Buckhorn Wilderness (approximately 11 miles in the North Unit and 48 miles in the South Unit). The Gray Wolf River trailhead and the Slab Camp trailhead provide access to the North Unit. Main access points to the South Unit include the Upper Dungeness trailhead, Tubal Cain trailhead, Upper Big Quilcene trailhead, Mt. Townsend trailhead, Tunnel Creek trailhead, and Little Quilcene trailhead (USFS 2016b). The smaller northern portion is drained by the Gray Wolf River, which descends from higher mountainous terrain with abundant mountain goat habitat. High elevations host small mountain goat groups. The 2016 survey located three animals in four survey areas (mostly in the Daniel J. Evans Wilderness, adjacent to the forest).

Colonel Bob Wilderness

The Colonel Bob Wilderness, 11,850 acres in size, is located south of the Daniel J. Evans Wilderness near Lake Quinalt (<http://www.wilderness.net>). Terrain is steep, rising from 1,300 feet to 4,509 feet in less than a mile. Colonel Bob Wilderness has three access points: the Ziegler Creek trailhead, Pete's Creek trailhead, and Fletcher Canyon trailhead. There are twelve miles of established trails that access the subalpine reaches of the management unit (USFS 2016c). While there is suitable mountain goat habitat in the wilderness, WDFW and NPS wildlife biologists have only identified one individual male mountain goat.

Mount Skokomish Wilderness

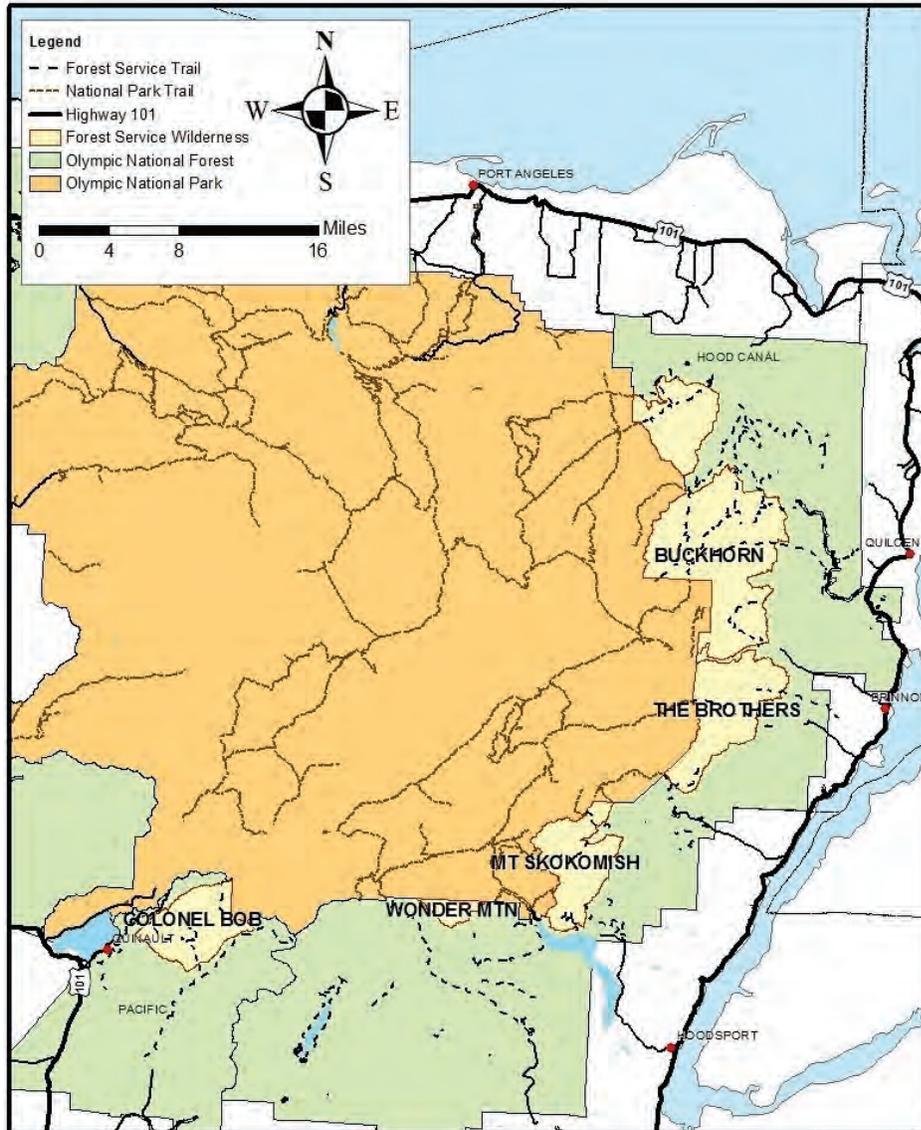
Mount Skokomish Wilderness, 13,280 acres in size, is southeast of the Daniel J. Evans Wilderness (<http://www.wilderness.net>). The wilderness is primarily accessed from the south near the Lake Cushman area, and has the highest concentrated recreational use on the forest. There are twelve miles of established trails in the wilderness. Access to the southern boundary of the wilderness is from the Mount Rose and Mount Ellinor trails, the highest use trail system in the forest. The interior of the wilderness is accessed from the Hamma Hamma River drainage on the steep Mildred Lakes Trail (USFS 2016d). The Mount Skokomish Wilderness hosts the largest groups of mountain goats on the forest. The mountain goat groups range in the vicinity of Mounts Washington, Rose, Ellinor, and Jefferson Peak to Mount Pershing, and from Mount Lincoln north to Mount Skokomish at 6,434 feet in elevation, on the northern boundary of the wilderness. The 2016 helicopter survey identified 40 mountain goats in the Mount Skokomish Wilderness.

Wonder Mountain Wilderness

The 2,201 acre Wonder Mountain Wilderness is one of the smallest wildernesses in the Western United States (<http://www.wilderness.net>). It is located on the southwestern side of the forest, east of Colonel Bob Wilderness and west of Lake Cushman. Wonder Mountain Wilderness rises from 1,740 feet to the 4,758 foot summit of Wonder Mountain. This wilderness is unique within Olympic National Forest because there are no established trails leading to or within it; access is primarily by user created waytrails. The two main access

roads to Wonder Mountain Wilderness have seasonal closures from October 1 to April 30, to protect wildlife (USFS 2016e). The mountain goat population is unknown.

The map provides an overview of the five wilderness areas potentially affected by the proposed action, mountain goat removal through capture and lethal removal. Listed clockwise are the National Forest Wilderness areas: Buckhorn, The Brothers, Mount Skokomish, Wonder Mountain and Colonel Bob.



Options outside of wilderness

Can action be taken outside of wilderness that adequately addresses the situation?

No.

Mountain goats populations range fluidly between Olympic National Park and Olympic National Forest. Mountain goats range outside of wilderness areas during winter months

(Rice 2008). Their summer range is in wilderness alpine and subalpine areas (Jenkins et al. 2016). The Mount Washington group (approximately 31 individuals surveyed in 2012) in the vicinity of Mount Ellinor and Mount Washington is, at times, an exception. The southeast face of the ridge where the group sometimes forages is outside the Mount Skokomish Wilderness.

The impacts of exotic mountain goats on soil, vegetation, and visitor safety occur largely in their summer range, which is within wilderness with the exception of the small area used by the Mount Washington group described above.

The following actions outside of wilderness were considered:

- Remove mountain goats while they are in winter range outside of wilderness. Removal of mountain goats is only feasible while the animals are utilizing their summer range, because locating and capturing or shooting the animals is not possible when they are dispersed under canopy, below the timberline in non-wilderness areas. The animals are elusive and extremely difficult to locate.
- Remove mountain goats while they are in summer range outside of wilderness. Only the Mount Washington group in the Mount Skokomish wilderness has summer range that includes an area outside wilderness, a small ridge face where they sometimes forage. Capture or lethal removal only taking place when the Mount Washington group is utilizing this area would have no lasting effect for this area since mountain goats from other groups would recolonize the area. It also would not address the impacts of mountain goats in other Olympic Peninsula wilderness areas.
- Remove mountain goats only from Olympic National Park and not from wilderness areas in Olympic National Forest. Capture or lethal removal only taking place in Olympic National Park would have no lasting effect since mountain goats would recolonize from the forest wilderness areas. Multi-agency collaboration is therefore required for success.
- Conduct visitor education outside wilderness to mitigate public safety issues. Visitor education is already part of the current *Mountain Goat Action Plan*. Visitor education does not address the impacts of mountain goats on soil and vegetation, or the impacts of their presence, as a non-indigenous species, on wilderness character.

Criteria for determining necessity

Valid existing rights or special provisions of other wilderness legislation

Action is not necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or the Washington State Wilderness Act of 1984, Public Law 98 through 339) that requires action.

Requirements of other legislation

Action is not necessary to meet the requirements of other federal laws.

Wilderness character

Action is necessary to preserve the following qualities of wilderness character.

- Natural. Ecological intervention actions are necessary to lessen negative effects to biotic communities resulting from mountain goats, which are a non-indigenous species that was introduced by humans in the 1920s. The presence of mountain goats is a visible effect of modern civilization, human manipulation, and impact. As described above, mountain goats alter natural ecological processes through herbivory and soil disturbance. Heather, grasses, and other alpine and subalpine plant communities have been heavily impacted from mountain goat browsing and wallowing behavior.
- Opportunities for Solitude or Primitive and Unconfined Recreation. Currently, mountain goat management activities impede on visitors' opportunities for solitude, from patrols monitoring habituated mountain goats in wilderness to hazing of nuisance mountain goats and the occasional lethal removal of animals through WDFW special hunt or tribal hunt as an extreme measure. In addition, aircraft overflights are used to survey mountain goats, with visual and noise effects for wilderness visitors. Visitor contacts and temporary area closures are used as to protect visitor safety in the event of conflict with aggressive mountain goats.
- Other Features of Value: Scientific Value (Endemic Species). The Olympic Peninsula's isolated biogeographic history and geographic isolation resulted in endemism of species and, also, no occurrences of some species common in the North Cascades. Mountain goats browsing, trampling and wallowing behavior cause adverse impacts to the alpine and subalpine ecosystems where many of these endemic species are found (NPS PMIS 2016).

Step 2: Determine the minimum activity

Other direction

Agency directives

Forest Service Manual (FSM) 2300, Wilderness & Related Resource Management

FSM 2320.3 - Policy

1. Where there are alternatives among management decisions, wilderness values shall dominate over all other considerations except where limited by the Wilderness Act, subsequent legislation, or regulations.
2. Manage the use of other resources in wilderness in a manner compatible with wilderness resource management objectives.
6. Manage each wilderness as a total unit and coordinate management direction when they cross other administrative boundaries.

(3, 4, 5, 7, 8, 9, 10, and 11 omitted, not directly applicable to the situation.)

FSM 2323.31 – Management of Wildlife and Fish – Objectives

1. Provide an environment where the forces of natural selection and survival rather than human actions determine which and what numbers of wildlife species will exist.
2. Consistent with objective 1, protect wildlife and fish indigenous to the area from human caused conditions that could lead to Federal listing as threatened or endangered.
3. Provide protection for known populations and aid in recovery in areas of previous habitation, of federally listed threatened or endangered species and their habitats.

FSM 2323.32 – Management of Wildlife and Fish – Policy

1. Recognize that States have jurisdiction and responsibilities for the protection and management of wildlife and fish populations in wilderness. Cooperate and work closely with State wildlife and fish authorities in all aspects of wildlife and fish management. Base any Forest Service recommendation to State wildlife and fish agencies on the need for protection and maintenance of the wilderness resource. Recognize wilderness protection needs and identify any needed requirements in coordination efforts and in cooperative agreements with State agencies.
2. Wildlife and fish management programs shall be consistent with wilderness values.
3. Discourage measures for direct control (other than normal harvest) of wildlife and fish populations.

5. Apply the “Policies and Guidelines for Fish and Wildlife Management in Wilderness and Primitive Areas,” developed jointly by the Forest Service, Bureau of Land Management, and the International Association of Fish and Wildlife Agencies in a practical, reasonable, and uniform manner in all National Forest wilderness units. Use the guidelines as a foundation for or as addendums to State or individual wilderness cooperative agreements.

(4 omitted, not directly applicable to the situation.)

FSM 2323.33a - Reintroductions

Reintroduce wildlife species only if the species was once indigenous to an area and was extirpated by human induced events. Favor federally listed threatened or endangered species in reintroduction efforts. Reintroductions shall be made in a manner compatible with the wilderness environment. Motorized or mechanical transport may be permitted if it is impossible to do the approved reintroduction by non-motorized methods (sec. 2326).

FSM 2323.33d - Other Wildlife Damage Control

The Regional Forester may approve other wildlife damage control projects on a case-by-case basis if necessary to protect federally listed threatened or endangered species or for public health and safety.

Forest Service Manual (FSM) 2326, Use of Motorized Equipment or Mechanical Transport in Wilderness

FSM 2326.02 - Objectives

1. Accomplish management activities with non-motorized equipment and non-mechanical transport of supplies and personnel.
2. Exclude the sight, sound, and other tangible evidence of motorized equipment or mechanical transport within wilderness except where they are needed and justified.

FSM 2326.03(3)

Discourages flights below 2000 feet above ground level and refers to the FAA recommendation below.¹

FAA Advisory Circular

TAC 91-36D (September 17, 2004)

All aircraft are requested to 1.) Avoid noise-sensitive areas and, wherever practicable, limit overflight at relatively low altitudes to such areas. 2.) Maintain a minimum altitude of 2,000 feet above the surface of noise sensitive areas. "Visual Flight Rules (VFR) Flight Near Noise

¹ Guidance on low-level flights over Designated Wilderness are recommendations. There is no statutory requirements except that noise from aircraft can be considered harassment of wildlife (16 USC 742j-1; 50 CFR Part 19). To harass is defined to “disturb, worry, molest, rally, concentrate, chase, drive, herd or torment.” Recommendations for overflights are included for reference in this analysis.

Sensitive Areas," defines the surface as: the highest terrain within 2,000 feet laterally of the route of flight, or the uppermost rim of a canyon or valley.

FSM 2326.1(5)

Guidelines cite conditions under which the use of motorized and/or mechanical transport use may be approved in wilderness. Directives specify conditions meeting minimum needs for protection and administration of the area as wilderness. These include:

- a) A delivery or application problem necessary to meet wilderness objectives cannot be resolved within reason through the use of non-motorized methods.
- b) An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.

("c" omitted, not directly applicable to the situation.)

Agreements with other agencies and partners

Memorandum of Understanding, Washington Department of Fisheries, Washington Department of Game (WDG), and USDA Forest Service Region 6 (August 1990)

Cooperators jointly agree "to utilize 'Policies and Guidelines for Fish and Wildlife Management in Wilderness', developed by the International Association of Fish and Wildlife Agencies, as the foundation for management of fish and wildlife in National Forest wilderness within Washington."

Policies and Guidelines for Fish and Wildlife Management in National Forests and Bureau of Land Management Wilderness (June 2006)

This document is intended as a framework for projects in wilderness between state fish and game agencies, represented by the Association of Fish and Wildlife Agencies (AFWA), and the Bureau of Land Management (BLM) and Forest Service. In As a matter of general policy, the BLM, Forest Service and AFWA agree that:

Fish and wildlife management activities will emphasize the conservation of natural processes, to the greatest extent possible. Management activities will be guided by the principle of doing only the minimum necessary to conserve and, if necessary, to enhance fish and wildlife resources, and to manage the area as wilderness.

and:

Proposed State fish and wildlife management activities that would involve uses generally prohibited under Section 4(c) of the Wilderness Act will be considered and may be authorized by the Federal administering agency. The FS and BLM will consult closely with the States and give careful consideration to State fish and wildlife interests when considering these proposed activities....

Removal of terrestrial wildlife species is addressed as a topic for coordination between the Forest Service and the state fish and game agency as part of implementation for transplanting wildlife:

12. Transplanting Wildlife

Transplants (removal, reintroduction, or supplemental introduction) of terrestrial wildlife species in wilderness may be permitted if necessary: (a) to perpetuate or recover a threatened or endangered species; (b) to restore the population of an indigenous species; or (c) to manage wildlife populations in accordance with the States' wildlife populations objectives.

Transplants shall be made in a manner compatible with the wilderness character of the area. Transplant projects require advance written approval by the Federal administering agency....

Guidelines for Transplanting Wildlife

Proposals for motorized methods and temporary holding and handling facilities that involve uses generally prohibited under Sec. 4(c) of the Wilderness Act will be considered and may be authorized by the Federal administering agency....

Management plans

Olympic National Forest Land and Resource Management Plan. 1990.

Forest-wide Standards and Guidelines, page IV-48:

"Potential actions involving nonindigenous fish and game (e.g. mountain goats) shall be coordinated with the Washington State Department of Wildlife and Fisheries. Use environmental analysis when appropriate."

Standards and Guidelines, Management Prescription B1 - Wilderness, pg. IV-84:

"Wildlife and fish populations should be managed to prevent damage to habitat that affects Wilderness values. Unacceptable changes shall be determined through the LAC process."

Supplemental Environmental Impact Statement for the 2015-2021 Game Management Plan (WDFW)

Objective 70:

"Clarify the needs for recovery and/or augmentation of populations in the North Cascades by 2017. If the assessment (above) demonstrates a clear benefit to be gained from translocation, and mountain goats are available for such purposes, implement at least one translocation project (including monitoring capable of informing future projects) by 2020."

Objective 73:

"Reduce the potential for mountain goat/human conflict through decreasing the incidence of habituated and/or conditioned goats, as well as the intensity of

habituation/condition of individual goats that frequent heavily used recreation areas.

Strategies:

...

e. Where feasible and needs warrant, conduct hazing, aversive conditioning, and if necessary, lethal removal of nuisance mountain goats.”

Time constraints

Mountain goats are elusive and difficult to locate when they are dispersed under canopy cover in their winter range. Location of mountain goats is only feasible when they are using their summer range. Additionally, avalanche conditions make the area unsafe for personnel outside of the warmer/low-snow season. Action would be feasible between July and September.

Components of activities

To identify the minimum activity to remove mountain goats from wilderness areas on the Olympic National Forest, the following discrete components or phases of each alternative will be compared. Specific details are covered in later sections under the *Alternatives* description.

- Transporting equipment and personnel
- Capturing mountain goats
- Removing mountain goats
- Future conditions

Alternative 1.) Capture and remove mountain goats using helicopters

Summary

Operations would occur over the course of 3 to 5 years, with most activities in years 1 to 4. Most operations in the first two years would be live capture and transport for translocation. However, personnel would consider culling aggressive, unhealthy or difficult-to-capture animals during this period. After the first two years, operations may include live captures but would shift to a majority of lethal removal towards the end of the operational period. Operations would occur over two, two-week management periods each year in July and August-September. In the second two-week period, there would be an area closure in a portion of the Mt. Skokomish Wilderness in the Mount Ellinor and Mount Washington area.

- Ground-based personnel (1-2 people: the handlers) and equipment would be transported by helicopter. Some personnel (2 people: the pilot and the darter) would conduct aerial operations by helicopter.
- Fixed-wing aircraft may be used for the purpose of locating groups of mountain goats (no landing of this type of aircraft would occur) and helicopters for capture and/or shooting mountain goats. Salt blocks may be used to bait goats at remote sites.
- Mountain goats that are captured would be transported by helicopter to staging areas outside wilderness for translocation to sites in the North Cascades. In subsequent years as capture becomes less effective, some mountain goats remaining after increased hunting seasons authorized by WDFW may be culled by sharpshooters shooting from helicopters; most carcasses would remain in wilderness.
- It is estimated there would be to up to 144 helicopter landings in wilderness (3 landings per animal captured for translocation).
- Operations in Olympic National Park and Olympic National Forest would remove at least 90% of mountain goats from the Olympic Peninsula. The North Cascades would receive translocated mountain goats to augment populations at risk of extirpation.

Locations

Wilderness area	Presence and estimated number of mountain goats	Removal priority
Mount Skokomish	The 2016 survey identified forty mountain goats, the largest population of mountain goats in the forest. Mountain goats are proximate to high visitor use areas.	Highest
The Brothers	The 2016 survey estimated seven individual mountain goats in the vicinity of a popular climbing route to the summit of south Brothers peak.	High

Buckhorn	High elevations host a small mountain goat group. The 2016 survey located three animals in four survey areas (mostly in the adjacent Daniel J. Evans Wilderness).	Low
Wonder Mountain	The mountain goat population is unknown.	Low
Colonel Bob	While there is suitable mountain goat habitat in the wilderness, researchers have only identified one individual male mountain goat.	Lowest

All proposed staging sites for helicopter and ground transportation operations are outside of wilderness areas. The helicopter staging area requires a large space for taking off and landing as well as an adequate area for veterinary care. Also required is access via improved road for loading mountain goats into trucks. Five staging areas have been identified. Three staging areas are in the northern part of Olympic National Park. Two staging areas are on Olympic National Forest, near the southeastern boundary of the park:

- Hamma Hamma Gravel Pit: This administrative site, historically used for transfer piles of rock road base, is located south of The Brothers Wilderness. The site is accessed from the paved Hamma Hamma Road (FS Road 25). The gravel pit is closed by a year-round gate.
- Upper Mount Ellinor Trailhead: This is a high-use public access point to the summit of Mount Ellinor, bordering the Mount Skokomish Wilderness. From the trailhead parking lot to the summit there is a 2,444 feet of elevation gain in 1.6 miles. The trailhead is accessed from the paved State Route 119 road to a gravel spur on FS Road 2419014. There are multiple points of access to the Mount Ellinor trailhead, both by designated trails and user trails from roads. System trails accessing the trailhead include numbers 812.1, 812.2, 827, 827.1, and 827.2. A complete closure of the upper trailhead for use as a helicopter staging area could be achieved by barricading FS Road 2419 at the junction of FS Road 24. The upper trailhead is within a mile of the largest group of mountain goats on the forest.

In total five staging areas (including three in Olympic National Park) are required because of the large size of the project area, the large spatial extent of mountain goat habitat, the dispersed nature of mountain goat populations, and the tendency for localized poor flying weather during summer months.

Activities at staging areas pose no long-term effects to wilderness. During management activities, wilderness visitors may see and hear aircraft flying between capture sites and the staging area. Access to wilderness may be impacted by closures at staging areas.

Transportation

Management activities for capture and translocation involve several modes of transportation for accessing remote areas in wilderness:

- Fixed-wing aircraft or helicopter would be used to identify areas for capture operations.
- A helicopter would be used to transport the capture team of 1 pilot, 1 darter, and 1-2 animal handlers. The pilot and darter would conduct aerial operations from the helicopter.

There are estimated to be up to 144 helicopter landings in wilderness (see Table 3). Weight restrictions for safe operations would not allow the helicopter to simultaneously carry all personnel (pilot, darter, and handlers) and one or more mountain goats (by sling load) in the same flight (Harris 2018b). For each mountain goat captured, the helicopter would land approximately three times to: (1) drop off the ground crew, (2) remove the animal(s) by sling load (no physical touchdown of the helicopter itself), and (3) pick up the ground crew. Helicopters would land external cargo nets and may physically touch down at capture sites to offload and onload crew. The helicopter would touch down briefly, typically 5-10 seconds.

Table 3 shows the number of estimated helicopter landings in Olympic National Forest wilderness areas under the action alternatives. Data on the number of mountain goats by complex is taken from the 2012 and 2016 mountain goat surveys (Rice 2012, Jenkins et al. 2016), organized by geographic location². Actual numbers of landings would vary depending on factors including the number of mountain goats present at the time of implementation, the need for mountain goats for translocation at that time, the ability to capture mountain goats, and the ability to remove more than one mountain goat per flight.

Mountain Goat Group Complex	Priority 1 through 5 (1 = highest)	Number Mountain Goats Observed	Alternative 1	
			Landings for translocation <i>(if all mountain goats were able to be captured for translocation)</i>	Landings for lethal removal <i>(for any lethal removal, there would be no landing)</i>
Copper Mountain	5	2	6	0
Mt. Washington / Mt. Ellinor	1	31	93	0
Flapjack—Skokomish	4	6	18	0
Mt. Bretherton	5	0	0	0
The Brothers	2	5	15	0
Mt. Jupiter	2	0	0	0
Constance—Townsend	2	4	12	0
Royal—Fricaba	4	0	0	0
Tyler—Baldy	3	0	0	0
Total Flights			144	0

² Copper Mountain group; Mount Washington group; Flapjack—Skokomish complex, includes Flapjack Lakes, Mt. Gladys, Mt. Henderson, Mt. Skokomish groups. Mt. Bretherton group; The Brothers group; Mt. Jupiter group; Mt. Constance—Townsend complex, includes Harrison Lake, Mt. Constance, Tunnel Creek, Warrior, Charlia Lakes, The Gargoyles, Marmot Pass, Buckhorn, Silver Lake, Copper Creek and Mt. Townsend Groups; Royal—Fricaba complex, includes Mt. Fricaba, Royal Lake and Royal Creek Groups. The Tyler Peak—Baldy complex includes, the Baldy and Tyler Peak Groups.

Capture and handling

Operations would occur over two two-week management periods per year in July and August-September. Operations on Olympic National Park and Olympic National Forest would capture up to 300 mountain goats for translocation. The objective would be to translocate up to 300 mountain goats, but the number of animals translocated and the number and proportion of animals captured from Olympic National Forest wilderness areas would depend on the outcome of capture operations in both Olympic National Park and Olympic National Forest. Proposed management elements and actions likely used for capture and translocation are as follows:

- Mineral salt lick blocks may be placed to attract mountain goats to suitable locations for greater efficacy for either capture or lethal removal actions. Preferred locations for salt licks are distant from public use areas or difficult to access to lessen human and mountain goat interactions.
- Mountain goats would be captured, transported and processed at one time. Mountain goats would be captured through air- and ground-based techniques.
- Air-based capture methods may include net guns and darting following guidelines in 351DM2-351DM3, “Aerial Capture, Eradication and Tagging of Animals (ACETA) Handbook” (DOI 1997).

Once a mountain goat is netted or darted, the helicopter would land to drop off the ground crew (handler and darter) as near the animal as safely possible in order to secure the animal for transport and reposition it if necessary. Immobilized animals would be stabilized. Captured mountain goats may or may not be sedated prior to transporting them to staging areas. The animal would be subdued, placed in an individual transport bag, and attached to a helicopter by a sling and belly hook or long line for transport to staging areas where they could receive veterinary care and be safely prepared for translocation.

To minimize stress, capture operations would seek to herd mountain goats over a 1- to 2-minute period per mountain goat, and pursuits lasting for more than 5 minutes would be abandoned. Animal processing time—from when the handler reaches the animal on the ground until the animal is in the transport bag— would typically be less than 10 minutes for animal welfare concerns. Using helicopter transport for the ground crew to reach animals on the ground would allow the handler to stabilize an animal within a few minutes of the animal being immobilized. This is necessary to minimize the chance of serious injury or death should the animal be positioned poorly or need recovery from respiratory depression.

Lethal removal

Lethal removal may be used, particularly toward the second half of the operational period. Aggressive, unhealthy or difficult-to-access animals may be shot. There would be no helicopter landings for lethal removal activities (see Table 3). Lethal removal would constitute an adjunct to legal hunting seasons authorized by WDFW. Lethal removal would likely be carried out by sharpshooters firing from helicopters, but could also include some ground-based operations as described in Alternative 4. Most carcasses would remain in wilderness; some may be packed out. Carcasses that fall near trails, campsites, or other areas where visitors gather would be moved to where visitors would be unlikely to come

into contact with them. Moving of carcasses would be accomplished by personnel traveling by foot or pack stock.

Forest area closures

Limited areas of the forest, inside and outside of wilderness, may be temporarily closed for up to two weeks while capture and lethal removal operations take place at the staging area(s) and capture site(s). There would be one two-week management period in July and one two-week management period in August-September each year of operations. Not all staging areas and capture sites would have activities in each management period. Visitor use locations and roads in vicinity of active staging areas (outside of wilderness) would be closed for safety.

- Where closures are implemented, visitors would be prohibited from entering wilderness sites by trail, route or cross country travel.
- Closures would be coordinated with wilderness and law enforcement officers and all other forest staff working nearby.
- Closures may be in effect for several days up to approximately 2 weeks.
- Forest-wide closures would not occur.

Alternative 3.) No-action alternative³

Summary

Under the no-action alternative, current options for management of mountain goats in wilderness areas would remain in place. Management activities associated with controlling human-mountain goat interactions include hazing mountain goats, distributing educational materials to visitors, and placing salt blocks in non-wilderness locations. Occurrences of management activities are case dependent. All operations in wilderness areas occur without prohibited uses such as landing of aircraft. Research and monitoring activities, including aerial surveys using helicopters and fixed-wing aircraft, would continue over Olympic National Forest wilderness areas. In comparison to the action alternatives, the continued habitat degradation, alteration of forage resources, and soil disturbance due to the no-action alternative would have greater long-term, adverse impacts on the natural quality of wilderness character. The continued abundance of mountain goats would also likely have substantial adverse impacts on vegetation through herbivory, trampling, and soil disturbance, which affects the relative abundance of plant species, alters interspecific competition, and degrades habitat for sensitive subalpine and alpine plant communities. As the mountain goat population continues to grow under the no-action alternative, these adverse impacts would expand geographically and in intensity.

- Transport of personnel and equipment for removal would not occur.
- Capture of mountain goats would not occur.
- Removal of mountain goats would not occur. However, as is the current situation, individual animals that are determined a danger to public safety may be culled.
- There would be no helicopter landings in wilderness.
- Mountain goats would remain in Olympic National Forest wilderness areas, and their population is expected to grow. If mountain goats were removed from Olympic National Park, mountain goats that remain in Olympic National Forest would be a source population to recolonize the park. The impacts of mountain goats on the natural quality of wilderness character—particularly sensitive alpine and subalpine vegetation, endemic species, and ecological processes—would continue, and may increase if the mountain goat population increases. The North Cascades would not receive mountain goats translocated from the Olympic Peninsula.

Locations

Management activities would occur on a case-by-case basis. Because mountain goats would not be translocated, there would be no capture sites or staging areas.

³ In the draft version of the MRA that was included in the DEIS, there was an alternative, Alternative 2, that would use helicopters to remove mountain goats but require ground-based personnel to be transported by non-motorized means (foot or pack stock). Based on subsequent consultation with NPS and WDFW, Alternative 2 was eliminated because it would not be feasible to implement. It is described in the section “Alternative considered but not fully analyzed”. Numbering of Alternative 3 from the previous draft was retained.

Transportation

Management activities would occur on a case-by-case basis. In wilderness, staff generally travel by foot. There would be no landing of aircraft or use of mechanical transport in wilderness, though annual overflights with helicopters and fixed-wing aircraft would continue to be used for monitoring mountain goat populations.

Capture and handling

Management activities would occur on a case-by-case basis. No capture would occur. Individual mountain goats that threaten public safety may be tracked and hazed. Salt blocks may be placed outside of wilderness.

Lethal removal

Management activities would occur on a case-by-case basis. In extreme cases, individual mountain goats that threaten public safety may be culled. WDFW special hunts or tribal hunts may be used. There is protocol in place to consider whether to approve lethally removing an animal; to date lethal removal has not been used.

Forest area closures

Temporary area closures may be used on a case-by-case basis to protect public safety.

Alternative 4.) Lethally remove mountain goats (no capture) using aircraft and ground-based personnel traveling by foot or stock⁴

Summary

Lethal removal using ground- and helicopter-based firearms would be used to reduce or eliminate mountain goats. Ground-based personnel, which may include NPS staff and trained volunteers, would access areas that could be reached on foot or stock, but in more remote areas, a helicopter would be used (there would be no landings in wilderness.) Mountain goats would not be translocated. The operational period would be 3 to 5 years, with most activity occurring in years 1 to 3 with activity in years 4 and 5 only if necessary. Helicopter-based operations would occur in the same two-week management periods as in Alternative 1. Ground-based operations would occur opportunistically at any time during the year as needed, with most activities in fall.

- Ground-based personnel would travel by foot or stock. As in Alternative 1, some personnel would conduct operations from helicopters or fixed-wing aircraft. However, there would be no landing of aircraft in wilderness.
- Lethal removal would occur with no capture. Animals would be culled through a combination of aerial gunning using fixed-wing aircraft or helicopters and ground-based personnel using firearms. Salt blocks may be used to bait mountain goats.
- Removal of mountain goats for translocation would not occur. Animals would be culled with most carcasses remaining in wilderness; some may be packed out.
- There would be no helicopter landings in wilderness.
- Future conditions on the Olympic Peninsula would be the same as in Alternative 1. The North Cascades would not receive translocated mountain goats.

Locations

Same as in Alternative 1.

Transportation

Ground-based personnel would travel by foot or stock, using National Forest System trails and traveling cross-country as needed to reach mountain goats. Any carcasses removed from wilderness would be transported by foot or stock. There would be no helicopter landings in wilderness (see Table 3).

Capture and handling

Capture and handling would not occur.

⁴ The draft MRA that was included in the DEIS did not have this alternative. Alternative 4 was added based on comments received and coordination with NPS and WDFW.

Lethal removal

Lethal removal would be by a combination of aerial gunning using fixed-wing aircraft or helicopters and ground-based personnel using firearms. To reduce aircraft use, management would start with ground-based efforts. Most carcasses would remain in wilderness; some may be packed out. Carcasses that fall near trails, campsites, or other areas where visitors gather would be moved to where visitors would be unlikely to come into contact with them. Moving of carcasses would be accomplished by personnel traveling by foot or pack stock. Mineral salt lick blocks may be placed to attract mountain goats to suitable locations for greater efficacy for lethal removal actions. Preferred locations for salt licks are distant from public use areas or difficult to access in order to lessen human and mountain goat interactions.

Forest area closures

Same as Alternative 1.

Effects to wilderness character

The following sections compare the three alternatives⁵ within the framework of the four universal wilderness character qualities: untrammeled, undeveloped, natural, and solitude/unconfined recreation. Information is organized into the following matrixes.

Untrammeled, natural, undeveloped, and opportunities for solitude or primitive and unconfined recreation qualities

Untrammeled	<i>"[An] area where the earth and its community of life are untrammeled by man," that "generally appears to have been affected primarily by the forces of nature" and "retain[s] its primeval character and influence." [W]ilderness is essentially unhindered and free from the intentional actions of modern human control or manipulation (Landres et al. 2015, 10-11).</i>
Alternative 1	Short-term: Darting, net gunning, baiting, and removing (through capture and lethal methods) mountain goats constitute modern human manipulation of animal behavior and movement. Long-term: Removing an established species or taking administrative actions to reduce its population are intentional actions to control the community of life.
Alternative 3	Managers continue to control human-mountain goat interactions through hazing and other activities that constitute modern human manipulation of animal behavior and movement.
Alternative 4	Short-term: Lethal removal of mountain goats for the purpose of population control constitutes modern human manipulation. Long-term: Removing an established species or taking administrative actions to reduce its population are intentional actions to control the community of life.

Natural	<i>"Protected and managed so as to preserve its natural conditions." [W]ilderness ecological systems are substantially free from the effects of modern civilization (Landres et al. 2015, 11).</i>
Alternative 1	Removing at least 90% of mountain goats on the Olympic Peninsula would eliminate a non-indigenous species or reduce its population with intent of elimination. Removal would support the recovery of soils and plants, including endemic species, because mountain goats' browsing, grazing, wallowing, trailing, and trampling would be eliminated, resulting in long-term, beneficial impacts on the natural quality of wilderness character.
Alternative 3	No change from the current condition; a non-indigenous large ungulate that was introduced by human remains. Its impacts to the ecosystem remain and may expand in geographic scope and intensity if the mountain goat population grows.

⁵ Alternative 2 from the draft MRA was eliminated because it would not be feasible to implement. This is documented in the section "alternatives considered but not fully analyzed".

<p>Alternative 4</p>	<p>Removing at least 90% of mountain goats on the Olympic Peninsula would eliminate a non-indigenous species or reduce its population with intent of elimination. Removal would support the recovery of soils and plants, including endemic species, because mountain goats' browsing, grazing, wallowing, trailing, and trampling would be eliminated, resulting in long-term, beneficial impacts on the natural quality of wilderness character. Implementation of Alternative 4 would accelerate soil and plant recovery because lethal reduction would take less time to reduce the mountain goat population than capture and translocation.</p>
<p>Undeveloped</p>	<p><i>"[A]n area of undeveloped Federal land... without permanent improvements or human habitation," "where man himself is a visitor who does not remain" and "with the imprint of man's work substantially unnoticeable." [W]ilderness is essentially without permanent improvements or the sights and sounds of modern human occupation (Landres et al. 2015, 11).</i></p>
<p>Alternative 1</p>	<p>Short-term: The use of aircraft and landing of helicopters to transport personnel and mountain goats, as well as temporary installation of salt blocks, would have a temporary effect the Undeveloped quality of wilderness character. It is estimated that there would be up to 144 helicopter landings in wilderness.</p> <p>Long-term: Removing at least 90% of mountain goats on the Olympic Peninsula is intended to contribute to their elimination. If mountain goats were eliminated, aircraft overflights to perform surveys of their population abundance would no longer be needed.</p>
<p>Alternative 3</p>	<p>No change from the current condition. Aerial overflights would continue to be used to survey mountain goat population abundance.</p>
<p>Alternative 4</p>	<p>Short-term: Temporary installation of salt blocks would result in a short-term effect the Undeveloped quality of wilderness character. Helicopters or fixed-wing aircraft would be used for aerial gunning, but would not land in wilderness. There would be fewer flights than for Alternative 1 and no landings.</p> <p>Long-term: Removing at least 90% of mountain goats on the Olympic Peninsula is intended to contribute to their elimination. If mountain goats were eliminated, aircraft overflights to perform surveys of their population abundance would no longer be needed.</p>

<p>Opportunities for Solitude or Primitive and Unconfined Recreation</p>	<p><i>Wilderness provides outstanding opportunities for recreation in an environment that is relatively free from the encumbrances of modern society, and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations (Landres et al. 2015, 11-12)</i></p>
<p>Alternative 1</p>	<p>Short-term: Opportunities for solitude would be temporarily degraded by the presence of aircraft during management periods. The timing of management periods in July and August-September coincides with the high visitor use season. Visitors may see or hear helicopters flying over wilderness and hovering to pick up/drop off personnel, equipment, and animals. Public closures to access routes limit opportunities for primitive and unconfined recreation while operations are carried out.</p> <p>Long-term: Removing at least 90% of mountain goats would similarly reduce the ongoing management of mountain goat-human interactions through visitor contacts, the use of hazing devices such as air horns or paintball guns, and temporary closures.</p>
<p>Alternative 3</p>	<p>Long-term: Opportunities for solitude impeded by continuous need to manage mountain goat-human interactions through visitor education and the use of hazing devices such as air horns or paintball guns.</p>
<p>Alternative 4</p>	<p>Short-term: Opportunities for solitude may be temporarily degraded by the presence of fixed-wing aircraft and helicopters and ground-based personnel during lethal removal activities. The timing of management periods when aircraft would be used in July and August-September coincides with the high visitor use season; ground-based activities could occur at other times as well. However, there would be less use of aircraft than in Alternative 1. Visitors may see or hear aircraft flying over wilderness. Visitors may hear the sounds of firearms, reaching high decibel levels for short periods of time during operations. Public closures to access routes limit opportunities for unconfined recreation while operations are carried out, including during periods of high visitor use.</p> <p>Long-term: Removing at least 90% of mountain goats would similarly reduce the ongoing management of mountain goat-human interactions through visitor contacts, the use of hazing devices such as air horns or paintball guns, and temporary closures.</p>

Other Features of Value

The Wilderness Act identifies Other Features of Value that contribute to wilderness character such as features of ecological, geological, or other features of scientific, educational, scenic or historical value.

For all alternatives, no lasting impacts are expected to occur to geological, educational, scenic or historical features of value to wilderness areas on Olympic National Forest.

All alternatives would affect ecological and scientific wilderness values. The Olympic Peninsula’s isolated biogeographic history and geographic isolation resulted in endemism of species and, also, no occurrences of some species common in the north Cascades. The Olympic Mountains are surrounded by open ocean, the Strait of Juan de Fuca, Hood Canal, and a broad coastal plain. The region was further isolated during the Holocene period by

glaciers. The area is, in effect, a biotic island. As a result, endemism of multiple species is present. At least 16 animal species and eight plant species or subspecies are only found on the Olympic Peninsula. Examples include the Olympic marmot, Olympic pocket gopher, and Olympic milkvetch (NPS PMIS 2016). As a result of these ecological and scientific values, portions of neighboring Olympic National Park are designated as both an International Biosphere Reserve and a World Heritage Site (UNESCO 2016a; UNESCO 2016b). Mountain goats' browsing, trampling and wallowing behavior causes adverse impacts to alpine and subalpine ecosystems (NPS PMIS 2016). Removal of mountain goats through the action alternatives is therefore expected to benefit these ecological and scientific Other Features of Value. Under the no-action alternative, mountain goats would continue to have adverse impacts on alpine and subalpine ecosystems, and these impacts would expand in geographic scope and intensity as mountain goat populations grow.

Alternatives considered but eliminated from analysis

- Capture and remove mountain goats using helicopters with ground-based personnel traveling by foot or pack stock to reduce helicopter landings to approximately 1 landing per animal captured (previously Alternative 2). The draft MRA included an alternative, Alternative 2, in which ground-based personnel would travel by foot or pack stock to reach mountain goats rather than being transported by helicopter as in Alternative 1. It was estimated that this could reduce the number of helicopter landings to only one landing needed per animal captured for translocation, versus the estimated three landings per animal captured in Alternative 1. However, Alternative 2 would not only be infeasible to implement, it would violate humane animal care standards.

In typical operations, as reflected in Alternative 1, the handler handles the animal on the ground with assistance from the darter; in some cases, when the animal has been stabilized, hobbled, blindfolded, drugged, and contained in the sling, the darter may go with the helicopter in search of another animal while the handler stays with the first animal until needed to handle the second animal. The darter assists the handler with handling because it is considered unsafe for an individual to handle a mountain goat single-handedly, even if the animal is immobilized. Moreover, the drugs used to immobilize ungulates can be deadly to humans. NPS protocol requires that personnel work in pairs when handling immobilizing drugs or immobilized animals so that if one person is accidentally exposed to the immobilizing drug, the second person can quickly administer the reversal agent (NPS 2005).

To address this, Alternative 2 proposed a crew of ground-based personnel including the handler. The crew of ground-based personnel would travel into wilderness by foot or pack stock to the vicinity of the mountain goat group. As in Alternative 1, the helicopter would chase mountain goats and, from the air, the darter would immobilize an animal. In Alternative 2, the ground-based personnel would then travel by foot to reach the immobilized animal, stabilize it, and process it for removal. As in Alternative 1, the mountain goat would be attached to the helicopter by sling load, which constitutes a landing of the helicopter, and be flown to the staging area. The ground-based personnel would wait in the area until the helicopter returned to the capture site and then travel by foot to the next immobilized animal. At the end of the day, the ground-based personnel would either travel out of wilderness by foot or pack stock or would stay in a spike camp in wilderness. To reach all mountain goat groups and capture the same number of animals as in Alternative 1, it was proposed that the ground-based personnel would travel cross-country across steep, rugged terrain, and that high-angle climbing techniques may be required.

Consultation with WDFW and NPS between the draft and final MRA resulted in Alternative 2 being dismissed because it would not be feasible to implement for two primary reasons:

1. Due to the extremely steep and rugged terrain, most mountain goat groups would be inaccessible to personnel traveling by foot; using pack stock in these conditions would be even less successful. It is not reasonable to expect that capture team personnel, whose expertise is wildlife capture and handling, also have technical climbing skills; nor would high-angle climbing techniques be effective to reach mountain goats that are being pursued by air and running, scattered, across the landscape. Few, if any, mountain goat groups could be captured with ground-based personnel traveling this way, and most mountain goats would therefore be lethally removed (in effect, this would be similar to Alternative 4).
 2. Mortality of mountain goats immobilized for capture would be greatly increased due to the time it would take personnel traveling by foot to reach the animal to stabilize it. The professional judgment of the WDFW wildlife biologist for the project (with experience in capture and translocation of ungulates) is that mortality of animals immobilized for capture under this scenario would likely exceed 50% and could approach 100% (Harris 2018b). In typical capture operations, as reflected in Alternative 1, an immobilized animal is stabilized as quickly as possible, typically within minutes. In this terrain, if the ground-based personnel are traveling cross-country by foot to reach the animal (while communicating with the helicopter crew to locate the animal) rather than the handler being dropped at the site of the animal by helicopter, hours could pass between the animal being immobilized and the ground-based personnel arriving to stabilize the animal. According to a NPS veterinarian, no responsible veterinarian or biologist would consider leaving an immobilized animal without attending care this long (Harris 2018c).
- Capture and remove mountain goats using helicopters with the handler traveling by foot and the darter waiting with the animal until the handler arrives to reduce helicopter landings to approximately 2 landings per animal captured. In this modified version of Alternative 2, the handler would travel by foot to reach mountain goats. After an animal was immobilized, the helicopter would land (touch down) to offload the darter who would stabilize and attend to the animal until the handler arrived. They would hobble, blindfold, and drug the animal and put it in the sling, then the helicopter would land to pick up the animal (by sling load) and the darter. While this might allow for fewer landings per animal captured and removed than in Alternative 1 and less time between an animal being immobilized and stabilized than in Alternative 2, it would violate NPS protocol that personnel always work in pairs by having one person (the darter) handle the animal alone. This would place the darter at risk from accidental exposure to the immobilizing drug without anyone else on the ground to quickly administer the reversal agent. Though the immobilized animal would not be left unattended (as it would in Alternative 2), in steep and rugged terrain it could be hours (rather than minutes in Alternative 1) between the time the animal is immobilized and the time it can be removed to the staging area for veterinary care. The professional judgment of the WDFW wildlife biologist for the project is that mortality of animals immobilized for capture under

this scenario would likely exceed 50% (Harris 2018b). Like Alternative 2, this violates humane animal care standards. While this scenario was considered as an option to potentially reduce helicopter landings in wilderness, it would increase either the time the helicopter was on the ground in wilderness or flight time over wilderness. Because NPS protocol requires a helicopter to be nearby when staff are handling an immobilized animal, and in order to evacuate staff if accidentally exposed to the immobilizing drug, the helicopter would have to physically land and wait on the ground until the handler arrives and prepares the animal for transport, including placing in the sling. The other option is for the helicopter to hover in the area during this time (Harris 2018a).

- Capture mountain goats using only ground-based methods and remove mountain goats using helicopters to reduce helicopter landings to approximately 1 landing per animal captured. In this scenario, only ground-based methods (mostly darting) would be used to capture mountain goats. A helicopter would be used to transport mountain goats to staging areas by sling load, as in Alternative 1. As in Alternative 2, the difficulty of the terrain and the remoteness of the areas where mountain goats are located would make most mountain goats inaccessible to ground-based personnel traveling cross-country by foot (or stock). Ground-based personnel would generally need to be within 30 yards of an animal to dart it; ground-based capture would therefore be less effective for removing mountain goats than public hunting (see below) since hunters can shoot mountain goats from 100-200 yards. Mountain goats that are not captured would either remain and serve as a source population to recolonize areas of the Olympic Peninsula where mountain goats had been removed, or would need to be lethally removed (in practice, this would be similar to Alternative 4).
- Capture and remove mountain goats without using motorized equipment or mechanical transport. Due to distance, terrain, and mountain goat behavior, there is no feasible way to transfer mountain goats from remote sites in wilderness to the staging areas without motorized equipment or mechanical transport.
- Euthanize mountain goats at capture sites. Capturing mountain goats prior to chemical euthanasia would prolong animals' stress compared to other, faster methods of culling. Humane animal care standards favor other methods of culling.
- Allow public hunting to lethally remove mountain goats. Hunting of mountain goats on Olympic National Forest is currently authorized by WDFW. The Forest Service will coordinate with WDFW to identify potential opportunities for maximizing harvest of mountain goats within Olympic National Forest. However, public hunting alone would not be sufficient to eliminate the mountain goat population. Due to the difficulty of the terrain and the remoteness of areas where mountain goats are located, the remnant population of mountain goats that hunters are unable to access would serve as a population source to recolonize areas where mountain goats had been removed.

- Control mountain goat fertility. Although fertility control has been demonstrated to be effective in controlling individual animal fertility and in very limited circumstances of population growth rate of closed, easily accessed, small populations. Where fertility control has been successful, it has limited population growth, but has not eliminated populations of wild ungulates. We estimate that we could feasibly capture no more than 50% of the goat population, leaving the remaining 50% of the goat population capable of reproduction; the goat population would not only persist, but impacts would grow over time. Chemical agents, such as immunocontraceptive vaccines (e.g., native PZP or GnRH vaccines), require repeated doses to the same animal, to be highly effective at suppressing fertility. Surgical sterilization performed off-site would require the use of helicopters or other mechanical transport to move mountain goats from remote capture sites in wilderness to areas. Use of helicopters or other mechanical transport to facilitate fertility control would have recurring negative effects to the undeveloped quality of wilderness character. Surgical sterilization performed at the capture site would present hazards to both personnel and mountain goats. The use of fertility control adversely affects wilderness values as it is not a natural process. Fertility control as an authorized management action would be a negative effect on the untrammeled and natural qualities of wilderness character as it would be an intentional manipulation of the biophysical environment. Administering fertility control measures would be time and resource intensive and would require years of repeated management action in wilderness. Male and female goats are very difficult to distinguish from each other and the amount of time and costs associated with either darting all goats or capturing all goats to inject only the females or castrate all the males would be impractical. Fertility control on female goats would have to be repeated indefinitely to be effective. Mountain goats that have been treated would need to be tagged and possibly collared and tracked. This would create further adverse effects on the untrammeled, natural, and undeveloped qualities of wilderness character. If all mountain goats were to be indiscriminately darted from the air, this would be an adverse effect on the undeveloped quality of wilderness character, as well as on opportunities for solitude and primitive and unconfined recreation as noise from helicopters would disrupt the natural soundscape and area closures to visitors may need to be in effect during darting operations. Most concerning is that these actions would need to occur on a regular basis to be effective until all exotic mountain goats are eliminated. If any female mountain goats are missed in this process, the population would continue to increase. The more time that is needed to administer fertility control the more chance the population would continue to grow, as not all mountain goats would be treated within the first year or two unless the action is implemented on a much more frequent basis than the two 2-week periods each year as identified for alternatives 1 and 2. This would mean extensively more helicopter flights, more staff on the ground, and more area closures to visitors—all on an indefinite basis.
- Use fencing to keep mountain goats out of areas with high visitation, sensitive vegetation, or endemic species. An alternative that would construct a fence around the boundaries of wilderness areas or sensitive alpine ecosystems was eliminated

from further consideration for many reasons including the following: fencing would interfere with native wildlife species and ecosystem processes; fencing would not address impacts on natural resources and visitor safety within the park; and fencing would present issues associated with development within designated wilderness areas.

- Use salt blocks to bait mountain goats away from areas with high visitation, sensitive vegetation, or endemic species. Salt blocks are installations that would negatively affect the undeveloped quality of wilderness character. Use of salt blocks as an attractant may influence distribution of habituated and conditioned mountain goats for a while, but there is no evidence that salt blocks would keep mountain goats from seeking salts from humans. In addition, the presence of salt blocks in the long term would have other unintended consequences: it would alter movement patterns and habitat use of mountain goats, and other wildlife species that seek salts (deer, Olympic marmots), and cause resource impacts to soils and vegetation in that area. It would also artificially concentrate salt-seeking wildlife in a restricted area, making them more prone to predation. In addition, displacement of mountain goats through the use of salt blocks would not control or eliminate the goat population. Resource impacts would be exacerbated as the population continues to grow. Finally, the use of salt blocks in wilderness as a long-term management strategy would adversely affect the untrammelled, natural, and undeveloped qualities of wilderness character.

Determination

Removal of mountain goats is essential to the overall ecological integrity of Olympic National Forest wilderness areas and to preserving wilderness character, as demonstrated in Step 1 of this analysis. I am dismissing Alternative 3, because it would not remove mountain goats from these areas, and their impacts to wilderness character would continue.

As documented in the alternatives considered but not fully analyzed, there is no reasonable or safe alternative to remove mountain goats that would not use motorized equipment or mechanical transport. Essential capture, lethal removal, and translocation activities are not feasible utilizing non-motorized equipment or having some capture team personnel travel by foot or stock, due to seasonal limitations, size and scope of the operations, geographical restrictions, and protocols for the safety of personnel and ensuring humane animal care standards are followed.

Alternative 4 would remove mountain goats through lethal removal only, without capture and removal for translocation. This alternative would have less impact to wilderness character than Alternative 1. Washington Department of Fish and Wildlife has primary responsibility for management of mountain goats on National Forest System lands. WDFW has identified the mountain goat population on the Olympic Peninsula, including mountain goats from the Olympic National Forest, as a source to augment mountain goat populations in the North Cascades, consistent with the state's goals and objectives for mountain goat management. Alternative 4 would not allow WDFW to carry out wildlife management activities according to its authority.

I select Alternative 1 as the minimum requirement for the administration of the area for the purpose of the Wilderness Act. Alternative 1 is consistent with Forest Service Manual directives for wilderness management and with the Olympic National Forest Land and Resource Management Plan (1990). Alternative 1 would negatively affect the untrammeled quality, undeveloped quality, and opportunities for solitude or primitive and unconfined recreation quality of wilderness character. Effects to the undeveloped quality and to opportunities for solitude or primitive and unconfined recreation, however, would be temporary during the two, two-week periods each year when operations are implemented. Furthermore, the activities are dispersed over a large geographic area. Removal of nearly all mountain goats from Olympic National Forest wilderness areas, and—with activities in Olympic National Park—from the entire Olympic Peninsula, would have long-term benefits for the natural quality of wilderness character and ecological and scientific features of value. Alternative 1 contributes to complete removal of mountain goats, which would allow an end to current practices such as aerial overflights to survey mountain goat populations as well as tracking, hazing, and temporary closures to manage individual mountain goats that are a threat to public safety.

The following mitigation measures should be incorporated into the project design criteria:

- Focus initial activities at the highest-priority areas, specifically Mount Ellinor.

- During lethal removal operations, personnel should access wilderness areas via foot or riding stock where it is possible to do so without risking bodily harm. This shall be considered for travel to sites accessible by trail or non-technical cross-country travel (e.g. without the use of crampons, ice axes, rope or other specialized equipment).
 - To limit the effects of helicopter flights, foot travel shall be considered for both placement of salt blocks for advance baiting of mountain goats as well as for access to capture sites during the capture operational period.
 - Lethal removal sites to be considered for travel by foot or riding stock include, but are not limited to, Marmot Pass in the Buckhorn Wilderness and wilderness portions of Mount Ellinor and Mount Skokomish.
- Salt blocks should be placed outside of wilderness to the extent possible.
- Any removal or relocation of carcasses, such as those that are near trails or campsites, should be done by personnel who access the area by foot or stock.

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United States Department of Agriculture

Minimum Requirements Analysis

Cascade Wilderness Areas Mountain Goat Population Augmentation



Forest Service

Mt. Baker-Snoqualmie and
Okanogan-Wenatchee National Forests

March 2018

Responsible Official:

Jamie Kingsbury
Forest Supervisor
Mt. Baker-Snoqualmie National Forest

Mike Williams
Forest Supervisor
Okanogan-Wenatchee National Forest

The Regional Forester of the Pacific Northwest Region of the U.S. Forest Service delegates authority to approve non-emergency project use of motorized equipment and mechanical transport to Forest Supervisors who have completed either the Regional Wilderness Stewardship Training or National Wilderness Leadership Training offered by the Arthur Carhart National Wilderness Training Center, when the District Ranger(s) for the project area also meet this training requirement. The Forest Supervisors above, as well as the District Rangers, have met the training requirement.

Introduction

Olympic National Park and the Olympic National Forest are proposing to reduce or eliminate mountain goats from Washington's Olympic Peninsula. Mountain goats were introduced to the Olympic Peninsula in the 1920's. Since that time the goats have been observed impacting the ecosystem and further endangering endemic plant species. To aid in restoring mountain goat populations in the North Cascades, the Washington Department of Fish and Wildlife (WDFW) proposes to translocate approximately 325-375 mountain goats from the Olympic Peninsula into suitable habitat in the Northern Washington Cascades, or "North Cascades," using helicopters and temporary installation of fencing and salt blocks. Specific locations of translocation sites and staging areas are provided in Appendix A. Proposed translocation sites include sites in three wilderness areas on the Mt. Baker-Snoqualmie National Forest and Okanogan-Wenatchee National Forest.

A **minimum requirements analysis (MRA)** is required by law whenever land managers are considering a use prohibited by Section 4(c) of the Wilderness Act of 1964:

...and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

Section 2(a) of the Wilderness Act states that wilderness areas

shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character.

Wilderness character is not explicitly defined in the Wilderness Act. An interagency effort to provide direction related to wilderness character monitoring developed the following definition in the Technical Report, *Keeping It Wild 2: An Updated Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2015), which was in turn adopted by the four federal wilderness management agencies.

Wilderness character is a holistic concept based on the interaction of (1) biophysical environments primarily free from modern human manipulation and impact, (2) personal experiences in natural environments relatively free from the encumbrances and signs of modern society, and (3) symbolic meanings of humility, restraint, and interdependence that inspire human connection with nature. Taken together, these tangible and intangible values define wilderness character and distinguish wilderness from all other lands.

Keeping It Wild 2 links the conceptual definition of wilderness character to a practical meaning of wilderness character by using a framework of five “qualities” derived from the statutory definition of wilderness in the Wilderness Act. Taken together, these five qualities represent the primary tangible aspects of wilderness character that link on-the-ground conditions in wilderness and the outcomes of wilderness stewardship to the statutory definition of wilderness.

Four of the wilderness character qualities occur in every wilderness: untrammeled, natural, undeveloped, and solitude or primitive and unconfined recreation. A fifth quality, other features of value, may or may not occur within a specific wilderness. The five qualities of wilderness character are described in the table below (Landres et al. 2015:10-12):

Table 1. Qualities of Wilderness Character (Landres et al. 2015)	
Untrammeled	<i>The Wilderness Act states that wilderness is “an area where the earth and its community of life are untrammeled by man,” that “generally appears to have been affected primarily by the forces of nature” and “retain[s] its primeval character and influence.” This means that wilderness is essentially unhindered and free from the intentional actions of modern human control or manipulation.</i>
Natural	<i>The Wilderness Act states that wilderness is “protected and managed so as to preserve its natural conditions.” This means that wilderness ecological systems are substantially free from the effects of modern civilization.</i>
Undeveloped	<i>The Wilderness Act states that wilderness is “an area of undeveloped Federal land... without permanent improvements or human habitation,” “where man himself is a visitor who does not remain” and “with the imprint of man’s work substantially unnoticeable.” This means that wilderness is essentially without permanent improvements or the sights and sounds of modern human occupation.</i>

<p>Solitude or Primitive and Unconfined Recreation</p>	<p><i>The Wilderness Act states that wilderness has “outstanding opportunities for solitude or a primitive and unconfined type of recreation.” This means that wilderness provides outstanding opportunities for recreation in an environment that is relatively free from the encumbrances of modern society, and for the experience of (continued) the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations.</i></p>
<p>Other Features of Value</p>	<p><i>The Wilderness Act states that wilderness “may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” This quality captures important elements or “features” of a particular wilderness that are not covered by the other four qualities. Typically these occur in a specific location, such as archaeological, historical, or paleontological features; some, however, may occur over a broad area such as an extensive geological or paleontological area, or a cultural landscape.</i></p>

The MRA will consider (1) if administrative action in wilderness is necessary to preserve wilderness character or meet other direction in the Act or the requirements of other federal laws, and then (2) if action in wilderness is necessary, the minimum method or tool.

Step 1: Is action necessary in wilderness?

Description of the situation

Mountain goats are native to the North Cascades Mountains and are the predominant large herbivore in alpine areas and an important component of these ecosystems. Mountain goats are classified as a Regional Forester Sensitive species on National Forests within Washington (USDA Forest Service memo dated 7/21/2015, see <http://www.fs.fed.us/r6/sfpnw/issssp/documents3/2670-1950-final-sss-list-enc1-20150713.xlsx>). The mountain goat also serves as a forest-level management indicator species (MIS) for habitat that includes the alpine and subalpine areas of the Mt. Baker-Snoqualmie National Forest and Okanogan-Wenatchee National Forest. Habitat includes cliffs, crags or other areas of mountainous terrain and open alpine meadow areas down to conifer forest habitats. Mountain goats are a culturally important species to area Tribes, who value it in many ways, and are considered a Treaty Resource by Tribes. Mountain goats are also sought after by sport hunters as a big game trophy animal.

Mountain goat populations have declined substantially in most of Washington's North Cascades (Rice and Gay 2010, Rice 2012). Although the precise magnitude of the decline is uncertain (WDFW 2015a, b), WDFW estimates the population of mountain goats across the state has declined by at least 50% since 1961. The decline was not uniform, with some populations decreasing by over 90% or disappearing entirely. During the 1960's through the early 1980's 200-400 mountain goats were harvested annually. As a decline in harvest became apparent, WDFW dramatically reduced permits to about 20 annually and only permitted harvest in areas where the population seemed to be doing well. Since that time mountain goat populations have recovered in some portions of Washington's North Cascades. However, in much of their range, mountain goat populations remain small and isolated (WDFW 2015a, b), and appear unlikely to recover for many decades without reintroduction and/or augmentation. Without recovery in these areas, long-term genetic and demographic health of mountain goats in the North Cascades cannot be assured.

To augment mountain goat populations that WDFW has identified as at risk of extirpation, WDFW proposes to release mountain goats in the Glacier Peak, Henry M. Jackson and Alpine Lakes wilderness areas. Mountain goats are indigenous to these wilderness areas. See Appendix A for specific release sites and a description of each wilderness area.

Options outside of wilderness

Can action be taken outside of wilderness that adequately addresses the situation?
No.

Although there are areas of mountain goat habitat outside of wilderness, the overwhelming majority of summer mountain goat habitat in the North Cascades is within the large wilderness areas straddling the Cascade crest. Mountain goats require alpine habitat for them to thrive. Pockets of this habitat exist on the west side of the crest, but connections from this habitat to the larger more contiguous alpine areas is often lacking.

The following options outside of wilderness were considered:

- Translocate mountain goats only to release sites outside of wilderness: WDFW surveyed the area to identify potential release sites. Sites proposed for release in the North Cascades forests were subject to an extensive analysis that integrated several factors including habitat quality, past history of goat populations, current goat numbers, and connectivity to other goat populations. While WDFW has identified some suitable release sites outside of wilderness, many of the release sites that will ensure the greatest success are within wilderness areas. The large wilderness areas in the Cascades offer the greatest amount of alpine connectivity, which WDFW has identified as needed to provide a favorable outcome for augmentation. According to WDFW, utilizing solely non-wilderness release sites would not adequately address the need to restore mountain goat populations in the North Cascades to levels that would avoid the threat of extirpation.
- Reduce hunting to allow mountain goat populations to recover: Hunting does not take place where goats have not recovered, and these are the focal areas for reintroduction, augmentation, and recovery. According to WDFW, even if recreational hunting were further restricted or eliminated entirely where currently implemented, other mountain goat populations would receive very little if any benefit.

Criteria for determining necessity

Valid existing rights or special provisions of other wilderness legislation

Action is not necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or legislation specific to each wilderness area in the proposed project area; see below.)

Glacier Peak Wilderness

Glacier Peak Wilderness was established in 1964 as one of the 54 original wilderness areas. The wilderness was expanded in 1968 as part of the North Cascades National Park creation and further expanded by the 1984 Washington State Wilderness Act.

Henry M. Jackson Wilderness

Henry M. Jackson Wilderness was designated as part of the 1984 Washington Wilderness Act.

Alpine Lakes Wilderness

Alpine Lakes Wilderness was designated in 1976 and expanded in 2014 as part of the 2015 Defense Authorization Act. Henry M. Jackson Wilderness was designated as part of the 1984 Washington Wilderness Act.

Requirements of other legislation

Action is not necessary to meet the requirements of other federal laws.

Wilderness character

Action is necessary to preserve the following qualities of wilderness character.

- **Natural:** Mountain goats are an indigenous species and an integral ecological component of the wilderness areas in Washington's central and North Cascades Mountains. Translocation of the mountain goats from the Olympic Peninsula to the Glacier Peak, Henry M. Jackson, and Alpine Lakes wilderness areas will help restore mountain goat populations that have suffered substantial declines in recent decades. Augmentation of the mountain goat population will preserve wilderness character by restoring ecological values impacted by the decline of goats. Mountain goats play a key ecological role in the alpine environment. They help to spread nutrients across the landscape into areas not accessible by other large ungulates. Their sharp hooves can mulch hardened ground that may help plants, such as *Leutkea*, gain a foothold on areas that have been recently deglaciated. They are prey animals to large predators—primarily cougars but also wolves—and could serve as prey for grizzlies, which are a Threatened species under the Endangered Species Act. Eagles can take young goats on occasion.

Step 2: Determine the minimum activity

Other direction

Agency directives

Forest Service Manual (FSM) 2300 - Wilderness & Related Resource Management

FSM 2323.32 provides the following policy regarding wildlife management in wilderness areas:

- “1. Recognize that States have jurisdiction and responsibilities for the protection and management of wildlife and fish populations in wilderness. Cooperate and work closely with State wildlife and fish authorities in all aspects of wildlife and fish management. Base any Forest Service recommendation to State wildlife and fish agencies on the need for protection and maintenance of the wilderness resource. Recognize wilderness protection needs and identify any needed requirements in coordination efforts and in cooperative agreements with State agencies.
2. Wildlife and fish management programs shall be consistent with wilderness values.
- ...
5. Apply the “Policies and Guidelines for Fish and Wildlife Management in Wilderness and Primitive Areas,” developed jointly by the Forest Service, Bureau of Land Management, and the International Association of Fish and Wildlife Agencies in a practical, reasonable, and uniform manner in all National Forest wilderness units. Use the guidelines as a foundation for or as addendums to State or individual wilderness cooperative agreements.”

(3 and 4 omitted, not directly applicable to the situation.)

FSM 2323.33a further provides:

“[re]introduce wildlife species only if the species was once indigenous to an area and was extirpated by human induced events. Favor federally listed threatened or endangered species in reintroduction efforts. Reintroductions shall be made in a manner compatible with the wilderness environment. Motorized or mechanical transport may be permitted if it is impossible to do the approved reintroduction by nonmotorized methods.”

Forest Service Manual (FSM) 2326, Use of Motorized Equipment or Mechanical Transport in Wilderness

FSM 2326.02 - Objectives

1. Accomplish management activities with non-motorized equipment and non-mechanical transport of supplies and personnel.

2. Exclude the sight, sound, and other tangible evidence of motorized equipment or mechanical transport within wilderness except where they are needed and justified.

FSM 2326.03(3)

Discourages flights below 2000 feet above ground level and refers to the FAA recommendation below¹:

FAA Advisory Circular

TAC 91-36D (September 17, 2004)

All aircraft are requested to 1.) Avoid noise-sensitive areas and, wherever practicable, limit overflight at relatively low altitudes to such areas. 2.) Maintain a minimum altitude of 2,000 feet above the surface of noise sensitive areas. "Visual Flight Rules (VFR) Flight Near Noise Sensitive Areas," defines the surface as: the highest terrain within 2,000 feet laterally of the route of flight, or the uppermost rim of a canyon or valley.

FSM 2326.1(5)

Guidelines cite conditions under which the use of motorized and/or mechanical transport use may be approved in wilderness. Directives specify conditions meeting minimum needs for protection and administration of the area as wilderness. These include:

- a) A delivery or application problem necessary to meet wilderness objectives cannot be resolved within reason through the use of non-motorized methods.
- b) An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.

("c" omitted, not directly applicable to the situation.)

Forest Service Manual (FSM) 2600 – Wildlife, Fish, and Sensitive Plant Habitat Management
FSM 2670.22 also calls for the Forest Service to:

"maintain viable populations of all native and desired nonnative wildlife, fish and plant species in habitats throughout their geographic range on National Forest System Lands."

¹ Guidance on low-level flights over Designated Wilderness are recommendations. There is no statutory requirements except that noise from aircraft can be considered harassment of wildlife (16 USC 742j-1; 50 CFR Part 19). To harass is defined to "disturb, worry, molest, rally, concentrate, chase, drive, herd or torment." Recommendations for overflights are included for reference in this analysis.

Agreements with other agencies and partners

Memorandum of Understanding, Washington Department of Fisheries, Washington Department of Game (WDG), and USDA Forest Service Region 6 (August 1990)

Cooperators jointly agree “to utilize ‘Policies and Guidelines for Fish and Wildlife Management in Wilderness’, developed by the International Association of Fish and Wildlife Agencies, as the foundation for management of fish and wildlife in National Forest wilderness within Washington.”

Policies and Guidelines for Fish and Wildlife Management in National Forests and Bureau of Land Management Wilderness (June 2006)

This document is intended as a framework for projects in wilderness between state fish and game agencies, represented by the Association of Fish and Wildlife Agencies (AFWA), and the Bureau of Land Management (BLM) and Forest Service. As a matter of general policy, the BLM, Forest Service and AFWA agree that:

“Fish and wildlife management activities will emphasize the conservation of natural processes, to the greatest extent possible. Management activities will be guided by the principle of doing only the minimum necessary to conserve and, if necessary, to enhance fish and wildlife resources, and to manage the area as wilderness.”

and:

“Proposed State fish and wildlife management activities that would involve uses generally prohibited under Section 4(c) of the Wilderness Act will be considered and may be authorized by the Federal administering agency. The FS and BLM will consult closely with the States and give careful consideration to State fish and wildlife interests when considering these proposed activities....”

Removal of terrestrial wildlife species is addressed as a topic for coordination between the Forest Service and the state fish and game agency as part of implementation for transplanting wildlife:

“12. Transplanting Wildlife

Transplants (removal, reintroduction, or supplemental introduction) of terrestrial wildlife species in wilderness may be permitted if necessary: (a) to perpetuate or recover a threatened or endangered species; (b) to restore the population of an indigenous species; or (c) to manage wildlife populations in accordance with the States’ wildlife populations objectives.

Transplants shall be made in a manner compatible with the wilderness character of the area. Transplant projects require advance written approval by the Federal administering agency....

Guidelines for Transplanting Wildlife

Proposals for motorized methods and temporary holding and handling facilities that involve uses generally prohibited under Sec. 4(c) of the Wilderness Act will be considered and may be authorized by the Federal administering agency....”

Management plans

Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (1990)

Forest-wide Standards and Guidelines, page 4-112:

“[n]ative species shall be maintained, with special emphasis on the preservation of threatened or endangered species, plus designated management indicator species and their habitats. Fish or wildlife indigenous to an area, may be re-established if previously eliminated by the influence of man.”

Wenatchee National Forest Land and Resource Management Plan (1990)

Forest-wide Standards and Guidelines, pages IV-81, item 4:

“Coordinate and cooperate with the Washington Department of Wildlife in relocation of animals. Add additional animals where the habitat is under utilized and remove animals where habitat is over utilized.”

Forest-wide Standards and Guidelines, page IV-104, item 1:

“Maintain or enhance biological diversity by providing or developing an ecologically sound distribution of plant and animal communities and species at the forest stand, subdrainage, and Forest level. This distribution must contribute to the overall goal of maintaining or enhancing all native and desirable introduced species and communities.”

Washington Department of Fish and Wildlife Game Management Plan July 2015 – June 2021

Mountain Goat Management Goals, page 84:

“The statewide goals for mountain goats are:

1. Perpetuate and manage mountain goats and their habitats to ensure healthy, productive populations and long-term genetic connectivity.
2. Manage mountain goats for a variety of recreational, educational, and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing, and photography.
3. Enhance statewide mountain goat populations and manage goats for a sustained yield.
4. Where conflicts with recreationists have been documented and ongoing, minimize habituation and conditioning of mountain goats to humans, thus reducing the threat to both humans and mountain goats.”

Objective 70, page 86:

“Clarify the needs for recovery and/or augmentation of populations in the North Cascades by 2017. If the assessment (above) demonstrates a clear benefit to be gained from translocation, and mountain goats are available for such purposes, implement at least one translocation project (including monitoring capable of informing future projects) by 2020.”

Time constraints

Any release activities in the North Cascades must coincide with capture operations to reduce transfer-related mortality to the maximum extent possible. Capture operations on the Olympic Peninsula are only feasible during the warmer/low-snow period in the Olympic Mountains of July to September, when mountain goats are using their summer range and when avalanche conditions are not too unsafe for ground-based personnel.

Overview of alternatives

Components of activities

To identify the minimum activity to augment mountain goat populations in the North Cascades, the following discrete components or phases of each alternative will be compared. Specific details are covered in later sections under the *Alternatives* description.

- Transporting mountain goats
- Transporting personnel
- Transporting equipment
- Handling and release of mountain goats
- Future condition of North Cascades wilderness areas

Alternatives considered but eliminated from analysis

- No action in wilderness: An alternative that would take no action in wilderness was eliminated, because WDFW’s analysis of potential release sites did not identify enough release sites outside of wilderness where translocation would be successful due to less suitable escape terrain in non-contiguous habitat patches outside wilderness (see Step 1).
- No motorized equipment or mechanical transport in wilderness: An alternative that would not use helicopters to release mountain goats in wilderness was not considered. There is no other method available that could negotiate terrain and timing requirements to successfully translocate goats. In a stressful, unnatural situation (such as result from capture and retention in captivity), mountain goats are likely to engage in considerable aggression. Thus, unlike some species that can safely be transported in groups (e.g., bighorn sheep), mountain goats must be transported in individual crates (ODFW and CTWSR 2010). Mountain goats are also

sensitive to stress, warm temperatures and capture myopathy (Hebert et al. 1980, Blood et al. 2001). Blood et al. (2001) reported that transplant-caused mortality rates for mountain goats in British Columbia during 1980-2000 were higher (10.6%) than for other translocated ungulates reviewed. Thus, moving mountain goats from the donor population to release sites must be conducted using individual crates, and must be done relatively quickly and with care to keeping them cool and with a minimum of human disturbance. If goats are housed together, or if the time required to move individual goats to their release sites is too lengthy, considerable mortality can be expected.

Overview of Alternatives 1 and 2

Two alternatives were analyzed:

- Alternative 1: Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites
- Alternative 2: Use Helicopters to Transport Mountain Goats and Equipment to Release Sites

Both alternatives involve moving mountain goats from non-wilderness staging areas to wilderness release sites, transporting equipment and personnel to and from the release sites and temporarily placing salt blocks at release sites.

Table 1. Estimated helicopter trips between staging and release areas for each Alternative.

Release site name	Wilderness	Approximate # mountain goats to release	Estimated # helicopter trips (mountain goats, personnel, equipment) Alternative 1	Estimated # helicopter trips (mountain goats) Alternatives 2
Chikamin	Alpine Lakes	30	36	31
Kaleetan	Alpine Lakes	30	36	31
Preacher Mtn	Alpine Lakes	30	36	31
Cadet Lake Ridge	Henry M. Jackson	34	40	35
White Chuck Glacier	Glacier Peak	40	46	41
Buckindy	Glacier Peak	34	40	35
Snowking Meadow	Glacier Peak	34	40	35
	Total		274	239

Alternative 1) Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites

- Personnel would be transported to and from release sites by helicopter.
- Equipment would be transported to and from release sites by helicopter.
- Mountain goats would be transported to release sites by helicopter.
- Mountain goats may be fitted with collars or ear tags (outside of wilderness) prior to release. Fencing would be temporarily installed in wilderness during release activities. Salt blocks would be temporarily placed in wilderness for up to one year.
- Translocated mountain goats augment local populations, helping to ensure the persistence of an indigenous species. Collars or ear tags would be used to monitor mountain goat survival and evaluate the success of the project.

Timing and locations

Staging sites would be located outside of wilderness. See Appendix A for specific staging and release sites.

The actual timing of release would vary based on when the goats are captured on the Olympic Peninsula, transported to staging areas and then transported to release sites by helicopter. Primary management activities would occur two times per year in two-week intervals (e.g., two weeks in July and two weeks in late August or early September). Capture (via helicopter on the Olympic Peninsula) and release (via helicopter in the Cascades) are weather dependent and could be delayed by hours or days in cases of inclement weather.

It is not possible to predict the exact number of days that each release site would be used, because it is not known how many mountain goats would be captured and ready for transport on any given day. However, this analysis assumes that to translocate 30-40 goats, 3-4 separate days of work would be required (i.e., 6-12 goats transported and released during each active day). These days may be spread across the two to three years of expected activity.

Transporting personnel and equipment

A crew of ground-based personnel would be flown to and from release sites by helicopter. Equipment (see Table 3) would be flown to and from release sites by helicopter. Three landings and pick-ups would be needed for each release site (see Table 2). The first two helicopter flights would be to transport ground personnel (6 individuals) to the site. A third flight would transport additional supplies and equipment (portable fencing). Three more flights would be needed to return equipment and personnel to the staging areas.

Temporary installations

A salt block would be placed at each release site in order to help provide a central “meeting place” for goats released. Salt would be placed so as to minimize salt being introduced to

the environment. Salt blocks would be one-time temporary installations that would be removed approximately one year after installation by ground crews hiking to the area. Only one salt block would be used at each wilderness release site. The salt blocks would be placed in a small tub that would not be visible to most wilderness visitors, and the salt would be buried under snow for much of the winter months. Any remaining salt the following summer would be removed and all components of the bait site taken down and removed from the wilderness.

Approximately 100 meters of temporary, plastic, portable 'snow fencing' would be erected at release sites to herd goats from release site toward escape terrain. Fencing would only be installed during release activities and would be removed from wilderness when release activities are not occurring at the site.

Transporting, handling, and releasing mountain goats

Refrigerator trucks would be used to transport mountain goats from the Olympic Peninsula to staging areas as close to the release sites as possible. Mountain goats will be fitted with collars (radio or GPS) or ear tags at staging areas outside of wilderness prior to release; the purpose of collars and markings is to allow WDFW to better monitor mountain goats and evaluate the survival of translocated mountain goats after release. Mountain goats would be transported in individual crates until their release at the recipient release sites. Mountain goats would be airlifted by helicopter, 1 or 2 crates at a time, to release sites.

15 to 20 goats would be released together (nannies first), allowing subsequent animals to see and smell previously released animals. Approximately 36-46 round-trip flights between staging area and release sites would be needed (18-23 to deliver goats and 18-23 to return crates to staging area; see Table 2). The helicopter would lower mountain goats in crates to the ground at the release sites; the helicopter itself would not need to touch down to place mountain goats. Round-trip helicopter flights between staging and release sites would require an average of about 11 minutes per trip for mountain goat placement and additional 2 minutes per trip for the helicopter itself to land and offload crew members (see Table 2).

Once mountain goats are transferred to the release site, they would be released from the crates. Crates would be returned to the staging area two at a time.

Number of mountain goats translocated

The number of mountain goats proposed for translocation is based on an extensive review of the species' population status with respect to its habitat suitability in Washington. The addition of as many as 325-375 goats contributed by the Olympic Peninsula is well within the capacity of the North Cascades forests to absorb. Harris and Steele (2014), based on a survey and evaluation of 70 historic translocations of mountain goats into native range, recommended that at least 25-30 goats should be released within each individual release area in order to achieve a high likelihood of long-term success.

Table 2. ALTERNATIVE 1 - Estimated helicopter flight time over wilderness for each release site.

Release Site Name	Wilderness	# flights	Flight time over wilderness per ROUND trip	Approximate Flight minutes per Release Site
Chikamin	Alpine Lakes	36	10	360
Kaleetan	Alpine Lakes	36	8	288
Preacher Mtn	Alpine Lakes	36	12	432
Cadet Lake Ridge	Henry M. Jackson	40	5	200
White Chuck Glacier	Glacier Peak	46	16	736
Buckindy	Glacier Peak	40	12	480
Snowking Meadow	Glacier Peak	40	12	480
<i>Extra time for crew landing and pick up</i>				84
	Total	274		3060 minutes (51 hours)

Flights times and number of trips listed above are estimates and actual may vary due to unforeseen circumstances such as, but not limited to, weather and mechanical issues. Flight time will vary depending on the type of helicopter actually available.

Table 3. ALTERNATIVE 1 - Equipment needs.

Item	# Items	Approx. Weight (pounds)	Total Pounds
Medical kit	1	2.2	2.2
Radio	1	1.1	1.1
Binoculars	4	2.2	8.8
Spotting scope	1	4.4	4.4
Tripod	1	4.4	4.4
Receiver VHF	1	2.2	2.2
Rubber mallet or post pounder	1	5	5
Temporary fencing posts	10	2	10
Temporary fencing material	1	25	25
		Total	63.1

Alternative 2) Use Helicopters to Transport Mountain Goats and Equipment to Release Sites

- Mountain goats would be transported to release sites by helicopter.
- Personnel would travel to and from release sites by foot.
- Equipment would be transported to and from release sites by helicopter.
- Mountain goats would be fitted with collars or ear tags (outside of wilderness) prior to release. Fencing would be temporarily installed in wilderness during release activities. Salt blocks would be temporarily placed in wilderness for up to one year.
- Translocated mountain goats augment local populations, helping to ensure the persistence of an indigenous species. Collars or ear tags would be used to monitor mountain goat survival and evaluate the success of the project.

The components of Alternative 2 would be the same as Alternative 1 with the exception of the ground crew hiking to the release sites.

Timing and locations

Timing would be the same as Alternative 1, except operations would include time for ground-based personnel to travel by foot to release sites from the nearest trailhead. Staging sites would be the same as Alternative 1 (see Appendix A). Release sites would be the same as for Alternative 1 (see Appendix A), except the topography of some of the more remote sites may make it infeasible for crews traveling by foot to reach them, making those specific release sites unusable. The most important time constraint related to this project is to have the ground crew on site at the time goats are being transported. If the ground crew is hiking to the release site, chances are that by the time they arrive, weather, mountain goat capture, or other factors may have changed so that the crew may have to de-mobilize and return later.

Transporting personnel and equipment

A ground-based crew would travel to release sites by foot from the closest trailhead, using National Forest System Trails and cross-country travel as needed to access release sites. Snowking, Buckindy, White Chuck, and Kaleetan release sites would likely require two days to reach and two more days to hike out due to the rough country and complex topography that would need to be traversed. A minimum of four days of gear and supplies (likely over 50 lbs each) would need to be carried in for the safety of crew members should they arrive at the release site only to be weathered in. If mountain goats could not be delivered, the crew would then have to hike out for resupply, or wait until the weather improves so helicopter flights could begin and bring in additional supplies. While somewhat closer, Preacher, Chikaminv and Cadet would still be arduous day hikes and require bringing 2-3 days of camping gear (see Table 5).

Other than camping gear and supplies that would be carried by personnel hiking in, transportation of equipment would be the same as in Alternative 1 except additional food and supplies for the ground-based crew may be transported by helicopter.

Total flight time of this alternative is estimated to be about 7.6 hours less than in Alternative 1 (see Table 4).

Temporary installations

Same as Alternative 1.

Transporting, handling, and releasing mountain goats

Similar to Alternative 1 except that if ground-based personnel are unable to reach the release site by foot in time to meet the helicopter, it may increase the time mountain goats are held in captivity and the risk of stress to the animals.

Number of mountain goats translocated

The number of mountain goats available and intended for translocation would be the same as for Alternative 1. However, if personnel traveling by foot are unable to reach release sites then those sites would not be used, and fewer mountain goats may be released.

Table 4. ALTERNATIVE 2 - Estimated helicopter flight time over wilderness for each release site.

Release site name	Wilderness area	# flights	Estimated flight time over wilderness per ROUND trip	Approximate flight minutes per release site
Chikamin	Alpine Lakes	31	10	310
Kaleetan	Alpine Lakes	31	8	248
Preacher Mtn	Alpine Lakes	31	12	372
White Chuck Glacier	Glacier Peak	41	16	656
Cadet Lake Ridge	Henry M. Jackson	35	5	175
Buckindy	Glacier Peak	35	12	420
Snowking Meadow	Glacier Peak	35	12	420
	Total	239		2601 minutes (43.4 hours)

Flights times and number of trips listed above are estimates and actual may vary due to unforeseen circumstances such as, but not limited to, weather and mechanical issues. Flight time will vary depending on the type of helicopter actually available.

Table 5. ALTERNATIVE 2 - Equipment needs.

Item	# Items	Approx. Weight (pounds)	Total Pounds
Medical kit	1	2.2	2.2
Radio	1	1.1	1.1
Climbing equipment	1	11.0	11.0
Camping equipment	6	55.1	330
Binoculars	4	2.2	8.8
Spotting scope	1	4.4	4.4
Tripod	1	4.4	4.4
Receiver VHF	1	2.2	2.2
Rubber mallet or post pounder	1	5	5
Temporary fencing posts	10	2	10
Temporary fencing material	1	25	25
		<i>Total</i>	<i>404.1 (67 pounds each person)</i>

Effects to wilderness character

The following sections compare the alternatives of the project within the framework of the qualities of wilderness character.

Untrammeled

Alternative 1) Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites

Mountain goats are indigenous to the wilderness areas where releases would occur, and proposed translocation patches were identified in part because mountain goats are known to occupy those habitats. However, the human-controlled movement of goats into the wilderness areas would be a trammeling action that would negatively affect the untrammeled quality of these areas.

Manipulating mountain goat behavior by placing fencing and salt blocks at the release sites, although temporary, would also affect the untrammeled quality of wilderness character.

Alternative 2) Use Helicopters to Transport Mountain Goats and Equipment to Release Sites Same as Alternative 1.

Natural

Alternative 1) Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites

Mountain goats are indigenous to the Glacier Peak, Henry M. Jackson, and Alpine Lakes wilderness areas and are the predominant large herbivore in alpine communities of these wilderness areas. Throughout much of the North Cascades mountain goat populations currently remain small and isolated. Reintroducing mountain goats to high-quality habitat patches historically occupied by mountain goats, but where populations are low or non-existent, will help to reestablish those populations and ensure the long-term integrity of the natural ecological conditions and processes in these areas. The reestablishment and continued presence of mountain goats, an indigenous species, would have a long-term positive effect on wilderness character.

Use of salt blocks may have a short-term negative effect on the natural quality of wilderness character. Salt blocks would be designed to minimize or completely avoid leaching of salt into the ground and surrounding environment. However, they may attract animals other than mountain goats, thus altering animals' natural behavior and movement.

Alternative 2) Use Helicopters to Transport Mountain Goats and Equipment to Release Sites

The long-term benefit to the natural quality from successful augmentation of mountain goat populations could be reduced compared to Alternative 1 due to the risk that not all wilderness release sites may be reachable by crews traveling on foot. To restore viable mountain goat populations throughout the mountain goat's native habitat and range, and maximize the probability of long-term demographic and genetic exchange among population clusters, an interacting set of populations across the North Cascades, including populations in wilderness, is needed. If one or more of the release sites in wilderness are

not accessible because of logistical constraints with reaching the sites on foot, the potential for successful establishment and long term viability of mountain goat populations may be less than that in Alternative 1.

The effect of salt blocks would be the same as in Alternative 1.

Undeveloped

Alternative 1) Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites

Helicopters would be used to transport mountain goats, personnel, and equipment from staging areas outside wilderness to release sites in wilderness. It is estimated that there would be approximately 274 flights and 51 hours of flight time over wilderness. Helicopters are both motorized equipment and mechanical transport, and their use has a temporary negative effect on the undeveloped quality of wilderness character.

Temporary installation of fencing during release operations and salt blocks for up to one year following releases would have short-term temporary negative effects on the undeveloped quality of wilderness character. The presence of collars on translocated mountain goats would have a temporary negative effect on the undeveloped quality of wilderness character while the collar is in wilderness (up to the lifetime of the animal.)

Alternative 2) Use Helicopters to Transport Mountain Goats and Equipment to Release Sites

Helicopters would be used to transport mountain goats and equipment from staging areas outside wilderness to release sites in wilderness. It is estimated that there would be approximately 239 flights and 43.4 hours of flight time over wilderness. Helicopters are both motorized equipment and mechanical transport, and their use has a temporary negative effect on the undeveloped quality of wilderness character. Alternative 2 would have approximately 35 fewer flights and 7.6 fewer hours of flight time than Alternative 1.

The effect of salt blocks, fencing, and collars would be the same as in Alternative 1.

Opportunities for solitude or primitive and unconfined recreation

Alternative 1) Use Helicopters to Transport Mountain Goats, Personnel, and Equipment to Release Sites

Opportunities for solitude: There would be a temporary negative effect on opportunities for solitude during the management periods while activities are being conducted. Some visitors may see or hear helicopters flying over wilderness and hovering to place goat crates, supplies, or landing to off-load crew members. While visitor use in the release site areas is generally low, due to the remote nature of some of the release sites, visitors in these remote areas may have a greater expectation of solitude than visitors in more easily accessible areas. Translocation of mountain goats would occur at one release site at a time so only one location would be affected by helicopter disturbance at any given time.

Opportunities for primitive and unconfined recreation: There would be temporary negative effects to opportunities for primitive and unconfined recreation. Although no trail closures are anticipated at release sites within wilderness, some of the proposed staging areas

outside of wilderness may require temporary closures which could limit access on certain trails. Operations will occur during periods in the summer that coincide with high visitation to these wilderness areas.

At the time these wilderness areas were established, one of the opportunities for primitive and unconfined recreation was the opportunity for a high quality trophy hunt of mountain goats. This was a unique opportunity afforded hunters until recent decades. There was also a greater opportunity for wilderness visitors to see mountain goats throughout their range than is currently available. Restoration of the mountain goat population may afford wilderness visitors a better chance of seeing one of the iconic animals in the North Cascades. It may eventually allow for some future resumption of a mountain goat trophy hunt.

Alternative 2) Use Helicopters to Transport Mountain Goats and Equipment to Release Sites

Opportunities for solitude: Effects to solitude would be similar to Alternative 1, but vary in several ways. The first would be a reduction in helicopter flight time over wilderness of approximately 7.6 hours as the result of crews not using helicopter transport to reach the release sites. Visitors may have a higher chance of encountering crews along trails as the crews hike in to the release sites. The six-person ground crew would need to hike in and camp for an extended period of time. Solitude would be reduced where visitors may come into contact with the ground crew or in the event the camp used by the crew is visible to or accessed by visitors. Although the extent of time the crew would stay at the release site depends on numerous other factors, the total duration is expected to be approximately one week.

Opportunities for primitive and unconfined recreation: Effects would be the same as Alternative 1.

Other Feature of Value

No Other Features of Value have been identified that would be affected.

Determination

After considering the options, **we have selected Alternative 1 (use helicopters to transport mountain goats, personnel, and equipment to release sites) as the minimum requirement** for the Glacier Peak, Henry M. Jackson, and Alpine Lakes wilderness areas. It is our judgement that there is not a reasonable or safe non-motorized method by which Washington Department of Fish and Wildlife could successfully augment mountain goat populations there. The project as proposed under Alternative 1 satisfies both (a) and (b) of Section (5) of FSM 2326.1.

Both alternatives would benefit the natural quality of wilderness character of these wilderness areas as they would contribute to restoring viable mountain goat populations throughout the habitat and range where mountain goats are indigenous. Translocation of mountain goats under both alternatives would negatively affect the untrammelled quality of wilderness character, because human-controlled movement of animals for the purpose of managing populations in wilderness is a trammeling action.

Other negative effects to wilderness character would mostly be limited to the management periods. The undeveloped quality of wilderness character would be negatively affected during operations by the use of helicopters—more so for Alternative 1 than Alternative 2—and by temporary placement of salt blocks and fencing at the release sites. The undeveloped quality would be negatively affected beyond project operations by the presence of collars on translocated mountain goats. Opportunities for solitude or primitive and unconfined recreation would see negative impacts due to sights and sounds of the helicopter, the potential to encounter personnel during operations, and temporary closure of some trailheads that access wilderness while they are used for staging. Alternative 2 would involve fewer flights and less flight time. For both alternatives the impacts of helicopter use would be temporary, of short duration (estimated to be up to 51 hours for Alternative 1 and 43.4 hours for Alternative 2), and spaced in two two-week periods per year over three years. While the timing of management periods would coincide with high-use months of July, August, and September, activities would mostly occur in areas where visitor use is generally low. In the long term, restoration of mountain goat populations may enhance opportunities for primitive and unconfined recreation through increased wildlife viewing opportunities.

The negative effects to wilderness character are outweighed by the potential to preserve an indigenous species and the ecological processes and conditions that support the natural quality of wilderness character for the long term through successful restoration of mountain goat populations in the North Cascades wilderness areas. Mountain goats are an integral part of the native wildlife of the North Cascades, part of the wilderness character, and important to the cultural identity of local tribes. Restoration of indigenous species that have been extirpated is a necessary action to restore wilderness character that has been diminished by their loss. Avoiding loss of indigenous species that are at risk of extirpation due to human actions—in this case, mountain goat populations that are not recovering from earlier hunting pressure—is necessary to preserve wilderness character.

In both alternatives, hazards for the crew involve exposure to helicopter flight in rugged mountainous terrain, as well as entry and exit from the helicopter. Helicopter transport in mountainous terrain poses numerous challenges due to vicissitudes in weather conditions, unpredictable winds, and lift conditions in varying temperatures. Disparate temperature conditions and elevations could result in modified load limits. Alternative 2, which is estimated to use approximately 35 fewer flights and 7.6 fewer flight hours and have ground-based personnel traveling by foot, would have less exposure to helicopter flight.

However, due to the steep nature of the trails and cross-country travel, Alternative 2 would have unacceptable risk of injury to personnel hiking to the release sites. These areas are characterized by steep slopes, numerous cliffs, heavy vegetation, frequent bad weather, and snow cover, all conditions which require a very fit and technically skilled team just to access the area. Hazards for the crew involve carrying heavy packs to the release sites and injuries associated with this activity. The potential release sites included in this project represent some of the steepest and most difficult terrain in the National Wilderness Preservation System.

Because of weather and other conditions in the area—and because releases must be coordinated with capture activities on the Olympic Peninsula—the project must take place during a relatively narrow temporal period. Flexibility in timing the utilization of release sites and staging areas provided by Alternative 1 will allow wildlife managers to make decisions that account for human and mountain goat safety during flight operations while providing for the long-term success of the population augmentation. The uncertainty of the crew's ability to reach all release sites by foot means Alternative 2 may not allow for as many mountain goats to be translocated or for populations in all areas to be augmented to avoid risk of extirpation.

We approve the following prohibited uses found in Section 4(c) of the Wilderness Act as described in Alternative 1:

- Mechanical transport: Use of helicopters
- Landing of aircraft: Sling-load landings to release mountain goats and landings to offload personnel
- Installations: Temporary installation of salt blocks and fencing

The following mitigation requirements apply to this determination:

- Where feasible, flights on weekends and holidays should be avoided to reduce potential impacts to visitors.
- Trailheads leading to the release sites will be posted with information about the project.
- Details, including timing, of the project will be posted on the Mt. Baker-Snoqualmie and Okanogan-Wenatchee NF websites.

- Kaleeten Peak area receives relatively high visitor use (Denny Creek/Melakwa Lake). The release site would avoid the scramble route to the south.
- Limit trail and road closures as much as practicable (avoid multiple closures at once and limit duration of closures to only length of time necessary for operations)
- Limit operations to one site at a time so that only one location would be affected by helicopter disturbance at any given time.
- Crews camping at the release sites practice Leave-No-Trace techniques so that there would be no evidence remaining of their presence.

Approved by: *Jamie Freeman*
for JAMIE KINGSBURY
Forest Supervisor
Mt. Baker-Snoqualmie National Forest

Date: 3/6/18

Approved by: *Mike Williams*
for MIKE WILLIAMS
Forest Supervisor
Okanogan-Wenatchee National Forest

Date: 3-9-18

Appendix A

Proposed release sites are in the Glacier Peak, Alpine Lakes, and Henry M. Jackson wilderness areas. Wilderness. Each site was evaluated by Dr. Rich Harris, a Section Manager for Bighorn sheep and mountain goats who works for WDFW. To identify and evaluate each site for suitability the following aspects were considered:

1. Habitat: Summer mountain goat habitat was defined based on the raster map of mountain goat habitat developed by Wells et al. (2011).
2. Connectivity: The degree to which areas in the habitat map should be considered as demographically connected.
3. Population Density: Population estimates for areas for which the mountain goat population has been estimated and calculated an average density of mountain goats. This density was used to estimate areas without an estimate as an estimate of potential population size.
4. Historic Harvest: The historic harvest for each area as an indicator of prior abundance.

Each potential reintroduction site was then scored by WDFW and Forest Service biologists on the MBS and OKW. An all-day meeting was held on 1/28/2016 with FS biologists, NEPA personnel and Wilderness staff along with RO staff and Rich Harris to reduce the number of potential reintroduction sites. Based upon that meeting, the subsequent evaluations of translocation sites by WDFW, the potential list of translocation sites was reduced to 12 sites, seven of which are in wilderness. Each site is estimated to receive 15-35 goats. While care was made to identify as many non wilderness sites as possible, the limitations of habitat that met the above criteria limited the options outside of wilderness.

Alpine Lakes Wilderness

The Alpine Lakes Wilderness was designated in 1976. A 22,000 acre addition to the Wilderness was approved by Congress as part of the National Defense Authorization Act for Fiscal Year 2015 (Public Law 113-291, December 19, 2014), expanding the Wilderness to a total area of 414,701 acres. Management is shared between the Mount Baker-Snoqualmie and Wenatchee national forests. The wilderness is between Snoqualmie and Stevens Passes in the North Cascades portion of the Cascade Range, including the sub-range called the Wenatchee Mountains. The Alpine Lakes Wilderness is characterized by sawtooth ridges, sharp summit spires, glacial valleys, and hundreds of glacially excavated lake basins. Small glaciers persist in the Stuart Range and along the high crest between Chikamin Peak and Mount Daniel.

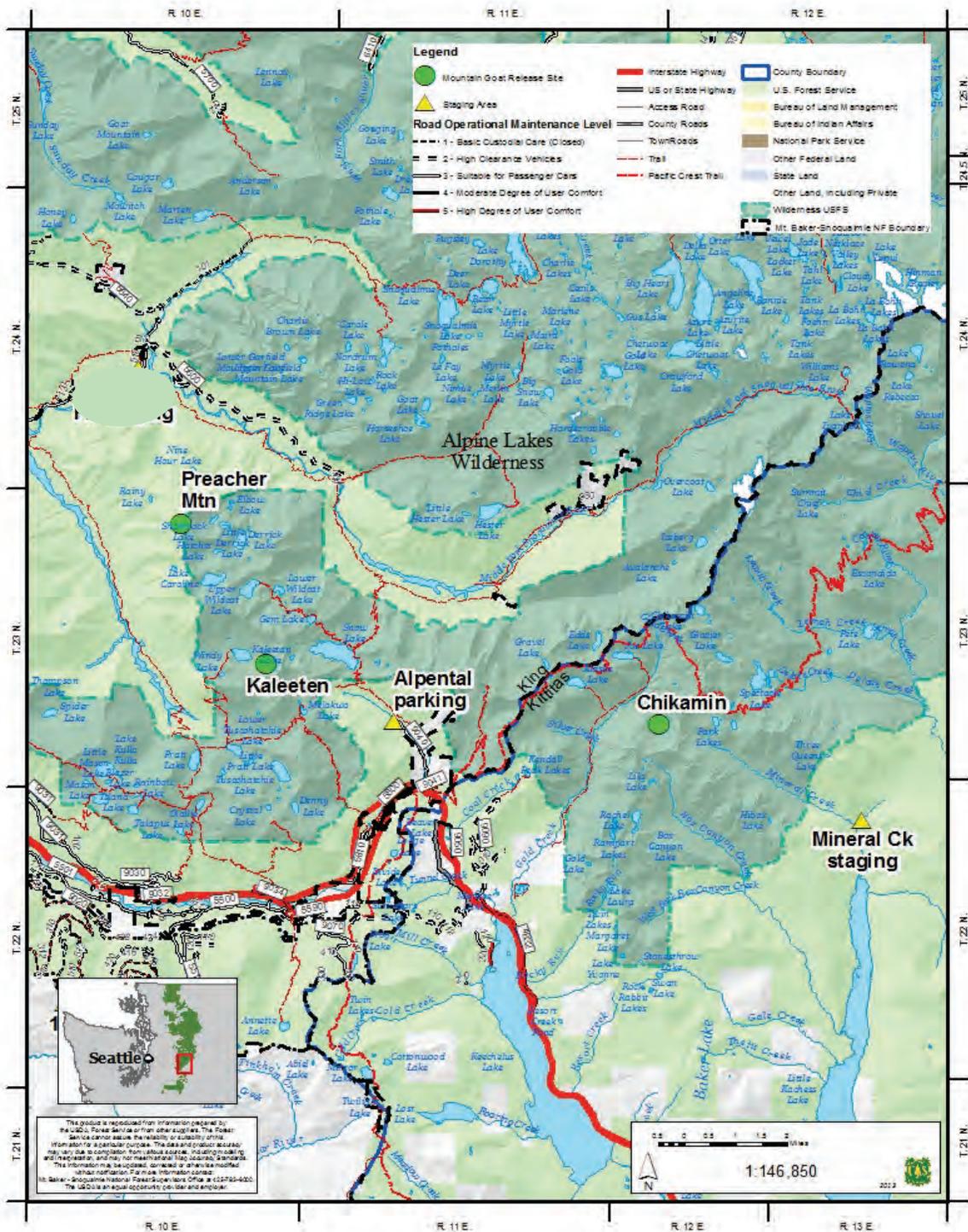
Because of the Alpine Lakes Wilderness's unique position straddling the Cascade crest and resulting variation in elevation and precipitation, a range of vegetation and alpine communities are represented from west to east. Numerous hiking trails provide access to the wilderness, including a portion of the Pacific Crest National Scenic Trail. Given its proximity to the Seattle metropolitan area and scenic qualities, the area receives high visitor use, especially where there is easy access from Interstate 90 and Highway 2.

Kaleetan, Chikamin, and Preacher Mtn. release sites – Alpine Lakes Wilderness

This large patch of approximately 86 km² is located in primarily within the MBSNF (Skykomish and Snoqualmie Districts), although parts of it east of crest are on the OWNF (Figure 1). Extending on both sides of the Cascade Divide, it includes such prominent landmarks as Chikamin Ridge, Chimney Rock, and Dutch Miller Gap, and the peaks surrounding Necklace Valley, and extending northeasterly as far as Terrace Mountain and northwesterly as far as Malachite Peak. WDFW estimates the patch could potentially support 190-210 mountain goats, although anecdotal reports suggest that fewer than 20 currently occupy the patch. This patch ranked intermediate in its geological characteristics; positive because of its relatively high proportions of volcanic and sedimentary substrates, but balanced by a high proportion of sodium-rich substrate.

Proposed staging areas and release sites, Alpine Lakes Wilderness

Site Type	Name	Latitude	Longitude	Wilderness
Staging	Alpental parking	47.421015	-121.237841	
Release	Chikamin	47.447916	-121.321893	Alpine Lakes
Staging	Alpental parking	47.447486	-121.430793	
Release	Kaleetan	47.463607	-121.483788	Alpine Lakes
Staging	Alpental parking	47.447486	-121.430793	
Release	Preacher Mtn	47.503748	-121.520026	Alpine Lakes



Henry M. Jackson Wilderness

The United States Congress designated the Henry M. Jackson Wilderness in as part of the 1984 Washington Wilderness Act and it now has a total of 102,910 acres. The Henry M. Jackson Wilderness is bordered by the Glacier Peak Wilderness to the north and the Wild Sky Wilderness to the southwest. Extending for more than 20 miles along the north-south trending crest of the Cascade Mountains, this wilderness area is characterized by deep glacial valleys spreading out east and west from the crest. Snow often accumulates to a depth of 20 feet at higher elevations, and remains well into summer, eventually melting into the 60-plus lakes scattered throughout the area. Henry M. Jackson Wilderness shares its northeast border with the huge Glacier Peak Wilderness. 32 miles of the Pacific Crest National Scenic Trail (PCT) bisect the wilderness.

Cadet Lake Ridge release site – Henry M. Jackson Wilderness

This patch of excellent mountain goat habitat had not been initially considered as among candidate patches. In 2014, WDFW flew a survey in this area, identifying a recovering population of goats, primarily on nearby Sheep Mountain. Other remnant goat populations have been reported at Goat Lake and the ridges off Sloan Peak. Given the habitat quality, this area would benefit from augmenting the known populations, to encourage growth and connectivity to goat populations to the south and north.

Proposed staging and release site, Henry M. Jackson Wilderness

Site Type	Name	Latitude	Longitude	Wilderness
Staging	Bald Eagle outhouse	48.030972	-121.291675	
Release	Cadet Lake ridge	48.019780	-121.332430	Henry M. Jackson

Glacier Peak Wilderness

The 566,057 acre Glacier Peak Wilderness is located in the northern Cascade Mountains of Washington State bordering Stephen Mather Wilderness to the north and Henry M. Jackson Wilderness to the south. The Wilderness Act of 1964 designated the Glacier Peak Wilderness, and the wilderness was increased in size (10,000 acres) by Public Law 90-544 (October 2, 1968), an act establishing the North Cascades National Park Complex and designating the Pasayten Wilderness and modifying the Glacier Peak Wilderness. The Wilderness was expanded by 112,000 acres as a result of Public Law 98-399 (July 3, 1984) A 450 mile trail system provides access to the Wilderness. The Pacific Crest National Scenic Trail (PCT) meanders around the west and north sides of Glacier Peak, descending into deep valleys and climbing alpine passes.

Glacier Peak Wilderness Area is characterized by heavily forested stream courses, steep-sided valleys, and rugged glacier covered peaks. Various species of wildlife inhabit the area and include deer, bear, mountain goat, cougar, marten, and wolverine. Numerous creeks cut through the valleys from their sharp drainages. Other bodies of water include more than 200 lakes, many unnamed and difficult to access. Snows can accumulate to depths of 45 feet on the west side of the crest. Alpine Lake Wilderness.

White Chuck Glacier release site – Glacier Peak Wilderness

This large patch of approximately 90 km², is located primarily within the MBSNF (Darrington Districts), although parts of it east of the crest are on the OWNF (Figure 2). This patch is located entirely within the Glacier Peak Wilderness and is centered on Glacier Peak itself, approximately 28 km northwest of Barlow Pass. Prominent landmarks in this patch in addition to Glacier Peak include Black Mountain, White Mountain, White Chuck Cinder Cone, Kennedy Peak, Milk Lake, and Lime Ridge. WDFW estimates that this patch could support 200-220 mountain goats. This patch experienced the highest historic harvest of mountain goats, and recent surveys indicate up to 130 goats currently occupy the patch (although many may do so only seasonally, to take advantage of mineral deposits on Gamma Ridge). This patch ranked first in the WDFW analysis of connectivity to other potential goat populations.

Mt. Buckindy release site – Glacier Peak Wilderness

This large patch of approximately 92 km² is primarily within the MBNSF (Mt. Baker and Darrington Districts), and is entirely within designated wilderness (Figure 2). Prominent landmarks include Mt. Buckindy, and Le Conte Mountain. WDFW estimates, based on the size of this patch, that it might potentially support 219 goats. This site contains abundant escape terrain, but forage productivity is low and WDFW's geological score for the site, based on substrates, was much lower than other patches proposed for release sites. However, this patch could provide considerable connectivity between the Glacier Peak area to the south, and the ranges to the north, possibly all the way to the recovered population around Mt. Baker (it ranked 2nd among all patches in connectivity score).

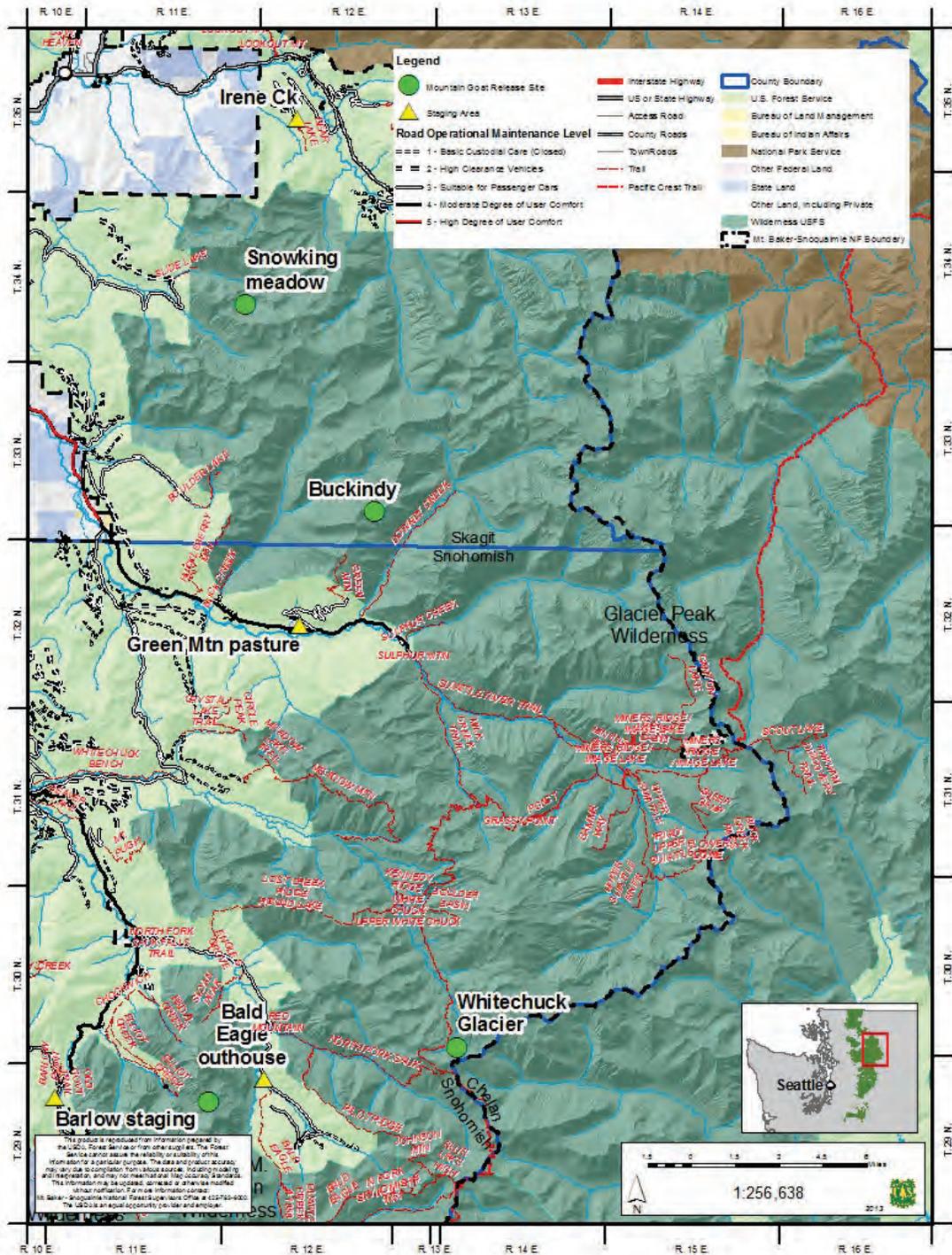
Snowking Meadow release site – Glacier Peak Wilderness

This patch of approximately 46 km² (Figure 2) of summer mountain goat habitat was estimated to have a long-term capacity of 110 goats, but WDFW data suggest it has few if any at present. It ranked 5th among all patches considered in connectivity, potentially providing for connectivity

between the Glacier Peak and Mt. Baker areas. It would have ranked more highly, but most of it consists of Na-rich substrates, raising the question of whether vegetation growing in this area will ultimately support a large population of goats. However, similar to the Buckindy site Snowking Mountain has several large glaciers and perennial snowpatches, suggesting that this area may ultimately have potential as summer goat habitat.

Proposed staging and release sites, Glacier Peak Wilderness

Site Type	Name	Latitude	Longitude	Wilderness
Staging	Bald Eagle outhouse	48.030972	-121.291675	
Release	White Chuck Glacier	48.048430	-121.148910	Glacier Peak
Staging	Green Mtn Pasture	48.255760	-121.270404	
Release	Buckindy	48.312974	-121.216468	Glacier Peak
Staging	Irene Creek	48.506668	-121.278686	
Release	Snowking Meadow	48.414584	-121.314399	Glacier Peak



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**APPENDIX G: USDA FOREST SERVICE SPECIAL-STATUS SPECIES
FOR THE OLYMPIC NATIONAL FOREST (WILDLIFE, FISH, AND
PLANTS)**

TABLE G-1. USDA FOREST SERVICE SPECIAL-STATUS FISH AND WILDLIFE SPECIES FOR THE OLYMPIC NATIONAL FOREST

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Euphydryas editha taylori</i>	Taylor's checkerspot butterfly (and Designated Critical Habitat)	ESA listed as Threatened	Mountain Goat areas at higher elevations, outside of known occupied sites (>0.5 mile) and Designated Critical Habitat within Dungeness watershed.	Open habitats (balds, created openings) with patches of vegetation of native forbs and grasses that contain variety of host and nectar plants for feeding and overwintering.	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH
<i>Strix occidentalis caurina</i>	Northern spotted owl (and Designated Critical Habitat)	ESA listed as Threatened	26 spotted owl home ranges overlap in project area; majority of sites are historic. Designated Critical Habitat, NCO-2, outside of Wilderness (staging areas).	Nests in complex forested habitats with multi-layered canopies, large overstory trees, snags, and downed wood. Roosting and foraging similar to nesting but with lesser habitat components. Utilize younger, denser stands for dispersing.	No Effect – species and DCH	No Effect – species and DCH- based on field reconnaissance conducted by FS in November 2016	No Effect – species and DCH	No Effect – species and DCH- based on field reconnaissance conducted by FS in November 2016
<i>Brachyramphus marmoratus</i>	Marbled murrelet (and Designated Critical Habitat)	ESA listed as Threatened	No historical occupied sites or <0.5 mile from historical site from staging or mountain goat areas. Hamma Hamma and Mt. Ellinor staging areas within Designated Critical Habitat, WA-06-b. No suitable habitat adjacent to mountain goat areas and staging areas.	Seasonal forest inhabitant for nesting only. Nests in older forested stands which may include remnant trees with one or more platforms on branches >4 inches diameter in large diameter live conifers.	No Effect – species and DCH	No Effect – species and DCH- based on field reconnaissance conducted by FS in November 2016	No Effect – species and DCH	No Effect – species and DCH- based on field reconnaissance conducted by FS in November 2016
<i>Salvelinus confluentus</i>	Bull trout (and Designated Critical Habitat)	ESA listed as Threatened	Habitat not present in project area.	Rivers and riparian.	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Oncorhynchus mykiss</i>	Puget Sound Steelhead (and Designated Critical Habitat)	ESA listed as Threatened	Habitat not present in project area.	Rivers and riparian.	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH
<i>Oncorhynchus keta</i>	Hood Canal Summer Chum Salmon (and Designated Critical Habitat)	ESA listed as Threatened	Habitat not present in project area.	Rivers and riparian.	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH
<i>Oncorhynchus tshawytscha</i>	Puget Sound Chinook Salmon (and Designated Critical Habitat)	ESA listed as Threatened	Habitat not present in project area.	Rivers and riparian.	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH	No Effect – species and DCH
<i>Oncorhynchus clarkii</i>	Coastal cutthroat trout – Puget Sound and Olympic Peninsula	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian.	No Impact	No Impact	No Impact	No Impact
<i>Oncorhynchus kisutch</i>	Coho salmon – Puget Sound/Strait of Georgia	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian.	No Impact	No Impact	No Impact	No Impact
<i>Catostomus sp.</i>	Salish sucker	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian.	No Impact	No Impact	No Impact	No Impact
<i>Lampetra tridentata</i>	River lamprey	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian.	No Impact	No Impact	No Impact	No Impact
<i>Novumbra hubbsi</i>	Olympic mudminnow	Regional Forester Sensitive	Habitat not present in project area.	Wetland, bog, low gradient rivers.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Rhinichthys cataractae</i>	Nooksack dace	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian.	No Impact	No Impact	No Impact	No Impact
<i>Martes pennanti</i>	Pacific fisher	Forest Service Sensitive	No known den location in project area, but suitable habitat present adjacent to staging areas.	Same habitat as for northern spotted owl. Requires multiple rest sites that are often tree cavities, downed trees or snags.	No Impact	No Impact	No Impact	No Impact
<i>Accipiter gentilis</i>	Northern goshawk	Forest Service Sensitive	No known territories within the project area. Habitat is present adjacent to staging areas.	Nests in dense, mature and late successional conifer forests.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Falco peregrinus</i>	Peregrine falcon	Regional Forester Sensitive	No known locations, but habitat is present in project area.	Nests on cliff or rock outcrops. Primary forage along large bodies of water.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Gavia immer</i>	Common loon	Regional Forester Sensitive	Habitat not present in project area.	Inhabits salt and fresh water bodies, nesting in inland lakes and ponds.	No Impact	No Impact	No Impact	No Impact
<i>Haliaeetus leucocephalus</i>	Bald eagle	Regional Forester Sensitive, Olympic National Forest Management Indicator Species	No known nest sites in project area, but have been observed roosting and foraging in watersheds of project area.	Nests in conifer forests containing old-growth components typically within one mile of water.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Histrionicus histrionicus</i>	Harlequin duck	Regional Forester Sensitive	Habitat not present in project area.	Seasonal forest inhabitant. Nests along fast-flowing streams with loafing sites nearby.	No Impact	No Impact	No Impact	No Impact
<i>Plethodon vandykei</i>	Van Dyke's salamander	Regional Forester Sensitive	Habitat not present in project area.	Associated with streams, seeps and springs, wet talus and forest litter from sea level to 3,600 feet (2,000 meters).	No Impact	No Impact	No Impact	No Impact
<i>Rhyacotriton olympicus</i>	Olympic torrent salamander	Regional Forester Sensitive	Habitat not present in project area.	Found around the splash zone of cold, clear streams, seeps or waterfalls. Seeps running through talus slopes also provide habitat.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Cryptomastix devia</i>	Puget Oregonian	Regional Forester Sensitive	Habitat not present in project area.	Associated with hardwood shrubs and trees.	No Impact	No Impact	No Impact	No Impact
<i>Fluminicola virens</i>	Olympia pebblesnail	Regional Forester Sensitive	Habitat not present in project area.	Typically found in cold, clear streams with near-saturation amounts of dissolved oxygen, nor or minor nutrient enhancement and continual current and coarse stable substrate.	No Impact	No Impact	No Impact	No Impact
<i>Hemphillia malonei</i>	Malone jumping slug	Forest Service Strategic	Habitat not present in project area.	Found in moist forested habitats, generally over 50 years old with greater than 50% canopy cover; dense sword fern, coarse wood, exfoliated bark piles.	No Impact	No Impact	No Impact	No Impact
<i>Hemphillia burringtoni</i>	Keeled (Burrington) jumping-slug	Regional Forester Sensitive	Habitat not present in project area.	Associated with low to mid-elevation rain forests. Usually found within or under rotting logs, or forest floor litter.	No Impact	No Impact	No Impact	No Impact
<i>Megomphix hemphill</i>	Oregon megomphix	Forest Service Strategic	Habitat not present in project area.	Found at low elevations, normally below 500 ft. Most occupied sites are on well-shaded north slopes and terraces, and many are near streams and have a thin mantel of soil; bigleaf maple is closely associated.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Pristiloma johnsoni</i>	Broadwhorl tightcoil	Regional Forester Sensitive	Habitat not present in project area.	Associated with exceptionally moist and very diverse forest sites at lower elevations. Typically in abundant ground cover (<i>Gaultheria</i> , <i>Oxalis</i> , sword fern, grasses), conifer or hardwood overstory, and moderate to deep litter.	No Impact	No Impact	No Impact	No Impact
<i>Pristiloma johnsoni</i>	Mottled tail-dropper	Forest Service Strategic	Habitat not present in project area.	Found near waterfalls and associated with slopes; known to occupy in southern end of Olympic mountains.	No Impact	No Impact	No Impact	No Impact
<i>Prophysaon obscurum</i>	Pacific vertigo	Forest Service Strategic	Project area outside the suspected range of species.	Occurs in forested sites at lower elevations and may be found on tree trunks and lower branches of deciduous trees and shrubs and among litter beneath them.	No Impact	No Impact	No Impact	No Impact
<i>Vertigo sp.</i>	Hoko vertigo	Forest Service Strategic	Project area outside the suspected range of species.	Old-growth riparian associate species, possibly in low elevations (40–300 feet) near streams. Habitat characterized by old trees, riparian hardwoods and mesic conditions. Detected on undersides of limbs and leaning trunks of alder.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Prophysaon coeruleum</i>	Blue-gray tail-dropper	Regional Forester Sensitive	Habitat not present in project area.	Associated with moist conifer and mixed conifer-hardwood forests, partially decayed logs, leaf and needle litter, mosses and moist plant communities.	No Impact	No Impact	No Impact	No Impact
<i>Agonum belleri</i>	Beller's ground beetle	Forest Service Strategic	Habitat not present in project area.	Occurs only in low to mid-elevation (less than 3,280 feet) Puget trough sphagnum bogs; unique, peat-forming wetlands.	No Impact	No Impact	No Impact	No Impact
<i>Bombus occidentalis</i>	Western bumble bee	Regional Forester Sensitive	No known locations, but potential habitat is present in project area.	Associated with meadows and openings in forested areas. Habitat including flowering plants for foraging and rodent burrows for nesting.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Callophrys johnsoni</i>	Johnson's hairstreak	Regional Forester Sensitive	Habitat not present in project area.	Depends on old-growth hemlock that contains dwarf mistletoe.	No Impact	No Impact	No Impact	No Impact
<i>Habrodais grunus</i>	Golden hairstreak	Regional Forester Sensitive	Habitat not present in project area.	Associated with golden chinquapin.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Lycaena mariposa charlottensis</i>	Makah copper	Regional Forester Sensitive	Habitat not present in project area.	Associated with meadow and wetland habitats particularly peat bogs. Host is <i>Vaccinium</i> .	No Impact	No Impact	No Impact	No Impact
<i>Oeneis chryxus valerata</i>	Olympic arctic	Regional Forester Sensitive	Habitat is present in project area. Known locations include Obstruction Pt., Hurricane Ridge, Mt. Townsend.	Associated with higher elevation meadows and along shale ridges and summits with sparse grasses.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Icaricia icarioides blackmore</i>	Puget blue	Regional Forester Sensitive	Habitat is present in project area. Known locations include Mt. Townsend.	Associated with dry alpine meadows. Host on lupine. May occur on roadside and forest openings.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Plebejus lupini texanus</i>	Lupine blue	Regional Forester Sensitive	Habitat is present in project area. Known locations include Obstruction Pt., Hurricane Ridge, and Mt. Townsend.	Alpine and subalpine dry meadows. Host plant Cushion buckwheat.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Polites sonora siris</i>	Dog star skipper	Forest Service Strategic	No known locations, but potential habitat is present in project area.	Found in native prairies, grasslands, and alpine meadows; woodland edges and clearings, streambanks and springs. Also found along opening such as roadsides.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Speyeria zerene bremnerii</i>	Valley silverspot	Regional Forester Sensitive	Known locations include Deer Park., Mt. Townsend habitat is available in project area.	Occupies subalpine habitat, forest openings, prairies, grasslands.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Nisquallia olympica</i>	Olympic grasshopper	Forest Service Strategic	No known locations, but potential habitat is present in project area.	Favors large scree at edges of low foliage which is found at higher elevations.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Rhyacophila pichaca</i> and <i>Rhyacophila viquaea</i>	Caddisfly	Forest Service Strategic	Habitat not present in project area.	Rivers and riparian areas.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	Regional Forester Sensitive	Habitat not present in project area.	Uses areas beneath sloughing bark, most often found in old-growth trees and snags. Commonly roosts in caves, large trees, mines, buildings and bridges for roosting.	No Impact	No Impact	No Impact	No Impact
<i>Marmota olympus</i>	Olympic marmot	Regional Forester Sensitive	Known locations in project area is within mountain goat habitat.	Alpine and subalpine habitats; talus slopes.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Myotis keenii</i>	Keen's myotis	Regional Forester Sensitive	No known locations, but potential habitat is present in project area.	Utilizes a variety of moist coastal forests of lower elevations dominated by western hemlock, Sitkum spruce, and other conifers. Day roosts in forested stands with increase in tree diameter, presence of defect, decreasing bark, and increasing proportion of old-growth in landscape or increasing proportion of trees in the early to late stages of decay.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Thomomys mazama melanops</i>	Olympic pocket gopher	Regional Forester Sensitive	No known locations, and suitable habitat is undetermined in the project area.	Associated with glacial outwash high elevation habitats.	No Impact	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)	May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability (MIIBNLPV)
<i>Myotis lucifugus</i>	Little brown myotis	Regional Forester Sensitive	No known locations, but suitable habitat is present in project area.	Habitat generalist and found in buildings and other structures, in conifer and hardwood forests (crevices and cavities of live trees, snags and stumps). Also found in open forests and forest margins associated with riparian areas and sites with open water.	No Impact	No Impact	No Impact	No Impact
<i>Martes caurina</i>	Pacific marten	Forest Service Strategic; Olympic National Forest Management Indicator Species	No known locations, but suitable habitat is present in project area.	Coniferous forest, normally older stands; use large logs, snags and live trees for denning/resting.	No Impact/Effect	No Impact/Effect	No Impact/Effect	No Impact/Effect

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
	Primary cavity excavators (various species)	Olympic National Forest Management Indicator Species	Species and habitat present in project area.	Standing dead and dying trees of various sizes for feeding, resting and nesting in conifer and hardwood forests.	No Effect	No Effect	No Effect	No Effect
<i>Hylatomus pileatus</i>	Pileated woodpecker	Olympic National Forest Management Indicator Species	Species and habitat present in project area.	Nests in decadent live trees and in snags (primarily broken top). Pacific silver fir favored species, but will nest in older western hemlock. Roosts in larger diameter western hemlock snags or live western redcedar. Forage in closed-canopy habitat with large, relatively hard snags.	No Effect	No Effect	No Effect	No Effect
<i>Cervus canadensis roosevelti</i>	Roosevelt elk	Olympic National Forest Management Indicator Species	Species and habitat present in project area.	Species uses wide variety of successional conditions for life stages (farmland, riparian, openings, older forests). Higher quality habitat found in younger aged habitats.	No Effect	Would not contribute toward a negative trend in viability (WNCTNTV)	Would not contribute toward a negative trend in viability (WNCTNTV)	Would not contribute toward a negative trend in viability (WNCTNTV)

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Odocoileus hemionus columbianus</i>	Columbia black-tailed deer	Olympic National Forest Management Indicator Species	Species and habitat present in project area.	Occupy a range of habitats, often with dense vegetation. Consume variety of browse including woody shrubs, forbs, lichens and some grasses. Food source more abundance in recently disturbed areas with less canopy cover than denser, mid-age to older forests.	No Effect	Would not contribute toward a negative trend in viability (WNCTNTV)	Would not contribute toward a negative trend in viability (WNCTNTV)	Would not contribute toward a negative trend in viability (WNCTNTV)
	Neotropical migratory birds	Migratory Landbirds	Species and habitat present in project area.	Focus in coniferous forests; depending on species may have close association with understory shrubs or early successional habitats; hardwoods; snags and conifers.	No Effect	Project would not alter or decrease habitat, and would not impact individuals or not contribute toward the need for additional conservation actions	Project would not alter or decrease habitat, and would not impact individuals or not contribute toward the need for additional conservation actions	Project would not alter or decrease habitat, and would not impact individuals or not contribute toward the need for additional conservation actions

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
	Survey and Manage species (mollusk)	Survey and Manage	Species and habitat not present in project area.	Downed wood, deciduous overstory, and high level of leaf litter.	No Effect	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.

DCH = Designated Critical Habitat; ESA = Endangered Species Act; MIIBNLPV: May impact individuals, but is not likely to cause a trend toward federal listing or a loss of population viability;
 WNCTNTV: Would not contribute toward a negative trend in viability.

TABLE G-2. USDA FOREST SERVICE SENSITIVE PLANT SPECIES FOR THE OLYMPIC NATIONAL FOREST

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Dermatocarpon meiophyllizum</i>	Lichen	USDA Forest Service Sensitive	No	Aquatic and semi-aquatic zones of stream channels.	No Impact	No Impact	No Impact	No Impact
<i>Erioderma solediatum</i>	Lichen	USDA Forest Service Sensitive	No	Epiphyte on Ericaceous shrubs, alder, and western hemlock in coastal fog zone.	No Impact	No Impact	No Impact	No Impact
<i>Leptogium cyanescens</i>	Lichen	USDA Forest Service Sensitive	No	On shaded twigs of deciduous trees and shrubs in humid habitats.	No Impact	No Impact	No Impact	No Impact
<i>Niebla cephalota</i>	Lichen	USDA Forest Service Sensitive	No	Open forest, forest edges, and scrublands along the immediate coast.	No Impact	No Impact	No Impact	No Impact
<i>Ramalina thrausta</i>	Lichen	USDA Forest Service Sensitive	No	Moist, cool forests in the coastal fog belt, typically in riparian areas.	No Impact	No Impact	No Impact	No Impact
<i>Tholurna dissimilis</i>	Lichen	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Krummholz or flag-form subalpine fir and Engelmann spruce on windswept ridges in the upper montane and subalpine zones up to timberline. Also found near sea level near Port Angeles, WA.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Astragalus australis</i> var. <i>cottonii</i>	Cotton's milk-vetch	Forest Service Sensitive, State Threatened	Yes. Olympic peninsula endemic; occurs in Buckhorn Wilderness.	High elevation alpine zone on unstable talus or scree slopes, and ridges with a mostly southerly or westerly aspect.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.
<i>Astragalus microcystis</i>	Least bladderly milk-vetch	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn Wilderness.	Dry, gravelly soils in cushion plant communities of the alpine and subalpine zones.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.
<i>Botrychium ascendens</i>	Upward-lobed moonwort	USDA Forest Service Sensitive	No	Coniferous forests, wet and dry meadows, stream banks, and roadsides.	No Impact	No Impact	No Impact	No Impact
<i>Carex anthoxanthea</i>	Yellow-flowered sedge	USDA Forest Service Sensitive	No	Moist, open areas near bogs, on grassy slopes, and in wet meadows at low to middle elevations.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Carex circinata</i>	Coiled sedge	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Rocky and moist areas, including cliffs, talus, outcrops, and wet meadows.	No Impact	No Impact	No Impact	No Impact
<i>Carex obtusata</i>	Blunt sedge	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn Wilderness.	Dry or vernal moist grasslands, bluffs, sandy flood plains, vernal moist scree meadows, alpine talus, and ridgetops.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial.	Impact, but beneficial.	Impact, but beneficial.
<i>Carex pauciflora</i>	Few-flowered sedge	USDA Forest Service Sensitive	No	Wetlands, boggy lake margins, prairies, stream banks, and coastal inland areas, often in Sphagnum or peaty soils.	No Impact	No Impact	No Impact	No Impact
<i>Carex scirpoidea</i> ssp. <i>scirpoidea</i>	Canadian single-spike sedge	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn and Mt. Skokomish Wilderness.	Moist alpine meadows, stream banks, and open rocky slopes in the mountains, often above timberline.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial.	Impact, but beneficial.	Impact, but beneficial.

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Carex stylosa</i>	Long-styled sedge	USDA Forest Service Sensitive	No	Ponds, bogs, fens, shallow marshes, streambanks, and moist meadows.	No Impact	No Impact	No Impact	No Impact
<i>Chrysolepis chrysophylla</i> var. <i>chrysophylla</i>	Golden chinquapin	USDA Forest Service Sensitive	No	Dry open sites to woodlands; infertile and droughty sites.	No Impact	No Impact	No Impact	No Impact
<i>Claytonia multiscapa</i> ssp. <i>pacifica</i>	Pacific lance-leaved springbeauty	USDA Forest Service Sensitive	Yes. Occurs in Mt. Skokomish Wilderness.	Wet subalpine to alpine meadows, often flowering at the edge of melting snowfields.	No Impact	Impact, but beneficial.	Impact, but beneficial.	Impact, but beneficial.
<i>Coptis aspleniifolia</i>	Spleenwort-leaved goldthread	USDA Forest Service Sensitive	No	Moist, cool sites with a well-developed litter layer.	No Impact	No Impact	No Impact	No Impact
<i>Dodecatheon austrofrigidum</i>	Frigid shootingstar	USDA Forest Service Sensitive	No	Open or shaded in rock crevices, under overhanging cliffs, on steep basalt slopes and rock outcrops along rivers and ridges, and in vernal moist areas.	No Impact	No Impact	No Impact	No Impact
<i>Draba cana</i>	Lance-leaved draba	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Alpine and subalpine open, dry meadows and knolls, in rock crevices, and on dry stony slopes.	No Impact	No Impact	No Impact	No Impact
<i>Draba juvenilis</i>	Long-stalked draba	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Moist meadows, rocky slopes, and cliffs in subalpine and alpine zones.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Dryas drummondii</i> var. <i>drummondii</i>	Drummond's mountain-avens	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn Wilderness.	Crevices of steep, rocky, dry cliffs, and limestone along rivers.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial.	Impact, but beneficial.	Impact, but beneficial.
<i>Erigeron aliceae</i>	Alice's fleabane	USDA Forest Service Sensitive	No	Open places in moist to dry montane forested zones.	No Impact	No Impact	No Impact	No Impact
<i>Erigeron peregrinus</i> var. <i>thompsonii</i>	Thompson's wandering daisy	USDA Forest Service Sensitive	No	Moist sphagnum bogs and swamps with peaty, organic soil.	No Impact	No Impact	No Impact	No Impact
<i>Erythronium quinaultense</i>	Quinault fawnlily	USDA Forest Service Sensitive	No	Openings and rock ledges in coniferous forests.	No Impact	No Impact	No Impact	No Impact
<i>Hedysarum occidentale</i> var. <i>occidentale</i>	Western hedysarum	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Rocky exposed sites, including meadows, shrub fields, bare rock outcrops, boulder fields, and talus slopes.	No Impact	No Impact	No Impact	No Impact
<i>Lycopodiella inundata</i>	Bog club-moss	USDA Forest Service Sensitive	No	Sphagnum bogs, wet, sandy places, wetlands adjacent to lakes, marshes, and swampy ground.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Montia diffusa</i>	Branching montia	USDA Forest Service Sensitive	No	Moist forests and open fir woodlands in lowland and montane zones.	No Impact	No Impact	No Impact	No Impact
<i>Ophioglossum pusillum</i>	Adder's-tongue	USDA Forest Service Sensitive	No	Seasonally wet areas, from forested sites to meadows to roadside ditches.	No Impact	No Impact	No Impact	No Impact
<i>Oxytropis monticola</i>	Yellowflower locoweed	USDA Forest Service Sensitive	Yes	Prairies, alpine meadows, open woodlands, and gravelly floodplains in moist or dry soils.	No Impact	No Impact	No Impact	No Impact
<i>Parnassia palustris</i> var. <i>tenuis</i>	Northern grass-of-parnassus	USDA Forest Service Sensitive	No	Seepy road cuts and rock faces, wet meadows and along streams.	No Impact	No Impact	No Impact	No Impact
<i>Pellaea breweri</i>	Brewer's cliff-brake	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn and Mt. Skokomish Wilderness.	Open rocky alpine areas; crevices, ledges, and bases of cliffs and rock outcrops; rocky slides.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial.	Impact, but beneficial.	Impact, but beneficial.
<i>Pinus albicaulis</i>	Whitebark pine	USDA Forest Service Sensitive	Yes. Occurs in Buckhorn Wilderness.	Alpine and subalpine habitats.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Polemonium carneum</i>	Great polemonium	USDA Forest Service Sensitive, State Threatened	No	Woody thickets, open and moist forests, prairie edges, and roadsides.	No Impact	No Impact	No Impact	No Impact
<i>Ranunculus cooleyae</i>	Cooley's buttercup	USDA Forest Service Sensitive	Yes. Not known to occur in project area, but habitat present.	Montane gravelly alluvial slopes, talus slopes, stream outlets, lake edges, and the edges of receding snow fields.	No Impact	No Impact	No Impact	No Impact
<i>Synthyris pinnatifida</i> var. <i>lanuginosa</i>	Featherleaf kittentails	USDA Forest Service Sensitive, State Threatened	Yes. Olympic peninsula endemic; occurs in Buckhorn Wilderness.	Dry rocky places, usually in a typical cushion plant community at high elevations.	May impact individuals but would not likely cause a trend toward federal listing or a loss of population viability.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.	Impact, but beneficial. Camp and Gamon (Field Guide to Rare Plants of WA) list introduced mountain goats as a threat to this species.
<i>Utricularia intermedia</i>	Flat-leaved bladderwort	USDA Forest Service Sensitive	No	Shallow ponds, slow moving streams, and wet meadows.	No Impact	No Impact	No Impact	No Impact
<i>Bartramioopsis lescurii</i>		USDA Forest Service Sensitive	No	On humus, soil over rock, cliffs and in rock crevices; usually on rock substrates and vertical surfaces. Occurs in cool, humid canyons and stream terraces at low to moderate elevations.	No Impact	No Impact	No Impact	No Impact

Species	Common Name	Status	Species or Habitat Present in Project Area (mountain goat habitat or staging areas)	General Habitat Description	Alternative A: No Action	Alternative B: Capture and Translocation	Alternative C: Lethal Removal	Alternative D: Capture and Translocation and Lethal Removal
<i>Iwatsukiella leucotricha</i>	Iwatsukiella moss	USDA Forest Service Sensitive	No	Moist, fog drenched forest, usually in the Pacific Silver fir zone.	No Impact	No Impact	No Impact	No Impact
Survey and Manage species (botanical)		Survey and Manage	Species and habitat are not present in project area.	Old growth and habitat components found in old growth (downed wood, large diameter trees, etc.).	No Effect	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.	Project is not a habitat-disturbing activity within habitat of the species, therefore pre-disturbance surveys are not required for these species.

Status Definitions

Interagency Special Status/Sensitive Species – USDA Forest Service “Sensitive” and US Bureau of Land Management (BLM) “Special Status”

Management for Sensitive species follows Forest Service Region 6 Sensitive Species policy as identified in Section 2670 of the Forest Service Manual (FS 1991). For Region 6 of the USDA Forest Service, Sensitive Species are defined as those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species’ existing distribution (FSM 2670.5). Management of sensitive species “must not result in a loss of species viability or create significant trends toward federal listing” (FSM 2670.32). The Regional Forester is responsible for identifying sensitive species and shall coordinate with federal and state agencies and other sources, as appropriate, in order to focus conservation management strategies and to avert the need for federal or state listing as a result of National Forest management activities.

Sensitive

1. All US Fish and Wildlife Service (USFWS) Candidate species that are suspected or documented on National Forest Service (NFS) lands.
2. All de-listed USFWS species that are suspected or documented on NFS lands are considered Sensitive for the duration of their delisting monitoring plan.
3. On Washington Natural Heritage Program Rare Animal and Flora lists and S1, S1S2, S1S3, S2, or S2S3 **and** G1-G5 or G1Q-G5Q or GNR or GU, **or** T1-T5 or TNR or TU ranks, **or** N1-N5 or NNR or NU.
4. On Washington Natural Heritage Program Rare Animal or Flora lists and S2S4 or S3 **and** G1-G3, or G1Q-G3Q or N1-N3, or T1-T3 ranks.

For both 3 and 4, the following must also apply:

- a. For Washington, flora species cannot have Washington Natural Heritage Program Review 1 or 2 status, and must be documented on at least one USDA Forest Service unit in Washington.
- b. Cannot be an undescribed species.

Strategic

1. Any species meeting items 3 or 4 above but:
 - a. For Washington, species is suspected only (not documented) on one or more USDA Forest Service unit in Washington, and/or
 - b. Species is undescribed and/or
 - c. For Washington, flora species is Washington Natural Heritage Program Review 1 or 2.
2. Washington Natural Heritage Program Rare Animal or Flora lists and SH or SX **and** G1-G5 or G1Q-G5Q or GH or GX.
3. On Washington Natural Heritage Program Rare Animal or Flora lists and SU or SNR **and** G1-G3 or G1Q-G3Q or GH or GX, or T1-T3 or TH or TX, or N1-N3 or NH or NX.

Olympic National Forest Management Indicator Species

A species selected under the Olympic National Forest Land and Resource Management Plan (FS 1990) that is presumed to be an indicator of the welfare of other species using the same habitat, and is a species whose condition can be used to assess the impacts of management actions on a particular area.

Survey and Manage Species

Survey and Manage are a set of standards and guidelines associated with the 1994 Record of Decision (ROD) (FS 1994) for Amendments to USDA Forest Service and BLM Planning Documents within the Range of the Northwest Spotted Owl (called the Northwest Forest Plan). They are documented in the January 2001 ROD and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (FS 2001). These standards and guidelines are applicable to NFS and BLM lands in western Washington, western Oregon, and north-western California and are intended to reduce or eliminate (mitigate) potential effects from agency actions to just over 300 flora and fauna species including mosses, liverworts, fungi, lichens, vascular plants, slugs, snails, salamanders, great gray owl, and red tree voles. These Survey and Manage species are assigned to one of six categories based upon the relative rarity of the species, the practicality to conduct pre-disturbance surveys, and the understanding of association with late-successional or old growth forests.

Three basic criteria must be met for species to be included in the standards and guidelines:

1. The species must occur within the Northwest Forest Plan area, or occur close to the Northwest Forest Plan area and have potentially suitable habitat within the National Forest Plan area.
2. The species must be closely associated with late-successional or old-growth forest.
3. The reserve system and other Standards and Guidelines of the Northwest Forest Plan do not appear to provide for a reasonable assurance of species persistence.

REFERENCES

USDA Forest Service (FS)

- 1990 Land and Resource Management Plan. Olympic National Forest. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 1990.
- 1991 Forest Service Manual (FSM) Directive Issuances. Title 2600 - Wildlife, Fish, and Sensitive Plant Habitat Management http://www.fs.fed.us/im/directives/fsm/2600/2600_zero_code.txt.
- 1994 Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. April 13, 1994. <https://reo.gov/riec/newroda.pdf>
- 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and manage, Protection Buffer, and the other Mitigation measures Standards and Guidelines. January 2001. <https://reo.gov/survey-and-manage/2001/RODjan01.pdf>

APPENDIX H: FEDERALLY LISTED SPECIES (*ENDANGERED SPECIES ACT*) AND USDA FOREST SERVICE SPECIAL-STATUS SPECIES FOR THE NORTH CASCADES NATIONAL FORESTS (WILDLIFE AND PLANTS)

TABLE H-1. ESA-LISTED FISH AND WILDLIFE SPECIES IN THE OKANOGAN-WENATCHEE AND MT. BAKER-SNOQUALMIE NATIONAL FORESTS

Common and Scientific Name	Federal Status	Critical Habitat within Project Area	Occur or Potential to Occur in Project Area	Potential Effects to Species or Habitat (Alternatives B and D)
Grizzly Bear (<i>Ursus arctos horribilis</i>)	Threatened	No	Yes	Yes
Canada Lynx (<i>Lynx Canadensis</i>)	Threatened	No	Yes	Yes
Gray Wolf (<i>Canis lupus</i>)	Endangered Western 2/3 of Washington	No	Yes	Yes
Wolverine (<i>Gulo gulo</i>)	Proposed Threatened	No	Yes	Yes
Northern Spotted Owl (<i>Strix occidentalis caurina</i>)	Threatened	Yes	Yes	Yes: Mt. Baker-Snoqualmie National Forest No: Okanogan and Wenatchee National Forest
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	Threatened	Yes	Yes	Yes: Mt. Baker-Snoqualmie National Forest No: Okanogan and Wenatchee National Forest
Bull Trout (<i>Salvelinus confluentus</i>)	Threatened	Yes	Yes	No Effect
Puget Sound Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	Threatened	Yes	Yes	No Effect
Upper Columbia River spring-run Chinook (<i>Oncorhynchus tshawytscha</i>)	Endangered	Yes	Yes	No Effect
Middle Columbia River steelhead (<i>Oncorhynchus mykiss</i>)	Threatened	Yes	Yes	No Effect
Puget Sound steelhead (<i>Oncorhynchus mykiss</i>)	Threatened	Yes	Yes	No Effect
Chum Salmon (<i>Oncorhynchus keta</i>)	Threatened	No	No	No Effect

Source: FS 2015

TABLE H-2. ESA-LISTED PLANT SPECIES IN THE OKANOGAN-WENATCHEE NATIONAL FOREST

Common Name	Scientific Name	Federal Status	Habitat	Occur in Project Area
Showy Stickseed	<i>Hackelia venusta</i>	Endangered	Narrow endemic, known from one population of 600 individuals in Chelan County. Open areas of steeply sloping, highly unstable granite cliffs. Sparse cover of other vascular plants and low canopy cover.	No
Wenatchee Mountains checker-mallow	<i>Sidalcea oregana var. calva</i>	Endangered	Endemic plant found only in mid-elevation wetlands and moist meadows within Chelan County.	No
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened	Geographically widespread orchid occurring in the Okanogan area. Habitat includes orchid occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams.	No

Source: FS 2015

TABLE H-3. USDA FOREST SERVICE REGIONAL FORESTER SENSITIVE FISH AND WILDLIFE SPECIES FOR THE OKANOGAN-WENATCHEE AND MT. BAKER-SNOQUALMIE NATIONAL FORESTS

Common Name	Scientific Name	Forest	Habitat Present/Affected	Effects Determination
Northern goshawk	<i>Accipiter gentilis</i>	MBS, OKW	Yes/No	No Impact
Gray flycatcher	<i>Empidonax wrightii</i>	OKW	No/No	No Impact
American peregrine falcon	<i>Falco peregrinus anatum</i>	MBS, OKW	Yes/No	No Impact
Common loon	<i>Gavia immer</i>	MBS, OKW	Yes/No	No Impact
Sandhill crane	<i>Grus canadensis</i>	OKW	No/No	No Impact
Bald eagle	<i>Haliaeetus leucocephalus</i>	MBS, OKW	Yes/No	No Impact
Harlequin duck	<i>Histrionicus histrionicus</i>	MBS, OKW	Yes/No	MIIBNLPV
Lewis's woodpecker	<i>Melanerpes lewis</i>	OKW	Yes/No	No Impact
White-headed woodpecker	<i>Picoides albolarvatus</i>	OKW	Yes/No	No Impact
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	OKW	Yes/No	No Impact
Gray wolf	<i>Canis lupus (northern rocky mtn.)</i>	OKW	Yes/Yes	MIIBNLPV
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	MBS, OKW	Yes/No	No Impact
Wolverine	<i>Gulo</i>	MBS, OKW	Yes/Yes	MIIBNLPV
Little Brown myotis	<i>Myotis lucifugus</i>	MBS, OKW	Yes/No	No Impact
Mountain goat	<i>Oreamnos americanus</i>	MBS, OKW	Yes/Yes	Beneficial Impact
Rocky Mtn. bighorn sheep	<i>Ovis canadensis</i>	OKW	Yes/No	No Impact
Bighorn sheep	<i>Ovis canadensis</i>	OKW	No/No	No Impact
Pacific fisher	<i>Pekania pennanti (Outside West Coast)</i>	OKW	Yes/No	No Impact
Western gray squirrel	<i>Sciurus griseus</i>	OKW	No	No Impact
Cascade red fox	<i>Vulpes vulpes cascadenis</i>	MBS, OKW	Yes/No	No Impact
Larch mountain salamander	<i>Plethodon larselli</i>	MBS, OKW	No/No	No Impact
Van dyke's salamander	<i>Plethodon vandykei</i>	MBS	No/No	No Impact
Western pond turtle	<i>Actinemys marmorata</i>	OKW	No/No	No Impact
Striped whipsnake	<i>Coluber taeniatus</i>	OKW	No/No	No Impact
Giant palouse earthworm	<i>Driloleirus americanus</i>	MBS, OKW	Yes/No	No Impact
Washington duskysnail	<i>Amnicola sp. nov. (Washington)</i>	OKW	Yes/No	No Impact
Masked duskysnail	<i>Colligyrus sp. nov. (Masked)</i>	OKW	Yes/No	No Impact
Puget oregonian	<i>Cryptomastix devia</i>	MBS, OKW	Yes/No	No Impact
Grand coulee mountainsnail	<i>Oreohelix junii</i>	OKW	Yes/No	No Impact
Chelan mountainsnail	<i>Oreohelix sp. nov. (Chelan)</i>	OKW	Yes/No	No Impact

Appendix H: Federally Listed Species (Endangered Species Act) and USDA Forest Service Special-Status Species for the North Cascades National Forests (Wildlife and Plants)

Common Name	Scientific Name	Forest	Habitat Present/Affected	Effects Determination
Shiny tightcoil	<i>Pristiloma wascoense</i>	MBS, OKW	Yes/No	No Impact
Broadwhorl tightcoil	<i>Pristiloma johnsoni</i>	MBS	Yes/No	No Impact
Blue-gray tail-dropper	<i>Prophysaon coeruleum</i>	OKW	Yes/No	No Impact
Western bumblebee	<i>Bombus occidentalis</i>	MBS, OKW	Yes/No	No Impact
Astarte fritillary	<i>Boloria astarte</i>	OKW	Yes/No	No Impact
Meadow fritillary	<i>Boloria bellona</i>	OKW	Yes/No	No Impact
Freija fritillary	<i>Boloria freija</i>	OKW	Yes/No	No Impact
Labrador sulphur	<i>Colias nastes</i>	OKW	Yes/No	No Impact
Lustrous copper	<i>Lycaena cupreus</i>	OKW	Yes/No	No Impact
Melissa arctic	<i>Oeneis melissa</i>	MBS, OKW	Yes/No	No Impact
Mardon skipper	<i>Polites mardon</i>	OKW	Yes/No	No Impact
Peck's skipper	<i>Polites peckius</i>	OKW	Yes/No	No Impact
Tawny-edged skipper	<i>Polites themistocles</i>	OKW	Yes/No	No Impact
Great basin fritillary	<i>Speyeria egleis</i>	OKW	Yes/No	No Impact
Johnson's hairstreak	<i>Callophrys johnsoni</i>	MBS	Yes/No	No Impact
Zigzag darner	<i>Aeshna sitchensis</i>	OKW	Yes/No	No Impact
Subarctic darner	<i>Aeshna subarctica</i>	OKW	Yes/No	No Impact
Subarctic bluet	<i>Coenagrion interrogatum</i>	OKW	Yes/No	No Impact
Pacific lamprey	<i>Entosphenus tridentatus</i>	OKW	Yes/No	No Impact
Lake Chub	<i>Couesius plumbeus</i>	OKW	Yes/No	No Impact
Westslope Cutthroat trout	<i>Oncorhynchus clarkii lewisi</i>	OKW	Yes/No	No Impact
Inland Columbia Basin redband trout	<i>Oncorhynchus mykiss gairdneri</i>	OKW	Yes/No	No Impact
Pygmy whitefish	<i>Prosopium coulterii</i>	OKW	Yes/No	No Impact

MBS = Mt. Baker-Snoqualmie National Forests

MIIBNLPV = May impact individuals, but is not likely to cause a trend toward Federal listing or a loss of population viability.

OKW = Okanogan, Wenatchee National Forest

TABLE H-4. USDA FOREST SERVICE MANAGEMENT INDICATOR SPECIES FOR THE OKANOGAN-WENATCHEE AND MT. BAKER-SNOQUALMIE NATIONAL FORESTS

Management Indicator Species	Forest	Habitat Present	Habitat Affected?	Effects Determination
American marten	MBS, OKA, WEN	Yes	No	No effect on Forest wide population viability
Bald Eagle	MBS	No	No	No effect on Forest wide population viability
Barred Owl	OKA	Yes	No	No effect on Forest wide population viability
Beaver	WEN	No	No	No effect on Forest wide population viability
Gray Wolf	MBS	Yes	Yes	No effect on Forest wide population viability
Grizzly Bear	MBS	Yes	No	No effect on Forest wide population viability
Lynx	OKA	Yes	No	No effect on Forest wide population viability
Mountain Goat	MBS, WEN	Yes	Yes	Beneficial effect to Forests population viability due to resulting increased population (Alts B, D, No Effect Alt A, C)
Mule Deer	OKA, WEN	Yes	No	No effect on Forest wide population viability
Northern Spotted Owl	MBS, OKA	Yes	No	No effect on Forest wide population viability
Peregrine Falcon	MBS	Yes	No	No effect on Forest wide population viability
Pileated Woodpecker	MBS, OKA, WEN	Yes	No	No effect on Forest wide population viability
Primary Cavity Excavators	MBS, OKA, WEN	Yes	No	No effect on Forest wide population viability
Rocky Mountain Elk	WEN	Yes	No	No effect on Forest wide population viability
Ruffed Grouse	OKA, WEN	Yes	No	No effect on Forest wide population viability
Three-toed woodpecker	OKA, WEN	Yes	No	No effect on Forest wide population viability

MBS = Mt. Baker-Snoqualmie National Forests

OKW = Okanogan, Wenatchee National Forest

WEN = Wenatchee Mountains

Appendix H: Federally Listed Species (Endangered Species Act) and USDA Forest Service Special-Status Species for the North Cascades National Forests (Wildlife and Plants)

TABLE H-5. USDA FOREST SERVICE SENSITIVE PLANT SPECIES FOR THE OKANOGAN-WENATCHEE AND MT. BAKER-SNOQUALMIE NATIONAL FORESTS

Common Name	Scientific Name	Forest
Least bladderly milk-vetch	<i>Astragalus microcystis</i>	OKW
Slender moonwort	<i>Botrychium lineare</i>	OKW
Stalked moonwort	<i>Botrychium pedunculosum</i>	MBS, OKW
Large-awn sedge	<i>Carex macrochaeta</i>	MBS, OKW
Few-flowered sedge	<i>Carex pauciflora</i>	MBS, OKW
Beaked sedge	<i>Carex rostrata</i>	MBS, OKW
Long-styled sedge	<i>Carex stylosa</i>	MBS, OKW
Pacific lance-leaved springbeauty	<i>Claytonia multiscapa ssp. pacifica</i>	OKW
Spleenwort-leaved goldthread	<i>Coptis aspleniifolia</i>	MBS, OKW
Drummond's mountain-avens	<i>Dryas drummondii var. drummondii</i>	MBS, OKW
Treelike clubmoss	<i>Lycopodium dendroideum</i>	MBS, OKW
Choris' bog-orchid	<i>Platanthera chorisiana</i>	MBS, OKW
Pale blue-eyed grass	<i>Sisyrinchium sarmentosum</i>	OKW
Lichen	<i>Dermatocarpon meiophyllizum</i>	OKW
Lichen	<i>Tholurna dissimilis</i>	OKW
Ross' avens	<i>Acomastylis rossii ssp. depressum</i>	OKW
Northern bentgrass	<i>Agrostis mertensii</i>	OKW
Sierra onion	<i>Allium campanulatum</i>	OKW
Pasqueflower	<i>Anemone patens var. multifida</i>	OKW
Palouse milk-vetch	<i>Astragalus arrectus</i>	OKW
Upward-lobed moonwort	<i>Botrychium ascendens</i>	MBS, OKW
Crenulate moonwort	<i>Botrychium crenulatum</i>	OKW
Western moonwort	<i>Botrychium hesperium</i>	OKW
Twin-spiked moonwort	<i>Botrychium paradoxum</i>	OKW
Hairlike sedge	<i>Carex capillaris</i>	OKW
Cordroot sedge	<i>Carex chordorrhiza</i>	OKW
Bristly sedge	<i>Carex comosa</i>	MBS, OKW
Yellow bog sedge	<i>Carex gynocrates</i>	OKW
Different nerve sedge	<i>Carex heteroneura var. epapillosa</i>	OKW
Poor sedge	<i>Carex magellanica ssp. irrigua</i>	MBS, OKW
Intermediate sedge	<i>Carex media</i>	OKW
Smokey Mtn. sedge	<i>Carex proposita</i>	MBS, OKW
Canadian single-spike sedge	<i>Carex scirpoidea ssp. scirpoidea</i>	MBS, OKW
Many-headed sedge	<i>Carex sychnocephala</i>	OKW
Sparseflower sedge	<i>Carex tenuiflora</i>	OKW
Valley sedge	<i>Carex vallicola</i>	OKW
Obscure indian-paintbrush	<i>Castilleja cryptantha</i>	MBS, OKW

APPENDICES

Common Name	Scientific Name	Forest
Thompson's chaenactis	<i>Chaenactis thompsonii</i>	MBS, OKW
Northern golden-carpet	<i>Chrysosplenium tetrandrum</i>	OKW
Long-bract frog orchid	<i>Coeloglossum viride</i>	OKW
Slender gentian	<i>Comastoma tenellum</i>	OKW
Steller's rockbrake	<i>Cryptogramma stelleri</i>	OKW
Yellow lady's-slipper	<i>Cypripedium parviflorum</i>	OKW
Wenatchee larkspur	<i>Delphinium viridescens</i>	OKW
Golden draba	<i>Draba aurea</i>	OKW
Lance-leaved draba	<i>Draba cana</i>	OKW
Salish fleabane	<i>Erigeron salishii</i>	MBS, OKW
Green keeled cotton-grass	<i>Eriophorum viridicarinatum</i>	OKW
Pale alpine forget-me-not	<i>Eritrichium nanum var. elongatum</i>	OKW
Pulsifer's monkey-flower	<i>Erythranthe pulsiferae</i>	OKW
Suksdorf's monkey-flower	<i>Erythranthe suksdorfii</i>	OKW
Swamp gentian	<i>Gentiana douglasiana</i>	MBS, OKW
Glaucous gentian	<i>Gentiana glauca</i>	MBS, OKW
Water avens	<i>Geum rivale</i>	OKW
Sagebrush stickseed	<i>Hackelia hispida var. disjuncta</i>	OKW
Taylor's stickseed	<i>Hackelia taylorii</i>	OKW
Oregon goldenaster	<i>Heterotheca oregona</i>	OKW
Longsepal globemallow	<i>Iliamna longisepala</i>	OKW
Howell's rush	<i>Juncus howellii</i>	OKW
Alpine azalea	<i>Kalmia procumbens</i>	MBS, OKW
Alaska curved woodrush	<i>Luzula arcuata ssp. unalaschcensis</i>	MBS, OKW
Branching montia	<i>Montia diffusa</i>	MBS, OKW
Coyote tobacco	<i>Nicotiana attenuata</i>	OKW
Yellowflower locoweed	<i>Oxytropis monticola</i>	MBS, OKW
Harford's ragwort	<i>Packera bolanderi var. harfordii</i>	MBS, OKW
Kotzebue's grass-of-parnassus	<i>Parnassia kotzebuei</i>	OKW
Mt. Rainier lousewort	<i>Pedicularis rainierensis</i>	MBS, OKW
Sierra cliffbrake	<i>Pellaea brachyptera</i>	OKW
Brewer's cliff-brake	<i>Pellaea breweri</i>	MBS, OKW
Whited's penstemon	<i>Penstemon eriantherus var. whitedii</i>	OKW
Chelan rockmat	<i>Petrophytum cinerascens</i>	OKW
Dwarf phacelia	<i>Phacelia minutissima</i>	OKW
Common twinpod	<i>Physaria didymocarpa var. didymocarpa</i>	OKW
American pillwort	<i>Pilularia americana</i>	OKW
Whitebark pine	<i>Pinus albicaulis</i>	MBS, OKW
Small northern bog-orchid	<i>Platanthera obtusata</i>	MBS, OKW

Appendix H: Federally Listed Species (Endangered Species Act) and USDA Forest Service Special-Status Species for the North Cascades National Forests (Wildlife and Plants)

Common Name	Scientific Name	Forest
Skunk polemonium	<i>Polemonium viscosum</i>	OKW
Snow cinquefoil	<i>Potentilla nivea</i>	OKW
Sticky goldenweed	<i>Pyrrcoma hirta</i> var. <i>sonchifolia</i>	OKW
Idaho gooseberry	<i>Ribes oxycanthoides</i> ssp. <i>irriguum</i>	OKW
Lowland toothcup	<i>Rotala ramosior</i>	OKW
Nagoonberry	<i>Rubus arcticus</i> ssp. <i>acaulis</i>	OKW
Glaucus willow	<i>Salix glauca</i> ssp. <i>glauca</i> var. <i>villosa</i>	OKW
Maccall's willow	<i>Salix maccalliana</i>	OKW
False mountain willow	<i>Salix pseudomonticola</i>	OKW
Black snake-root	<i>Sanicula marilandica</i>	OKW
Nodding saxifrage	<i>Saxifraga cernua</i>	OKW
Joint-leaved saxifrage	<i>Saxifragopsis fragarioides</i>	OKW
Seely's silene	<i>Silene seelyi</i>	OKW
Western ladies-tresses	<i>Spiranthes porrifolia</i>	OKW
Thompson's clover	<i>Trifolium thompsonii</i>	OKW
Velvet-leaf blueberry	<i>Vaccinium myrtilloides</i>	OKW
Kidney-leaved violet	<i>Viola renifolia</i>	OKW
Creeping snowberry	<i>Gaultheria hispidula</i>	MBS
Northern microseris	<i>Microseris borealis</i>	MBS
Adder's-tongue	<i>Ophioglossum pusillum</i>	MBS
Flat-leaved bladderwort	<i>Utricularia intermedia</i>	MBS
Alaska harebell	<i>Campanula lasiocarpa</i>	MBS
Black lily	<i>Fritillaria camschatcensis</i>	MBS
Western jewel-weed	<i>Impatiens noli-tangere</i>	MBS
Bog club-moss	<i>Lycopodiella inundata</i>	MBS
Cooley's buttercup	<i>Ranunculus cooleyae</i>	MBS
Scribner's grass	<i>Scribneria bolanderi</i>	MBS
Lichen	<i>Dermatocarpon meiophyllizum</i>	MBS, OKW
Lichen	<i>Tholurna dissimilis</i>	MBS, OKW
Moss	<i>Bartramiopsis lescurii</i>	MBS
Lichen	<i>Erioderma sorediatum</i>	MBS
Lichen	<i>Leptogium cyanescens</i>	MBS

MBS = Mt. Baker-Snoqualmie National Forests

OKW = Okanogan, Wenatchee National Forest

References

USDA Forest Service (FS)

- 2015 Final Region 6 Regional Forester Special Status Species List, July 13, 2015.
<http://www.fs.fed.us/r6/sfpnw/issssp/documents3/2670-1950-final-sss-list-enc1-20150713.xlsx>.

APPENDIX I: NORTH CASCADES RELEASE AREAS SITE SELECTION

Richard B. Harris and Clifford G. Rice, Washington Department of Fish & Wildlife

There is substantial evidence that mountain goats are currently well below historical levels in Washington, but that their current distribution is patchy, with some areas probably close to carrying capacity, while others remain well below historical levels. Rice (2012) overviewed that status of goats statewide as of 2008. These estimates have subsequently been updated annually (Harris 2016), with most populations subject to estimation having increased gradually, but the general pattern of patchy occupancy, with large regions of historic habitat essentially unoccupied, remains. The most parsimoniously supported explanation for the decline in mountain goats during the period roughly 1960-1990 is over-harvest sanctioned by Washington Department of Fish & Wildlife (WDFW) and its predecessor agency, the Washington Department of Game (Rice and Gay 2010).

The first step in selecting areas for potential translocation was to identify landscape patches that appropriately served as candidate translocation sites.

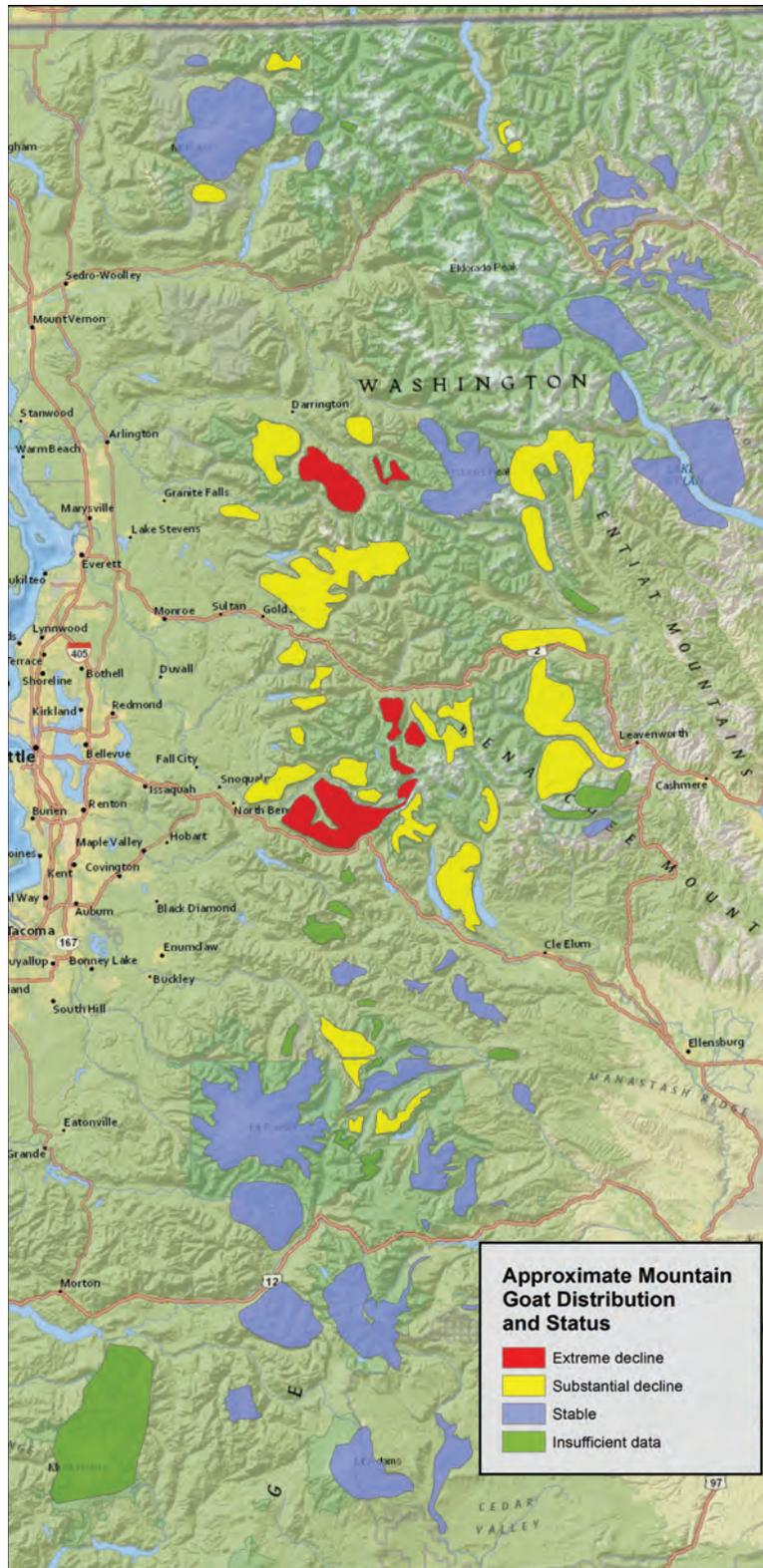
SCOPE

Based on a variety of sources, an assessment of the distribution and status of mountain goats in the Cascade Range of Washington indicated that declines have been primarily in the north-central portions of the range and have been most severe on the west side of the Cascade crest (figure 1). There is also substantial mountainous terrain in the western portion of the north-central Cascades that seems suitable for mountain goats, but from which they are absent or in very low numbers. For these reasons, the selection of translocation sites focused on the western side of the Cascade crest. Subsequently, at the recommendation of biological staff from the Okanogan-Wenatchee National Forest, we added consideration of a small number of patches east of the Cascade crest.

EXTENT OF POTENTIAL HABITAT

To identify suitable locations for mountain goat translocation we evaluated the following considerations:

- Habitat: We used the raster map of mountain goat habitat developed by Wells et al. (2011);
- Connectivity: We assessed which patches in the habitat map should be considered as connected;
- Population Density: We matched population estimates for areas in which mountain goat populations have been estimated, and calculated an average density of mountain goats. We then applied this density estimate to areas without an estimate as an estimate of potential population size;
- Historic Harvest: We enumerated the historic harvest for each area as an indicator of prior abundance.



Extreme decline indicates a decline $\approx 90\%$. Substantial decline indicates a decline $\approx 40-90\%$. Subsequent surveys have revised some of these estimates.

FIGURE 1. SUBJECTIVE ASSESSMENT OF THE STATUS AND DISTRIBUTION OF MOUNTAIN GOATS IN THE CASCADE RANGE IN WASHINGTON AS OF 2008

Habitat

Wells et al. (2011) developed a mountain goat habitat map for western Washington. This was based on 86,826 Global Positioning System (GPS) locations from 38 mountain goats fitted with GPS collars. The map was created from a logistic resource selection probability function comparing GPS locations (used) with randomly selected (available) locations. Independent variables included slope, aspect, distance to escape terrain ($>35^\circ$ slope), and various vegetation measures based on the Interagency Vegetation Mapping Project (O'Neil et al. 2002). The model was developed at a resolution of 25×25 m. For this analysis, we chose summer (as opposed to winter or annual) habitat because it more realistically depicted the distribution of mountain goat use, and because summer habitat patches are those we can access and potential move goats into.

Because this was a broad scale analysis, we aggregated the habitat pixels to 125×125 m with the ArcGIS "Aggregate" tool, using the median value of the 25 original cells. The aggregated pixels were then grouped with the "Region Group" tool (using 8 adjacent cells) to identify pixels adjacent to one another. The grouped pixels were then converted to a polygon shapefile with the "Raster-to-Polygon" tool and this shapefile's multipart characteristic removed with the "Dissolve" tool.

The resulting shapefile contained 13,592 polygons of mountain goat summer habitat. Most of these were small, so to concentrate on main areas of habitat, we removed all that were <0.25 km² in area. This resulted in 1,036 polygons with areas ranging from 0.25 to 185 km²

Connectivity

Many of the habitat polygons were nearby others. Because mountain goats will cross unsuitable habitat to access nearby patches, we evaluated connectivity of the habitat polygons. To do this, we used Least Cost Path analysis to determine resistance to movement between polygons based on the isolation by resistance model of Shirk et al. (2010). However, it would be excessive to analyze resistance among all polygons (many of which were many kilometers apart and had other closer polygons). To select pairs of polygons for analysis we found the centroid of each polygon and selected up to five polygons with the lowest centroid-to-centroid distance with a maximum distance of 10 km. We then determined the least cost path between all selected pairs of polygons and calculated the resistance for each path.

To address the question of what amount of resistance should prohibit connectivity, we examined polygon pairs in areas where mountain goat movements were well-understood, particularly where there had been GPS-collared mountain goats. We used expert opinion to score each pair as to whether mountain goats would likely move between those polygons in the course of normal movements. To facilitate these comparisons, polygons were given names after geographic features they contained. We then proposed cut-off values for resistance of 0.5, 1.0, 1.5, 2.0, 5.0, and 10.0, and dissolved polygon separations if the inter-polygon resistance was less than the candidate cut-off value (table 1). We then scored each polygon pair as to whether there was agreement between expert opinion and the result from each resistance cut-off value and calculated the proportion of pairs which agreed or disagreed for when the expert opinion was "Yes" and "No" for connectivity. The optimum candidate cut-off was selected as the value that had the highest mean proportion of pairs which agreed with expert opinion, namely 1.5 (figure 2). We therefore used the ArcGIS "Dissolve" tool to combine polygons with resistance separating them by ≤ 1.5 .

Of the 36 patches of mountain goat habitat identified by previous analysis, 4 were removed from consideration because they were in unsuitable locations (The Rockies Complex, Mt. Margaret, East St. Helens, and Mt. St. Helens).

TABLE 1. POLYGON PAIRS SCORED AS CONNECTED BY EXPERT OPINION AND BY LEAST COST PATH ANALYSIS WITH VARYING CUT-OFF VALUES OF RESISTANCE

Polygon Pair		Connected						
		Expert Opinion	Resistance Cut-off Value					
			0.5	1.0	1.5	2.0	5.0	10.0
Three Sisters	Mt. Baker	No	N	N	N	N	Y	Y
Black Buttes	Grouse Ridge	Yes	Y	Y	Y	Y	Y	Y
Bastile Ridge	Chowder Ridge	Yes	N	Y	Y	Y	Y	Y
Sholes Glacier	Chowder Ridge	No	N	N	N	Y	Y	Y
Avalanche Gorge	Lava Divide	No	N	Y	Y	Y	Y	Y
Park Creek	Lava Divide	Yes	N	N	N	Y	Y	Y
Ptarmigan Ridge	Avalanche Gorge	No	Y	Y	Y	Y	Y	Y
Ptarmigan Ridge	Lake Ann	No	Y	Y	Y	Y	Y	Y
Barometer Ridge	Church Mtn.	No	N	N	N	N	Y	Y
Whitehorse Mtn.	Jumbo Mtn.	No	N	Y	Y	Y	Y	Y
Three Fingers	Liberty Mtn.	No	N	N	N	Y	Y	Y
Stillaguamish Peak	Dickerman Mtn.	No	Y	Y	Y	Y	Y	Y
Twin Peaks	Dickerman Mtn.	No	Y	Y	Y	Y	Y	Y
Whitechuck Mtn.	Pugh Mtn.	No	N	N	N	N	Y	Y
Spring Mtn.	Pugh Mtn.	Yes	Y	Y	Y	Y	Y	Y
Spring Mtn.	Round Lake	Yes	N	N	Y	Y	Y	Y
Burroughs Mtn.	Skyscraper Mtn.	Yes	N	Y	Y	Y	Y	Y
Burroughs Mtn.	Ohanapecosh	No	N	Y	Y	Y	Y	Y
N. Chimney Rocks	S. Chimney Rocks	Yes	Y	Y	Y	Y	Y	Y
Chimney Rocks	Goat Lake	No	N	N	Y	Y	Y	Y
Elk Pass	Goat Lake	Yes	N	Y	Y	Y	Y	Y
Gilbert Peak	Goat Lake	No	N	N	N	Y	Y	Y
Goat Lake	Stonewall Ridge	No	N	N	N	N	Y	Y

Among the 32 remaining patches, 10 were occupied and 22 were unoccupied. Connectivity was assessed for every pair of these 32 patches using Linkage Mapper Connectivity Analysis Software (McRae and Kavanagh 2011). We assessed the connectivity between all pairs because there is no assurance that a dispersing mountain goat would necessarily stop dispersing at the first patch it encountered and because we wished to avoid a subjective estimation of the maximum distance a mountain goat might disperse. For resistance, we used the isolation by resistance surface produced by Shirk (2009; Shirk et al. 2010). Linkage Mapper produced a table of the least cost path movement costs for each patch pair in meter equivalents, from which we calculated the kilometer equivalent – a kilometer equivalent being equal to the distance accounting for resistance effects of landscape features along the path. The ratio of kilometer equivalents to kilometers (i.e., path length) ranged from 1.00 to 3.26 with a median of 1.16.

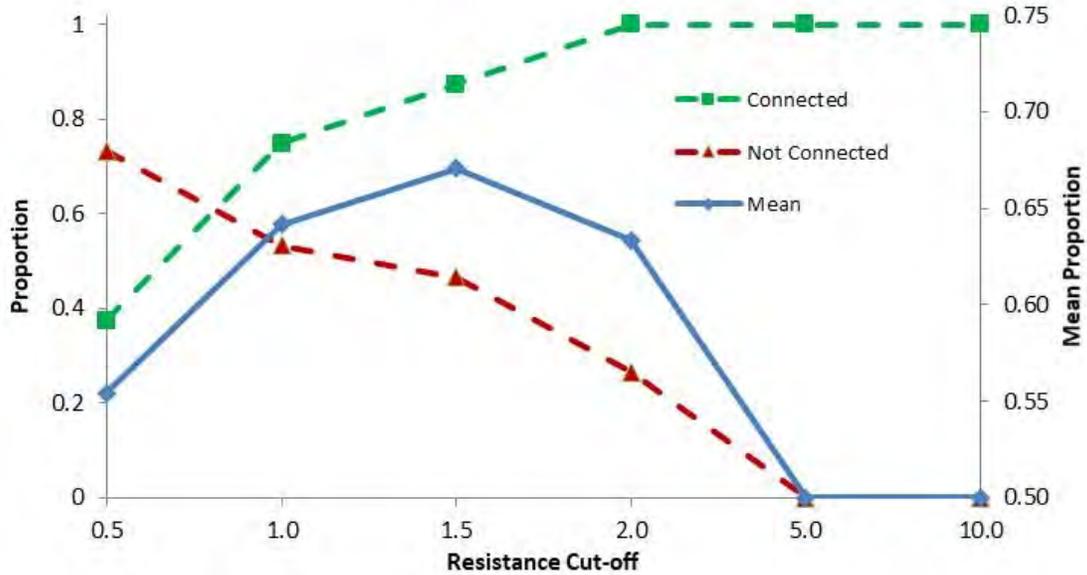


FIGURE 2. FOR CANDIDATE VALUES OF RESISTANCE CUT-OFF, THE PROPORTION OF 23 POLYGON PAIRS THAT AGREED ON CONNECTIVITY WITH EXPERT OPINION FOR THOSE JUDGED TO BE CONNECTED, NOT CONNECTED, AND THE MEAN OF THE TWO

In considering patches for translocation, it is worth consideration of, not only what the dispersal resistance to the other patches is, but also the amount of habitat or the expected mountain goat population in the other patches, and whether or not the connection is to another unoccupied patch or an occupied patch. That is, connections between patches with large potential populations are better than connections between patches with small population potential. Also, a patch highly connected to an occupied patch would not be a high priority for translocation because of the potential for natural dispersal to that patch. To quantify these considerations, we calculated an inter-patch connectivity score as follows:

$$ConIndex = \frac{PopEstA + PopEstB}{KmEq} \begin{pmatrix} UnoccupiedA \wedge UnoccupiedB \rightarrow 1 \\ OccupiedA \vee OccupiedB \rightarrow -1 \end{pmatrix}$$

where: *ConIndex* = the connectivity index

KmEq = kilometer equivalents

PopEstA and *PopEstB* = estimated population potential for patches A and B

Unoccupied, Occupied = whether patches A and B are occupied.

Values of *ConIndex* are near zero when patches are separated by large distances, especially if the potential population sizes are small. Large potential populations connected by small distances have a high index value if both are unoccupied, but a highly negative index if either is occupied. To assess the overall connectivity for each patch, we calculated the median *ConIndex* value for each unoccupied patch (figure 3).

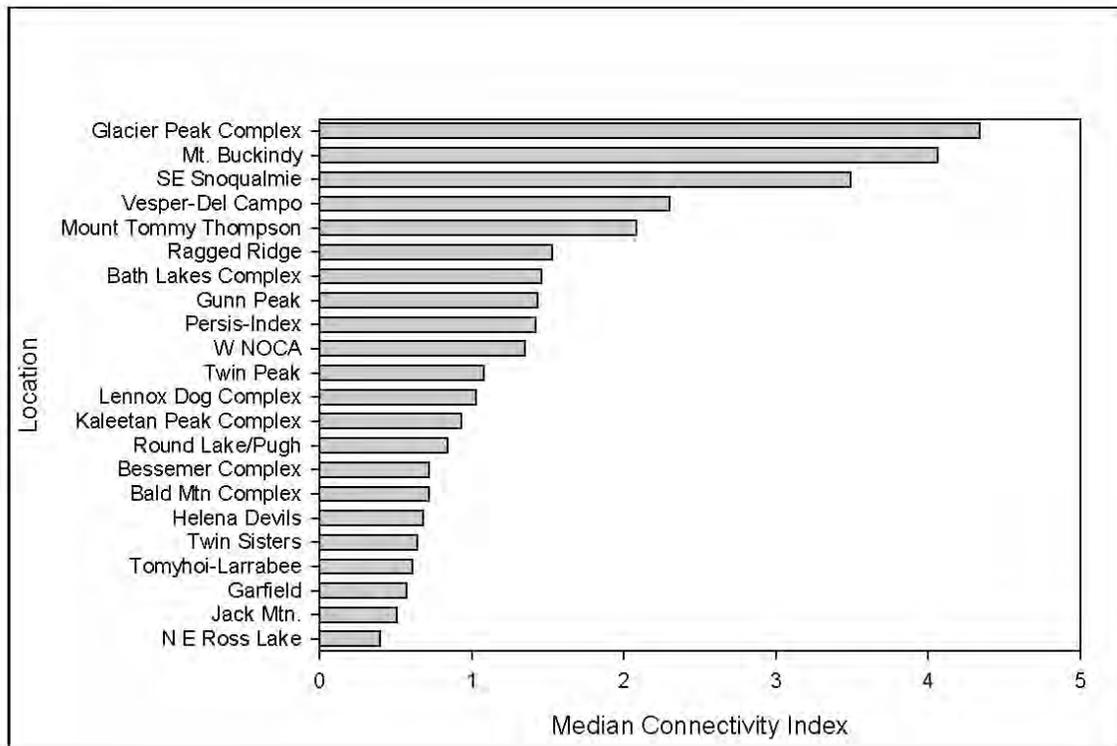


FIGURE 3. MEDIAN CONNECTIVITY INDICES FOR UNOCCUPIED MOUNTAIN GOAT HABITAT PATCHES

Historic Harvest

From 1947 through 1970, hunters reported their mountain goat kills by providing a place name and drainage. (After 1970, harvest was reported by hunt unit). The 1947-1970 reports were compiled into a database of 4,373 records of harvest location by linking the place name with a geographic name database and resolving multiple names (e.g., Lost Lake) by referring to the drainage reported. Although the precise location of these kills is not known, these geographic references are well-suited to a large-scale analysis of the locations from which mountain goats were harvested during these years. This can function as an indication of past abundance, but not without qualification. Certainly, accessibility and popularity also affected the locations from which mountain goats were harvested.

Our habitat model showed a large amount of habitat in North Cascades National Park. This park was created in 1968, so during most of the 1947-1970 period, mountain goats could be harvested in this area. Yet only 173 mountain goat kills were recorded in this area, and the many of these along the western margin of the northern section of what is now the national park. Excluding the northwest boundary areas, only 102 (2% of the total in the data set) mountain goats were harvested over this 1,825 km² area containing, according to our model, 683 km² (32%) of total mountain goat habitat. Although this is a generally inaccessible area, limited recent surveys and anecdotal reports have indicated that mountain goats are very sparsely encountered throughout this area. Thus, few mountain goats were harvested in this area in the past, and few have been encountered there recently. Because excessive harvest is considered to be the primary cause of declines in mountain goat populations (Rice and Gay 2010), the conclusion is that, despite our habitat model predictions, there have never been more than a few mountain goats in this area. For this reason, with the exception of the northwest boundary areas, North Cascades National Park

does not appear suitable for translocations and the habitat polygons in this area were manually removed from further consideration. There were 313 remaining habitat patches.

Potential Population Size

Rice (2012) evaluated the population status of mountain goats in Washington at various scales. This included estimates based on helicopter surveys and expert estimation for areas where surveys have not been conducted. The estimates from that evaluation were matched against habitat polygons, and those that were considered depressed populations were removed from analysis. We then estimated the density (mountain goats per km² of habitat) for each polygon. Because the distribution of these densities was highly skewed, we log-transformed them. Log-densities were not significantly different between surveyed and expert-estimated areas ($F_{1,24} = 1.278, P = 0.2695$), so the overall mean log-density of 0.871 ($SE = 0.253, n = 26$) was used. This corresponds to a density of 2.3 mountain goats per km² (95% $CI = 3.9-1.3$). We then estimated the population potential of each habitat patch by multiplying area times the mean population density.

Because mountain goat translocations should focus on areas with significant population potential, we selected all patches with a population potential of > 25 mountain goats. However, 6 patches were added because it appeared that the habitat model under-represented the area, and hence population potential in those patches. Each of these 36 patches was given a descriptive name based on geographic features it contained.

SELECTION OF CANDIDATE PATCHES

Mountain goats might be translocated into vacant habitat or to augment populations in patches with depressed populations, but it would be undesirable to translocate mountain goats into patches where mountain goats are near their potential or have substantial numbers which can be expected to increase satisfactorily on their own. We therefore classified patches as Occupied (estimated population > 25% of potential population) or Unoccupied (all others). We also sub-classified Occupied patches as those with 25-50% of their potential population and those >50%. Unoccupied patches were sub-classified as those with 10-25% of their potential population and those with <10%. We also enumerated the historic harvest for each habitat patch. The resulting patches are described in tables 2 and 3. Unoccupied patches are shown in figure 4.

TABLE 2. OCCUPIED PATCHES OF MOUNTAIN GOAT HABITAT, AS OF 2008

Name	Region	Patch Area (km ²)	Potential Population	Sub-Status	Historic Harvest
Gilbert Peak	Packwood	4.5	11	>50	63
White Chuck	Darrington	5.3	13	25-50	7
Church Mtn.	Mt. Baker	7.9	19	>50	0
Lincoln Creek/Chowder Ridge	Mt. Baker	14.7	35	>50	52
Corral Pass/Norse Peak	SE Cascades	15.5	37	>50	69
Goat Rocks	Packwood	19.1	46	>50	164
Whitehorse - 3 Fingers	Darrington	37.4	89	>50	47
Monte Cristo Complex	Darrington	54.0	129	25-50	114
Mt. Rainier	Mount Rainier	98.8	236	>50	0
E. Baker-Ruth Creek	Baker/NOCA	128.5	307	>50	176

TABLE 3. UNOCCUPIED PATCHES OF MOUNTAIN GOAT HABITAT

Name	Region	Patch Area (km²)	Potential Population	Sub-Status	Historic Harvest
Helena Devils	Darrington	7.6	18	<10	33
Garfield	Snoqualmie	8.5	20	<10	59
N E Ross Lake	Okanogan	10.3	24	<10	0
Bessemer Complex	Snoqualmie	11.4	27	10-25	45
Jack Mtn.	Okanogan	11.5	28	25-50	18
Mt. St. Helens	Mount St. Helens	12.7	30	<10	0
Round Lake/Pugh	Darrington	12.7	30	<10	54
Gunn Peak	Gunn Peak	14.3	34	<10	41
Ragged Ridge	Sultan River	15.4	37	<10	23
Lennox Dog Complex	Snoqualmie	15.9	38	<10	12
Twin Peak	Darrington	15.8	38	<10	48
Persis-Index	Snoqualmie	17.8	42	10-25	65
East St. Helens	Mount St. Helens	18.2	43	<10	0
The Rockies Complex	The Rockies	21.5	51	<10	0
Kaleetan Peak Complex	Snoqualmie	21.7	52	<10	23
Tomyhoi-Larrabee	Mt. Baker	23.1	55	<10	6
Twin Sisters	Mt. Baker	23.4	56	10-25	3
Mt. Margaret	Mount St. Helens	29.1	69	<10	0
Bath Lakes Complex	Bath Lakes	34.4	82	<10	4
Vesper-Del Campo	Sultan River	34.3	82	10-25	32
W NOCA	North Cascades NP	43.8	105	10-25	53
Mount Tommy Thompson	Snowking Mtn.	45.9	110	<10	20
SE Snoqualmie	Snoqualmie	86.1	206	<10	55
Glacier Peak Complex	Glacier Peak	90.2	216	<10	128
Mt. Buckindy	Snowking Mtn.	91.5	219	10-25	5

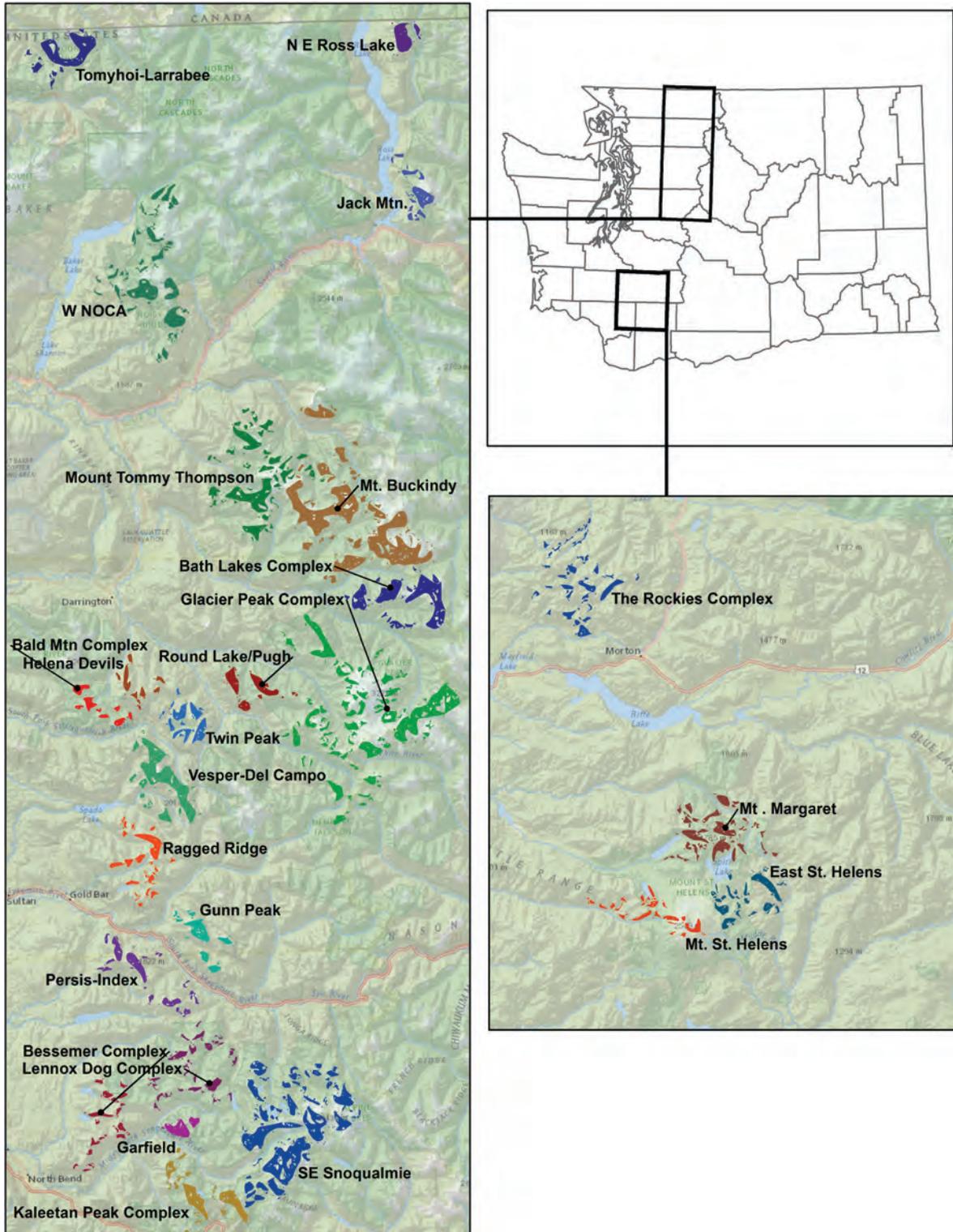


FIGURE 4. UNOCCUPIED PATCHES OF MOUNTAIN GOAT HABITAT IN THE WESTERN CASCADE RANGE, WASHINGTON, WITH POTENTIAL POPULATIONS OF >25 MOUNTAIN GOATS

FIELD INVESTIGATIONS OF FORAGE PLANTS IN RELATION TO GEOLOGICAL SUBSTRATE

Based on preliminary observations that areas of historically low density mountain goat populations (particularly in and around North Cascades National Park) were characterized by predominately plutonic geological formations, we hypothesized that geological substrate could serve as an additional proxy for mountain goat habitat quality, and thus indirectly predict long-term carrying capacity for goats. Based on this, we developed a small research project to explore this possibility, and received funding to implement it during the summer of 2015 from the City of Seattle, Seattle City Light Department Skagit River Hydroelectric Project Wildlife Grant Program. Additional funding came an Aquatic Lands Enhancement Account volunteer cooperative grant program, and from the Rocky Mountain Goat Alliance, Bozeman, MT, both administered by Conservation Northwest, Seattle Washington. The abstract from the resulting publication (Harris, Rice, and Wells 2017) follows:

We addressed three questions relevant to patterns of mountain goat abundance in Washington's North Cascades: 1) What are forages used by mountain goats during summer? 2) Is canopy cover of mountain goat forage species predicted by geological substrates? and 3) Are indices of nutritional quality and digestibility of two mountain goat forage species predicted by geological characteristics? These questions were motivated by observations that historical abundance of mountain goats in Washington, accounting for habitats generally documented as suitable for them, was greater over some geological substrates than others. Mountain goats ate primarily sedges, secondarily rushes, and made surprisingly little use of grasses. Mountain goats ate a wide variety of forbs, with none showing overwhelming use. Despite their abundance in many landscapes near mountain goat escape terrain, *Vaccinium* spp. were rarely consumed, and other shrubs in Ericaceae were avoided entirely. Geological substrate explained only a small proportion of variability in mountain goat forage availability. Categorized by geological origin, sedges had higher canopy cover when over sedimentary and shale substrates than when over plutonic substrates. Categorized by geochemistry, sedges had higher canopy cover when over sedimentary rocks than over potassium-feldspar substrates. Sodium-rich substrates generally supported less vegetation than other substrates across all forage categories. Neither nutrients nor digestibility of the two focal species were predicted by geological type. Our study suggests that geological substrates in the North Cascades vary slightly in their production of forage plants valued by mountain goats, but do not affect the nutritional quality of two key forage plants.

RANKING AND PROVISIONAL SELECTION OF CANDIDATE PATCHES

At this point we entered all patches into a spreadsheet that allowed staff from the Mt. Baker-Snoqualmie, National Forest, Okanogan-Wenatchee National Forest, Point Elliot Treaty Tribes, City of Seattle, North Cascades National Park, and researchers from Western Washington University to join WDFW staff in assessing and ranking the patches for suitability. Based on the results of Harris, Rice, and Wells (2017), we added for each candidate translocation patch its proportion atop geological substrates positively associated with mountain goat preferred forage plants (volcanic, sedimentary, and shale), and proportions atop substrates negatively associated with preferred forage (plutonic, metasedimentary, schist, gneiss, potassium-feldspar, and sodium-rich). We then assigned a single "geological score" as the sum of the proportions with positive associations, minus the sum of the proportions with negative associations. We also added the subjective assessments "general biological suitability," access (easiest to most difficult on

an ordinal scale), whether or not the site was located in designated federal wilderness, and whether there existed substantive, potential conflicts with existing uses.

Having aggregated all available biological and social criteria describing each patch in a single document, we judged that further attempts to systemize ranking via a numerical scheme would be counter-productive. We found no satisfactory way to objectively weight biological measures with one another (e.g., how much importance did patch size have vs. patch connectivity?) let alone to objectively merge quantified biological characteristics with unquantifiable ones (or social considerations). We thus circulated proposed, draft rankings derived by team members, and ultimately selected a consensus ranking (table 4).

TABLE 4. CANDIDATE TRANSLOCATION PATCHES, RANKED QUALITATIVELY ACCORDING TO CRITERIA SHOWN

Rank	Name	Size (km ²)	Estimated Potential Population Size	Estimated Current Population size	Biological Suitability (4 best, 1 worst)	Land Management	Wilderness	Connectivity Rank (from figure 3)	Geological Score
1	Vesper-Del Campo	34.3	82	12 ^a	4	WDNR/MBSNF	no	4	0.14
2	SE Snoqualmie	86.1	206	4 ^d	4	MBSNF	yes	2	0.01
3	Glacier Peak Complex	90.2	216	7 ^b	4	MBSNF	yes	1	-0.63
4	Twin Peak/Bald Mtn/Helena Devils	15.8	38	7 ^b	3	MBSNF	no	11	0.62
5	Persis-Index	17.8	42	0-5 ^d	3	MBSNF	no	7 (tie)	-0.15
6	Mt. Buckindy	91.5	219	10 ^c	1	MBSNF	yes	2	-0.75
7	Delancy Ridge/Tower Mtn		n/a	0 ^a	?	OWNF	no	n/a	n/a
8	Garfield	8.5	20	0-5 ^d	3	MBSNF	yes	18	0.38
9	Bath Lakes Complex	34.4	82	0-5 ^d	1	MBSNF	yes	7 (tie)	-0.94
10	Kaleetan Peak Complex	21.7	52	0-5 ^d	3	MBSNF	yes	13	-0.24
11	Round Lake/Pugh	12.7	30	15 ^b	4	MBSNF	yes	14	-0.99
12	Ragged Ridge	15.4	37	0-5 ^d	1	MBSNF/WDNR	no	6	-0.97
13	Mount Tommy Thompson	45.9	110	5 ^c	1	MBSNF	yes	5	-0.93
14	Gunn Peak	14.3	34	0-5 ^d	1	MBSNF	no	7 (tie)	-0.97
15	Jack Mtn.	11.5	28	10 ^c	3	OWNF	yes	18	-0.57
16	Twin Sisters	23.4	56	n/a	1	MBSNF	yes	16	-0.95
17	Lennox Dog Complex	15.9	38	0-5 ^d	1	MBSNF	yes	12	-0.96
18	Bessemer Complex	11.4	27	0-5 ^d	3	MBSNF/BLM	yes	15	-0.95
19	N E Ross Lake	10.3	24	n/a	4	OWNF	yes	19	-0.21
20	Tomyhoi-Larrabee	23.1	55	15 ^d	?	MBSNF	no	17	-0.39

a WDFW aerial survey, July 2016, Rice, Jenkins, and Chang 2009

b Cooperating tribal aerial survey, 2017

c Cliff Rice, WDFW, informal estimate

d WDFW and Western Washington University 2015 ground survey, unpublished data

FINAL SELECTION CONSIDERING FIELD LOGISTICS

Finally, it was necessary to determine if it would be logistically feasible to transport goats to a suitable release site within the highest ranking patches. WDFW staff contracted with a local helicopter vendor to visit each site (landing where permissible, outside of designated wilderness) on July 21, 2016. Based on these site visits, the number of candidate patches was reduced to 12, and exact sites for goat release and staging areas were identified (table 5).

TABLE 5. FINAL RELEASE SITES WITHIN RANKED TRANSLOCATION PATCHES

Biological Rank	Translocation Patch	Release Name	Latitude	Longitude	Distance: Staging to Release (miles)
1	Vesper Del Campo	Vesper Sperry	48.0198	-121.5157	3.3
2	SE Snoqualmie	Chikamin	47.4479	-121.3219	4.3
3	SE Snoqualmie	Kaleetan	47.4636	-121.4838	3.0
4	SE Snoqualmie	Preacher Mtn	47.5037	-121.5200	3.2
5	Glacier Peak	Whitechuck Glacier	48.0484	-121.1489	6.7
6	Twin/Bald/Helena	Mt Stillaguamish	48.0976	-121.4734	2.8
7	Persis/Index	Mt Index	47.7690	-121.5869	3.2
8	Sloan/Monte Cristo	Cadet Lake Ridge	48.0198	-121.3324	2.0
9	Tower Mtn	Tower Mtn	48.5925	-120.7203	3.1
10	Mt Buckindy	Buckindy/	48.3130	-121.2165	4.9
11	Tommy Thompson	Snowking meadow	48.4146	-121.3144	6.6
12	Cedar River	Goat meadow	47.2888	-121.5509	5.1

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APPENDIX J: AGENCY RESPONSES TO PUBLIC CONCERNS RECEIVED ON THE DRAFT PLAN/EIS

Alternative A

Concern 1: One commenter stated that compressed air horns should be used for hazing mountain goats.

Response: The use of compressed air horns is an option currently available for hazing conditioned and/or aggressive mountain goats in Olympic National Park (the park) and is used occasionally as necessary. Using air horns is not the preferred method to haze mountain goats because experience has proven it to be less effective than other techniques and it causes substantial noise disturbance to wildlife and humans alike.

Alternative B

Concern 2: Commenters expressed concern about the potential injury and mortality rates of mountain goats involved in the capture and translocation process under alternative B, including a discussion on humaneness. Commenters requested the estimated injury and mortality rate and how NPS would handle mountain goats that are injured in the process. One commenter asked about the NPS threshold for mortality rates that would trigger discontinuing translocation.

Another commenter inquired about the expected survival rates of the transplanted mountain goat population once in the North Cascades forests, about their potential to coexist with the existing Cascade population, and whether the mountain goats would be tested for disease. One commenter encouraged the NPS to examine mountain goats pinpointed for relocation to prevent any potential disease or other taxa from the Peninsula from being accidentally transported to the North Cascades forests.

Response: Injury or mortality of mountain goats subjected to capture and/or translocation is a possibility and is disclosed in the draft plan/EIS. These risks, which cannot be quantified, would be minimized through use of experienced, professional crews in capture operations, having veterinarians at receiving staging areas to attend to any injuries that can be treated, using professional ethics and vetted handling procedures to minimize stress at all times, and using refrigerator trucks to keep animals cool and away from distracting sights and sounds during translocation. Animal mortality thresholds that would trigger discontinuing translocation under alternatives B or D would be set following consultation with wildlife veterinarians, the capture contractors, and the project manager.

It is not possible to quantify the expected survival rates of individual mountain goats translocated into the North Cascades forests. The survival rate would vary depending on the age/sex of the animals translocated, as well as how quickly they adapt to their new surroundings. In general, it is reasonable to assume that annual survival rates of translocated animals would be moderately lower than those of resident animals of the same sex and age class already living in similar North Cascades environments. In a pilot translocation of six mountain goats from eastern Oregon into the Cedar River drainage on July 20, 2016, all six were known to still be alive as of late October 2017.

Mountain goats would be translocated to areas with few, if any, resident mountain goats; thus, interactions with resident mountain goats would be uncommon at the initiation of the project. Ultimately,

however, the wildlife biologists expect translocated mountain goats would interact with resident mountain goats without incident. Some of the six mountain goats translocated from eastern Oregon in the July 2016 pilot work are known to have joined with resident mountain goats. Refer to the concern 85 response for the full response regarding disease transmission.

Concern 3: Two commenters inquired about the potential for ewes to be separated from their kids during the capture and translocation process. One commenter requested the NPS to clarify this aspect of the alternative in the plan/EIS and to specify the exact conditions under which either adult or juvenile mountain goats would not be transferred to the North Cascades forests. Another commenter suggested that only adult mountain goats should be translocated from the park.

Response: Contractors would attempt to capture kids accompanying captured nannies whenever possible and would be transported to the staging area together and translocated together, however the NPS and Washington Department of Fish and Wildlife (WDFW) anticipate that kids born in the years of capture and translocation efforts would have a low probability of being successfully captured, translocated, and adapting to their new environment (Myatt et al. 2010; Olson et al. 2010). This low success rate can occur because of abandonment during the capture phase, failure to capture during the capture phase, abandonment during the release phase, or failure to adapt to the new environment. To reduce mortality associated with the 3rd and 4th of these causes, WDFW has partnered with a consortium of zoological parks and gardens vetted by the American Zoo Association to bring as many kids as possible into captive settings at accredited zoos. Any kids that cannot be accommodated by the zoo consortium would be released immediately adjacent to the nanny most likely to be its mother.

Concern 4: One commenter requested that the NPS prioritize the following areas for mountain goat removal from the park: Buckhorn Wilderness area, Little River Summit of Mount Townsend, Tyler Peak, Deer Park, Mount Angeles-Klahhane Ridge, Hurricane Hill, and Griff-Unicorn Peaks, areas with the highest occurrences of state-listed plants, and several camping areas. The commenter also suggested that the Switchback Trail and Klahhane Ridge area should be temporarily closed to hiking and that this area should be prioritized for mountain goat removal.

Response: The concern raised by the commenter appears to be based on past mountain goat distribution data, not current. Many of the areas listed have low to no mountain goats present at this time (figure 5 in the final plan/EIS). Park staff are acting now so that those areas with higher density of sensitive plants do not continue to get impacted by mountain goats. That being said, the draft plan/EIS also states that priority mountain goat removal areas are those with high levels of mountain goat/human interactions or sensitive resources.

Concern 5: Commenters questioned the need to relocate the mountain goat population to the North Cascades forests and felt that the translocation option was an effort to increase the mountain goat population in the North Cascades forests in order to permit more hunting.

One commenter inquired about the mountain goat allocations by area in table 2 and how these numbers were derived.

Response: The population of mountain goats in the North Cascades forests of Washington is considerably lower than its estimated long-term capacity (Rice and Gay 2010; Rice 2012; Harris 2016) and is patchily distributed. Although some areas of the North Cascades forests harbor mountain goat populations sufficiently abundant to sustain limited sport-hunting, other areas remain depressed, and are unlikely to recover for many decades absent a program to provide additional animals. The objective of translocating mountain goats from the Olympic Peninsula to selected areas within the North Cascades forests is to bolster the native population, particularly in regions where habitat appears adequate but

native populations have remained low. The long-term goal is to provide demographic and genetic connectivity, such that the North Cascades forests will support close to the number of mountain goats controlled by its habitat capability.

Mountain goats are classified as a game species under Washington State law, and thus WDFW is authorized to plan and implement sport-hunting seasons when biologically appropriate. Harvest guidelines for mountain goats are conservative (WDFW 2015) and call for documenting identifiable populations of more than 100 animals (exclusive of kids) by rigorous field surveys before hunting seasons can be implemented. As such, it is unlikely that any areas selected for translocation would be the subject of recreational harvests authorized by WDFW for at least 25 or more years following translocation.

WDFW derived the mountain goat allocation by area estimates in table 2 in both the draft and final plan/EIS by applying a constant (i.e., exponential) growth to mountain goat populations of 15, 20, 25, or 30 individuals (reasonable surrogates for the number of mountain goats to initially start with at a translocation area). WDFW then took 1.08 (i.e., 8% per year) as a reasonable maximum (although that rate of growth is exceedingly unlikely for mountain goats in their native habitat). WDFW calculated more realistic estimates of 6%, 4%, and 2% annual growth rates; to get 100 mountain goats older than kid-age, there must be approximately 120 total mountain goats. Therefore, at a 6% growth rate it would take about 30–35 years, 4% about 50 years, and 2% about 100 years to reach a number of mountain goats that WDFW would consider a recreational harvest in the translocation areas.

Concern 6: Commenters requested that the NPS consider different staging areas for the capture and translocation process. One commenter stated that the selection of Deer Park as a staging area was not an adequate area due to road, dust, and infrastructure conditions. The following areas were suggested: Lake Cushman Causeway, Olympic National Forest paved #27 mainline, Eastern parking lot at Hurricane Ridge, Quilcene Ranger Station, Idaho Creek water system spur road west of Hurricane Ridge Lodge, staging area in the southwest, and Bunch Field.

Response: The locations suggested by the commenter are areas that were used in the past, but are no longer considered adequate due to size, threatened and endangered species impacts, or logistical or visitor access constraints. Park staff reviewed many of the areas suggested, in addition to others, and selected the five listed in the draft plan/EIS (and final plan/EIS) as best meeting operational needs.

Concern 7: One commenter requested clarification of the proposed number of mountain goats to be translocated under alternative B, and stated that the range of animals to be removed by capture referenced on page 28 of the draft plan/EIS (325–375 mountain goats), differs from the total amount referred to later in the section (388 mountain goats).

Response: The NPS consistently provides the range of 325–375 mountain goats for translocation under alternatives B and D. The number referenced by the commenters was provided by adding up the number of mountain goats that could be placed in each release area in table 2. A footnote has been added to table 2 in the final plan/EIS to note that these figures are approximate maximums.

Concern 8: Commenters provided suggestions for new release areas. Commenters proposed that the NPS should consider corridors west of the Cascade crest, Canada, Goat Mountain, Bessemer Mountain, Oregon Cascades, Northwest Trek Wildlife Park, and areas not requiring helicopter accessibility.

One commenter noted that the decline in mountain goats available to tribal members in the North Cascades forests has affected traditional activities, and strongly recommended relocation of mountain goats to areas south of Interstate 90 to bring the populations above the required number to allow for hunting.

One commenter stated that the strategy employed for selecting release sites and estimates on the amount and success of translocation efforts need to be discussed in the plan/EIS, including if WDFW would radio collar some of the released mountain goats.

Response: Sites selected for release in the North Cascades forests were subject to an extensive analysis that integrated several factors including habitat quality, history of mountain goat populations, current mountain goat numbers, and connectivity to other mountain goat populations. A description of the selection process for the release sites can be found in appendix I in the final plan/EIS. Only the top 12 potential release sites were fully analyzed in the plan/EIS because there are not enough mountain goats present on the peninsula to successfully translocate to more than 12 areas.

One of the 12 proposed release areas described in the draft plan/EIS is just south of Interstate 90, in an area of considerable interest to a tribe. Other areas south of Interstate 90 were considered where mountain goat populations are currently depressed, but none of those areas ranked high enough to be selected, based on habitat quality, quantity, and connectivity with other candidate patches.

Experience in translocating mountain goats has shown that long-term success is unlikely if mountain goats are not released in summer habitat, as near to appropriate escape terrain as possible. There are no roads that access such habitats near any of the top-ranking release sites; thus, helicopters must be used to transport animals from the closest road access point to release sites. Helicopters available for such work can lift, at most, two loaded crates per load.

Refer to the concern 22 response for a discussion on the use of collars to monitor the success of mountain goat translocation.

Concern 9: One commenter requested that the NPS clarify the current ownership of mountain goats in Olympic National Forest.

Response: The final plan/EIS has been revised to delete any reference to “ownership” of mountain goats by the NPS or the US Department of Agriculture (USDA) Forest Service. Wildlife is generally not “owned” in any conventional sense. Both federal (NPS) and state (WDFW) agencies have been entrusted to make management decisions depending on the lands that the mountain goats occupy and on applicable laws.

Concern 10: Commenters provided feedback and suggestions regarding capture techniques. One commenter questioned the use of drive netting for capture efforts, noting it is inefficient and expensive. Several commenters requested that the NPS consider using salt bait in the capture process, as opposed to using helicopters.

Response: Drive netting will not be used to capture mountain goats. The plan/EIS includes salt block use as a potential tool for aiding capture in locations where mountain goats are already conditioned.

For more discussion on the use of salt baiting, refer to the concern 28 response.

Concern 11: One commenter requested that the NPS revisit the relevancy of the citation of D.A. Blood (2000) referenced on page 50 of in the draft plan/EIS as it pertains to capture, handling, transport, and release field techniques.

Response: The wrong citation was inadvertently included. The in-text citation and full reference has been updated as follows: Blood, D. A. 2001. Success of ungulate translocation projects in British Columbia. British Columbia Habitat Conservation Trust Fund Report. Victoria, British Columbia, Canada.

Alternative C

Concern 12: Commenters expressed concern about the timeline for proposed actions under alternative C. One commenter indicated that lethal operations should be conducted during the winter months in addition to the proposed summer months. Several commenters indicated that the proposed timeframe for alternative C should be shortened to two years and one commenter requested mountain goat removal occur simultaneously at Olympic National Park and Olympic National Forest.

Response: Although some ground based lethal removal operations would take place in the fall and winter (refer to revised text for alternatives C and D), mountain goats are generally in lower elevations, forested areas, and are harder to locate outside of the summer months (Jenkins et al. 2011). As a result, the NPS would operate in the summer months in order to be as efficient and effective as possible.

The NPS was conservative in developing the time estimates to allow for delays due to the potential for unfavorable weather and other factors that may inhibit plan implementation efficiency. However, the team has estimated that the majority of the actions under alternatives C and D would take place over the course of three years. The plan proposes to operate simultaneously in the park and the national forest.

Concern 13: Commenters expressed concern about the specific weapons proposed under alternative C and the weaponry qualifications of personnel who would be involved with lethal removal.

Response: A volunteer operational plan would be completed outside of the plan/EIS, should an action alternative be selected for implementation. The operational plan would include the requirements for level of physical fitness, marksmanship, acceptable weapons, and training required for park-specific issues prior to any implementation of a volunteer program.

Concern 14: Commenters requested eliminating or reducing proposed helicopter use under alternative C. One commenter requested that the plan/EIS clarify that there would be a reduced number of helicopter flights and landings under alternative C, when compared to the other action alternatives. One commenter suggested that a new alternative with fewer helicopter flights and landings (“alternative C lite”) be considered as a way to reduce impacts to wilderness.

Response: Due to the steep and inaccessible terrain in a large portion of the Olympic Peninsula mountain goat range, using only ground-based operations would not eliminate enough of the mountain goat population and therefore would not sufficiently meet the purpose and need for taking action. In addition, even after years of ground-based operations, the nucleus of remaining mountain goats would be larger than if aerial operations were used, because so much of the mountain goat habitat is not accessible by foot. Consequently, ground-based operations would need to occur indefinitely, as mountain goats would persist and the population eventually would be able to rebound without continual lethal control.

The draft plan/EIS does indicate that there would be fewer helicopter flights and landings under alternative C than under the other action alternatives. Specific hours and days of helicopter use for each alternative have been included in tables 1 and 2 of the final plan/EIS. Table 1 provides all helicopter hours on the Olympic Peninsula while table 2 provides all flight hours in the North Cascades (alternatives B and C only). When the hours in tables 1 and 2 are combined, alternative C has fewer hours across the initial management period than alternatives B or D.

The NPS does propose to reduce the amount of helicopter operations needed for lethal removal by using some ground-based operations. In the revised alternative C, the NPS would start the lethal removal process using ground-based operations in year 1. NPS staff would be used in select areas with high

visitor-mountain goat conflicts in the summer and with trained and skilled public volunteers range-wide in the fall. Aerial based lethal removal would start in year 2, and would focus on areas where ground-based mountain goat removal actions were not effective. It is expected that the majority of aerial removal operations would end at the end of year 3, but may last until year 4 of 5.

An “alternative C lite” would have more long-term impacts on wilderness character than both alternative C as it is described in the draft plan/EIS and alternative D. Limiting, reducing, or eliminating helicopter flights to aid in the removal of exotic mountain goats would greatly extend the removal period. This would have subsequent positive and negative impacts on wilderness character. Each year that the action is extended the mountain goat population would continue to grow. The use of helicopters as described in alternatives C and D was thoroughly discussed by the planning team and was determined as such in an effort to greatly reduce long-term impacts to wilderness character while still meeting the plan’s objectives.

Concern 15: One commenter inquired why alternative C was not selected as the preferred alternative because of NPS management policies, which require the removal of nonnative species, especially when threatened or endangered species are at risk.

Response: As stated on page 68 of the draft plan/EIS, both alternatives C and D (the NPS preferred alternative) would reduce or eliminate impacts on sensitive park resources through the removal of the majority of mountain goats in the park and on adjacent Olympic National Forest lands. However, the NPS believes alternative D best accomplishes the purpose and need for the project by meeting the project objectives of providing opportunities to augment native mountain goat populations in suitable mountain goat habitat and to support the wildlife management objectives of cooperating agencies and tribes. Alternative C would not meet these project objectives because the mountain goats would be lethally removed from the park, and no translocation would occur.

Concern 16: Commenters expressed concern about the mountain goat carcasses that would result following lethal removal operations. Commenters thought that leaving carcasses on the landscape would violate RCW 77.15.170, which prohibits the reckless waste of game animals. One commenter questioned the proposed carcass removal distance and that the carcasses would not be reused. A second commenter requested the removal of all carcasses to areas below 3,000 feet to avoid attracting predators and impacting marmots. A concern was expressed regarding the impacts that mountain goat carcasses containing immobilization drugs may have on other animals that may feed on these carcasses. One commenter requested providing carcasses to natural historians and zoologists for inclusion in museum and curated collections.

Response: Section 4.4.2.1 of *NPS Management Policies 2006* (NPS 2006) allows the NPS, as part of an animal reduction process, to leave carcasses of deceased animals in natural areas of the park to decompose. However, there are inherent trade-offs between the impacts of carcasses left on the landscape and the need to minimize the number of helicopter landings. Some commenters wanted no helicopter landings in order to protect the wilderness character, and other commenters want the removal of all carcasses. The NPS has revised the text for alternatives C and D to propose a compromise that would provide operational efficiency (fiscal savings and an optimized use of helicopter time) and would also minimize the impacts carcasses would have on the public and on natural and wilderness resources. The team proposes to have lethal removal, when deemed necessary, begin with ground-based shooting with volunteers (excepting only unavoidable euthanasia associated with live-capture, which is anticipated to be a rare event). As part of their duties, volunteers would be requested to remove as much of the carcass as they safely could from the field. If near trails or campsites, remaining carcasses would be moved at least 100 meters away. Additionally, ground-based removal operations would occur after peak visitor use season, in the fall. Having lethal operations occur later would also allow scavengers and/or decomposers

to reduce remaining carcass material over the winter. Most aerially based lethal removal operations would occur in remote areas far away from visitor use areas or marmot habitat. Carcasses remaining near a trail or visitor use site resulting from aerial shooting would be removed whenever landing the aircraft and having staff operating on the ground can be accomplished safely. Carcasses would be transported off-site, and donated to tribes, food banks, or legitimate research projects when possible. When practicable, DNA and other samples would be taken from carcasses prior to donation. Where mountain goats overlap in marmot habitat, and where lethal removal operations take place in the summer, as many carcasses would be moved as possible.

Carcasses from capture activities involving capture drugs would be few, and are not anticipated to cause secondary effects on scavengers. If a drug is used that has the potential to affect scavengers, all carcasses from drug related capture mortalities will be removed if the carcass can be safely accessed.

RCW 77.15.170 is intended to preclude waste of animals subject to legal harvest managed by the WDFW. In general, hunting-related statutes such as this would not apply within Olympic National Park. Outside of Olympic National Park, carcasses resulting from a legitimate management or research action for which no alternative exists to their being left in the field, would not fall under the prohibitions of RCW 77.15.170.

Alternative D

Concern 17: Multiple commenters requested that translocation and lethal removal actions take place outside of the peak visitation period; specifically, not between July and September and not on holidays and weekends.

Response: Because of both the seasonal altitudinal movement patterns of mountain goats in the Olympic mountains (Jenkins et al. 2011), and the prevailing weather patterns, the park must conduct aerial operations during the summer months. Mountain goats use low elevation areas from late autumn through spring, often with tree or shrub cover that renders capture operations untenable. They spend their time in high elevation alpine and subalpine areas in the summer and early autumn, where aerial capture is feasible and they are most readily seen. July is the best time for the co-occurrence of the requisite conditions for safe and efficient capture operations: mountain goats being high enough to capture them, weather cool enough for efficient aerial operations, mountain goats using open habitat later in the day, and consistent periods of no precipitation, allowing several days of aerial operations in a 2-week period. Later in the year mountain goats move to lower elevations and the weather deteriorates. To minimize visitor impacts, the park would plan to work a compressed schedule (two 2-week periods), freeing up the rest of the visitor season to have no impacts from mountain goat removal operations. Operating over one weekend during each 12-day translocation and lethal removal period provides the greatest flexibility and efficiency. If the NPS did not operate over one weekend, operational costs would increase and the period of impacts would be extended over a longer timeframe.

Mountain goat removal operations would not occur over the holidays (July 4 and Labor Day weekend).

Concern 18: Commenters provided a variety of suggestions regarding the timing of capture and translocation and lethal removal efforts. Several commenters stated that lethal removal should be expedited and the timeframe reduced; some commenters stated that lethal removal could take place simultaneously with capture efforts, or should begin after year 1. One commenter specified that most translocation and lethal removal activity should take place during years 1 to 3. Another commenter recommended that if funding for capture and translocation is not available, the park should not delay lethal removal efforts under alternative D, and should start that effort immediately. Another commenter

suggested that relocation efforts should be the focus during the first two years of implementation to reduce the amount of mountain goats removed lethally. One commenter suggested areas of the park where aerial capture is not feasible and that the NPS should prioritize those areas for immediate lethal removal of mountain goats.

Response: Although the analysis for alternative D covers operations occurring over a period of up to five years for the initial action, the park anticipates that it would take only three years to achieve most, if not all, of the desired population reduction. The extended timeframe is included in the analysis as a conservative measure, written to fully cover impacts if operations are hampered by periods of poor weather or other logistical difficulties that impair operation efficiency, or if unforeseen circumstances are encountered that influence capture or lethal removal operations. The capture operations are anticipated to be the primary activity in July and September in year 1, and depending on the capture rates and safety, July and late August/September in year 2. If capture operations are efficient and successful, ground-based lethal removal, using skilled public volunteers, would start following the second aerial capture operation in the fall of year 2. Year 3 would then be lethal removal, with aerial operations focusing in remote areas where capture operations and ground-based lethal removal actions were not effective. The objective is to get to zero mountain goats by the end of year 3. However, the NPS acknowledges that that end point may be hard to achieve, and it may take five years to get there, with some mountain goats remaining in remote areas. If there are mountain goats remaining, they would be removed through subsequent actions covered under the maintenance period.

In year 1, actions would be focused where mountain goats can be safely captured and where they are interacting with visitors and resources (i.e., Klahhane Ridge, High Divide, Bailey Range, Lake of the Angels, Lena Lakes, and Glacier Meadows).

The NPS is aware of the operational constraints in the areas suggested by the commenter. However, many of the areas listed are a low priority for initial action due to low numbers of mountain goats present, little to no human-mountain goat interaction, and/or the lack of sensitive resources present. Consequently, lethal removal of mountain goats in those areas is not a priority for operations in year 1.

Concern 19: Commenters recommended coordinating with WDFW on lethal removal of mountain goats. One commenter suggested combining alternative D with an increase in hunting permits from WDFW. Another commenter suggested allowing for a 4-week window for WDFW to lethally remove mountain goats from the park.

Response: WDFW is a cooperating agency and the NPS would coordinate all mountain goat capture and removal actions with it. Public hunting is not legal in Olympic National Park, as described in the section “Alternatives Considered but Dismissed from Further Analysis” in chapter 2. However, the NPS would be able to use designated skilled public volunteers for ground-based lethal removal operations. The NPS would seek the assistance of WDFW in planning and implementing that program. Additional text has been added to page 54 of the final plan/EIS to further describe the use of skilled public volunteers.

Concern 20: One commenter requested that the NPS disclose the number and location of lethal removals.

Response: The NPS would disclose the details of lethal removal efforts in the park’s project annual report. As part of the contracting and volunteer ground operations, the park would require reporting of this information to track the project’s success.

Concern 21: Commenters stated that alternative D should be revised to include complete removal (100%) of all mountain goats within the park. One commenter noted that the draft plan/EIS does not state that a small population could not be maintained without being detrimental to the use of the park, which is the

legal authority for full removal. One commenter suggested that the objective of alternative D (and alternative C) should be rephrased to emphasize elimination of mountain goats versus the proposed reduction of mountain goats, and that efforts to eliminate mountain goats should be expedited more quickly than proposed.

Response: The goal of the preferred alternative (and alternative C) is a mountain goat population of zero in the park. However, the NPS acknowledges that the complete removal of mountain goats may not be achievable due to constraints imposed by rugged terrain, weather, and the ability of mountain goats to elude capture. Therefore, if a small population of mountain goats does remain in the park, they will continue to produce some level of detriment to park resources, including wilderness character. That is why the goal of alternatives C and D is the complete removal of mountain goats. Text in alternatives C and D in the final plan/EIS has been revised to reflect this goal. Alternatives C and D have been revised to include the following statement: “The intent of initial management would be to reduce the population of mountain goats to zero, acknowledging that objective may be difficult to achieve.”

Refer to the concern 18 response for information on the timing of mountain goat removal operations and the constraints that could affect the duration of proposed management actions.

Concern 22: Commenters recommended additional actions under alternative D for long-term management, including a funded research and monitoring plan for 3–5 years after translocation and the ability to continue helicopter use for two years after translocation to investigate mountain goat mortalities.

Response: Alternatives B and D include the placement of GPS collars on mountain goats to monitor them after translocation. This would provide opportunities for future research regarding mountain goat translocation and ecology in the North Cascades forests. Although additional research and monitoring efforts are not part of this NEPA action, the NPS and WDFW would continue to seek funding for additional research and monitoring. Additional text has been added to the alternatives section of the final plan/EIS to provide information on collaring mountain goats for translocation.

The following text was added to alternative B in the final plan/EIS: “Mountain goats translocated to the North Cascades national forests would be marked to allow for research into the success of translocation and restoration efforts. Most animals would be radio-collared, and if funding allows, GPS collars would be used that wirelessly transmit locations and a mortality signal. Some animals would be only ear tagged; the ear tags would fall off eventually. A radio collar would remain on the animal for the rest of its life. Any tagging or collaring would be done at staging areas post-capture, pre-release, and would occur outside of designated wilderness.”

Concern 23: One commenter requested that agencies develop a memorandum of understanding to confirm the responsibilities of each agency, including funding requirements.

Response: The NPS and the cooperating agencies are currently operating under a memorandum of understanding that covers agency coordination during the NEPA process for this mountain goat management plan/EIS. This memorandum of understanding indicates that the cooperating agencies would enter into a subsequent memorandum of understanding or other appropriate agreement regarding the implementation of the selected action in this plan/EIS.

Concern 24: Commenters raised questions about the current mountain goat population in the park and the feasibility of removing 90% of the population over a 5-year period under alternative D. One commenter questioned the feasibility of achieving the capture rates described in the plan/EIS, noting that based on the range of mountain goats captured over the 4-year period outlined in the plan/EIS, the estimated annual removal efforts would exceed those previously achieved in the park. Commenters also questioned the

long-term success of the plan if mountain goats remain in the park; one commenter noted that with removal efforts, more than 70 mountain goats would likely remain in the park under alternative D, which would allow the population to rebound.

Response: The capture rates cited from the operations in the 1980s lend support to the estimates of projected capture success in this project. From 1980–1989, 407 mountain goats were removed (360 captured and translocated) from the park. Over half of those (205) came from the Klahhane Ridge area, where capture operations are logistically the easiest. The capture operations in 1988 (80 mountain goats in 11 days) and 1989 (69 mountain goats in 10 days) took place at the end of the operation, after mountain goats had been flown over and captures attempted for several years, and only 20 mountain goats came from Klahhane Ridge. In the current mountain goat management plan/EIS, the NPS has proposed to have two capture periods of 12 days each – up to 24 potential capture days for at least two years. Mountain goats have not been captured for many years and there are now dense pockets of mountain goats in workable terrain. Based on experience with weather, mountain goats could be caught at least 19 days per year, with an average of 6–12 mountain goats per day.

Refer to the concern 21 response regarding the complete elimination of the mountain goat population.

Concern 25: Commenters felt that the draft plan/EIS lacks rationale for selecting alternative D as the environmentally preferable alternative. Another commenter inquired about the correlation between alternative D as the environmentally preferable alternative and its associated carbon dioxide emissions.

Response: It is correct that alternative D would result in more helicopter flights (and more emissions) than alternative C primarily due to mountain goat translocation activities under alternative D. However, the impacts to air quality would be temporary and short-term because annual helicopter operations would be limited to a two-week time period in July and then another one in August or September. Over the long term, all of the action alternatives would reduce the impacts of mountain goats on the natural resources of the park to some degree, although alternative B would require a longer duration of management activities and would not be as successful at keeping mountain goat populations from rebounding in the future. However, when considering the environmental effects over a broader geographic scale, alternative D would contribute to the conservation of mountain goats in their native habitat, whereas alternative C would result in the lethal removal of the mountain goats in the park. For these reasons, alternative D was identified as the environmentally preferable alternative in the plan/EIS. Additionally, according to the NPS NEPA Handbook (NPS 2015) and NEPA regulations, the environmentally preferable alternative does not need to be identified in an EIS, nor does it have to be the alternative ultimately selected for implementation. It merely represents the agency’s opinion on which alternative causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources.

Alternatives Considered but Dismissed: Fertility Control

Concern 26: Multiple commenters requested that the NPS consider the use of fertility control, including chemical contraception or surgical sterilization, for long-term management of the mountain goat population. Commenters requested that the NPS discuss why reduction of the mountain goat population within five years is necessary, which eliminated fertility control as a viable alternative. One commenter disagreed that the use of fertility control would impact wilderness values and requested an expanded discussion of those potential impacts.

Conversely, some commenters agreed with the dismissal of fertility control as an effective method of eliminating mountain goats in the park. Commenters indicated that the dismissal statement in the draft plan/EIS should be expanded to include past experimentation, scientific review, and previous studies at the park. One commenter suggested considering but dismissing genetic engineering as a means of fertility control.

Response: The use of fertility control as a mountain goat management tool was considered but dismissed in chapter 2 of the draft plan/EIS. On page 61 of the final plan/EIS, the project team has revised that section to better describe why fertility control was dismissed as an alternative.

Although fertility control has been demonstrated to be effective in controlling individual animal fertility and in very limited circumstances of population growth rate of closed, easily accessed, small populations, it was determined that it would not be an effective tool for meeting the plan/EIS objectives of reducing or eliminating impacts from exotic mountain goats. Where fertility control has been successful, it has limited population growth, but has not eliminated populations of wild ungulates.

Populations in which fertility control has been successfully applied include permanent sterilization of feral horses that are accessible for annual roundup (Collins and Kasbohm 2017), or small, contained and easily accessible island populations of horses (Kirkpatrick and Turner 2008), white-tailed deer (Rutberg et al. 2013), and bison (Duncan et al. 2013). These conditions do not exist in the Olympic Mountains. No more than an estimated 50% of the mountain goat population could feasibly be captured, leaving the remaining 50% of the mountain goat population capable of reproduction; the mountain goat population would not only persist, but impacts would grow over time.

Chemical agents, such as immunocontraceptive vaccines (e.g., native PZP or GnRH vaccines), require repeated doses to the same animal, to be highly effective at suppressing fertility. Due to the remote, rugged, and extreme terrain the mountain goats reside within, helicopter darting during the summer months would be necessary to either capture or vaccinate the mountain goats. This would require several months of flying each year (e.g., for surveys where animals are counted from a distance, and people do not get close enough to dart every individual seen, surveyors for 6 to 7 days and cover half of the terrain). In the Olympic Mountains, such a program would be costly, impactful, and not effective for eliminating mountain goats or their impacts as it would be impossible to treat a sufficient number to significantly impact population dynamics. In addition, over time, mountain goats would learn to avoid helicopters and a diminishing proportion of the population would be accessible via helicopter. These conditions are consistent whether you are darting the animals with an immunocontraceptive or capturing them for permanent sterilization (e.g., ovariectomy, vasectomy, or castration). The primary obstacle in using fertility control in the Olympic Mountains is access to animals.

Even if the access issues were resolved there is currently no regulated or registered chemical contraception product for use in mountain goats. The only species with approved products are feral horses, burros, white-tailed deer, and other cervids (i.e., GonaCon Immuncontraceptive Vaccine, GonaCon-Equine, Zonastat-H, Zonastat-D). Therefore, in addition to extreme logistical challenges there are legal roadblocks to the use of these products in mountain goats.

The use of fertility control adversely affects wilderness values as it is not a natural process. Fertility control as an authorized management action would be a negative effect on the untrammeled quality of wilderness character as it would be an intentional manipulation of the biophysical environment. The sterilization that would result from fertility control measures would be a negative effect on the natural quality of wilderness character. Administering fertility control measures would be time and resource intensive and would require years of repeated management action in wilderness. Male and female mountain goats are very difficult to distinguish from each other and the amount of time and costs

associated with either darting all mountain goats or capturing all mountain goats to inject only the females or castrate all the males would be impractical. Fertility control on female mountain goats would have to be repeated indefinitely to be effective. Mountain goats that have been treated would need to be tagged and possibly collared and tracked. This would create further adverse effects on the untrammelled, natural, and undeveloped qualities of wilderness character. If all mountain goats were to be indiscriminately darted from the air, this would be an adverse effect on the undeveloped quality of wilderness character, the intentional action of darting would be an adverse effect on the untrammelled quality, and opportunities for solitude and primitive and unconfined recreation would also be adversely affected as noise from helicopters would disrupt the natural soundscape and area closures to visitors may need to be in effect during darting operations. Most concerning is that these actions would need to occur on a regular basis to be effective until all exotic goats are eliminated. This would greatly extend impacts to wilderness character beyond those of alternatives C or D. If any female mountain goats are missed in this process, the population would continue to increase. The more time that is needed to administer fertility control the more chance the population would continue to grow, as not all mountain goats would be treated within the first year or two unless the action is implemented on a much more frequent basis than the two 2-week periods each year as identified for alternatives C and D. This would mean extensively more helicopter flights, more staff on the ground, and more area closures to visitors—all on an indefinite basis.

Alternatives Considered but Dismissed: Introduction of Wolves

Concern 27: Multiple commenters requested that the NPS consider the introduction and reintroduction of wolves and other predators for long-term management of the mountain goat population. Commenters suggested that specific existing wolf populations should be relocated to the Olympics, including populations from Eastern Washington, Montana, and British Columbia. Several commenters suggested that a range of natural predators such as cougars, golden eagles, and bears, in addition to wolves, should be introduced.

Response: Wolves are not effective predators on mountain goats. Very rarely, when mountain goats find themselves in exposed conditions far from escape terrain (typically in winter), a wolf may be able to kill a mountain goat. Much more commonly however, wolves are unable to attack mountain goats because of the terrain they live in. In essence, mountain goats have made an evolutionary trade-off: they accept the poorer forage availability that comes with being tied so closely to the very steep terrain in which they are adapted to negotiate, in return for safety from coursing predators such as wolves. Predator populations, including the cougar, golden eagle, and black bear, are naturally regulated in the park. Existing predators would not control or eliminate the mountain goat population and are therefore not a viable alternative. Any artificial augmentation of native predators in the park would have more impacts on elk and deer than on mountain goats. Wolverine and grizzly bears are not native to the park, and hence not suitable for further discussion.

Alternatives Considered but Dismissed: Use of Salt Blocks as Long-term Management Measure

Concern 28: Commenters requested that the NPS consider placing salt licks in remote areas, away from visitor use and hiking areas, as a long-term mountain goat population management strategy. Commenters stated that salt licks are cost effective and can keep mountain goats away from visitors.

Response: As described in the section “Alternatives Considered but Dismissed from Further Analysis” in chapter 2, salt blocks as an attractant may influence distribution of habituated and conditioned mountain goats for a while, but there is no evidence that salt blocks would keep mountain goats from seeking salts from humans. In addition, the presence of salt blocks in the long term would have other unintended consequences: it would alter movement patterns and habitat use of mountain goats, and other wildlife species that seek salts (deer, Olympic marmots), and cause resource impacts to soils and vegetation in that area. It would also artificially concentrate salt-seeking wildlife in a restricted area, making them more prone to predation.

In addition, displacement of mountain goats through the use of salt blocks would not control or eliminate the mountain goat population. Resource impacts would be exacerbated as the population continues to grow.

Finally, the use of salt blocks in wilderness as a long-term management strategy would adversely affect the untrammelled, natural, and undeveloped qualities of wilderness character. The use of salt blocks would manipulate the biophysical environment, they are not a natural source of salt within the Daniel J. Evans Wilderness, and their placement within the wilderness would be considered a development. They could be used as a short-term measure to assist with capture operations only if they are determined to be the minimum tool through a minimum requirement analysis.

Alternatives Considered but Dismissed: Public Hunting in the Park

Concern 29: Multiple commenters suggested the use of hunters, increased WDFW hunting areas, and use of hunting in years 6–10 if the NPS-selected alternative actions have ceased to manage the mountain goat population in the park. Specific suggestions included using one of the following methods: military personnel, hunting permit funds to relocate mountain goats, short-range weapons, archers, and developing a permit lottery. Multiple commenters requested a change in NPS regulations to allow hunting in the park.

Response: During preparation of the draft plan/EIS, the NPS considered but dismissed alternatives allowing recreational hunting as a mountain goat management measure. This discussion is located on page 56 of the draft plan/EIS. Refer to the concern 14 response for why ground hunting alone would not achieve the plan’s objectives for mountain goat removal from the park. Refer to the concern 31 response for a discussion on hunting outside the park.

The NPS intends to use skilled and able volunteers for ground-based lethal removal operations (refer to the description for alternatives C and D), including qualified military and tribal personnel. NPS staff would work with WDFW to identify appropriate qualifications and design the recruitment process.

Alternatives Considered but Dismissed: Tribal Hunting in the Park

Concern 30: Commenters suggested that the NPS consider using skilled hunters from the tribes to assist with the mountain goat removals and noted that the tribes hunt and use all parts of mountain goats.

Response: Alternatives C and D in the plan/EIS propose to use skilled public volunteers to assist with ground-based lethal removal operations. Skilled hunters from tribes, in addition to other groups, would be welcome to participate after they have been properly vetted.

Alternatives Considered but Dismissed: Hunting Outside in the Park

Concern 31: Several commenters had suggestions related to hunting outside the park. One commenter suggested easier access to a hunting tag for mountain goats in the Olympic National Forest and another commenter suggested no tag limit in the forest.

Response: As estimated by earlier surveys conducted in 2014 and 2016, only about 5–10% of the total Olympic Peninsula mountain goat population lives outside the boundaries of Olympic National Park, and thus under the management responsibility of WDFW. A more aggressive recreational hunt of these mountain goats would therefore have limited impact on the overall population. During the hunting seasons from 2015 to 2017, WDFW offered six permits annually to hunters, resulting in a total of 11 animals removed. Mountain goats on the Olympic Peninsula, but outside of Olympic National Park, live in relatively small habitat patches. The number of hunters permitted in these small areas is limited in order to avoid crowding and to manage safety concerns.

Alternatives Considered but Dismissed: Discontinue Management – Allow Mountain Goat Population to Fluctuate Naturally

Concern 32: Commenters recommended allowing the mountain goats to live and thrive naturally in Olympic National Park.

Response: Mountain goats are introduced, and hence not “natural” in Olympic National Park. The plan to translocate many to the North Cascades forests is in an effort to restore populations there and to further facilitate their ability to thrive in their natural habitat.

Alternatives Considered but Dismissed: Fencing

Concern 33: One commenter requested additional information about the installation, maintenance, and operational costs associated with fencing. Another commenter suggested erecting fences around fragile vegetation areas while keeping mountain goats in the park, and using these protected areas to educate visitors about alpine vegetation.

Response: An alternative that would construct a fence around the boundaries of the park or sensitive alpine ecosystems was eliminated from further consideration for many reasons including the following: fencing would interfere with native wildlife species and ecosystem processes; fencing would not address impacts on natural resources and visitor safety within the park; and fencing would present issues associated with development within designated wilderness areas. The final plan/EIS has been revised to include additional dismissal of fences surrounding alpine plant communities in addition to a park boundary fence.

New Alternatives or Alternative Elements

Concern 34: Commenters suggested that NPS better manage visitor use and education in the park as a way to reduce interactions between visitors and mountain goats. Suggestions included the following: construction of comfort stations, allowing visitors to carry personal weapons and other hazing equipment, use of urine containers, increasing park signage to warn visitors, increasing the number of rangers in the park to provide protection, reducing the number of visitors or limiting where visitors can go, and improving visitor education. At least one commenter provided an example from another national park unit of visitor access modification to reduce human-wildlife conflicts.

Response: The park already has an extensive program to educate visitors on how to interact with mountain goats and wildlife in general (signs at trailheads, visitor centers, etc., information given by interpreters, staff at visitor centers, staff on trails, and content on the park's webpage). As in other NPS units, messaging is not completely effective in controlling human behavior. Some use the warning signs as a cue for a place to go to see mountain goats and get up close for pictures and petting. Others see signs and turn around and go to other areas. Park staff give advice to the public on how to haze mountain goats, but very few visitors are comfortable with doing it. More importantly, education may change some human behavior, but would not remedy the underlying issue which is the presence of an exotic ungulate, whose population is growing at 8% a year, and foraging on a plant community that did not evolve with this type of herbivory. Consequently, increased education alone would not meet the project's purpose and need.

Olympic National Park is nearly one million acres in size. With funding and staffing constraints it is impossible to have rangers on every trail at any given time to consistently apprise visitors about mountain goat issues.

There are many differences between the situation with mountain goat management in Olympic National Park and grizzly bear management in Yellowstone National Park. Grizzly bears are endangered, uncommon, and native in the Greater Yellowstone Ecosystem. Mountain goats in Olympic National Park are exotic, numerous, and ubiquitous. There would need to be permanent trail closures at Hurricane Ridge and many other backcountry areas to attempt to keep visitors and mountain goats separate. Additionally, this action would do nothing to reduce or eliminate impacts to native vegetation and soils as the exotic mountain goat population would continue to grow.

Placing a toilet at the Switchback Trailhead might help that area, but this would not solve the larger issue. There are toilets in many backcountry areas (e.g., High Divide) and there are still issues with mountain goats in those areas. Also, more toilets and the use of portable urine containers would not control or eliminate the exotic mountain goat population.

Concern 35: Commenters suggested that the NPS relocate and consolidate mountain goats to remote areas in the park and limit visitor access to these areas as an alternative to mountain goat removal from the park. One commenter suggested tagging and tracking mountain goat herds in the park to make visitors aware of where mountain goats are located.

Response: Relocating and consolidating exotic mountain goats to remote areas (i.e., wilderness) of the park and limiting visitor access to these areas would not meet the purpose and need for the plan, because a population of mountain goats would still remain and continue to adversely impact park resources, including wilderness character. The moving of mountain goats to another area of the park would have an adverse impact on the untrammeled quality of wilderness character as it would manipulate the biophysical environment and would not meet the objectives of the final plan/EIS. This action would also concentrate impacts to park resources, especially sensitive vegetation and other wildlife habitat which would also be

an adverse impact on the natural quality of wilderness character. Therefore, allowing a population of mountain goats to remain in the park was considered but dismissed from further consideration. Also refer to the concern 36 response.

Concern 36: One commenter suggested preserving a small portion of the mountain goat population at Hurricane Ridge to educate visitors about mountain goats and the impacts they can have on vegetation.

Response: Maintaining a population of mountain goats anywhere in Olympic National Park would not meet the purpose and need for the project, which is to reduce or eliminate impacts on park resources from the presences of exotic mountain goats. If mountain goats were allowed to remain in the park, there would continue to be adverse impacts to soils, vegetation, and wilderness. Section 4.4.4.2 of NPS *Management Policies 2006* (NPS 2006) sets policy for management (including potential removal) of nonnative species in the park; it does not provide for the retention of a harmful species solely to demonstrate the harm that it causes.

Concern 37: One commenter suggested reducing cougar hunting as a way to increase the cougar population, thereby increasing predators to the mountain goat population.

Response: Although cougars have extensive home ranges, there is no cougar hunting allowed in the park. Because the core of the park (where mountain goats reside) is over 700,000 acres, cougar hunting outside the park is not expected to significantly influence cougar populations there. That fact, combined with the fact that cougar predation has little to no influence on mountain goat population dynamics, leads to this suggestion not meeting the purpose and need for the plan.

Concern 38: One commenter recommended that mountain goats that are located near trails and pose a risk to hikers should be the focus of translocation efforts. The commenter recommended that the remaining mountain goats located in more remote areas not be removed. The commenter suggested that the NPS develop a population goal for specific areas of the park and relocate additional mountain goats if overpopulation occurs.

Response: As stated on page 44 of the draft plan/EIS, capture operations will focus on areas of high numbers of mountain goat-human interactions, in addition to areas with sensitive resources and areas with high densities of mountain goats. The suggestion to not remove mountain goats from the more remote areas and to develop a population goal for the park would be contrary to the purpose and need for the EIS and is not in accordance with NPS management policies regarding the presence of exotic species in the park.

Concern 39: One commenter suggested a new alternative, “alternative E,” that would involve translocating a smaller population of mountain goats to a smaller number of release sites within the Cascades forests, noting that the draft plan/EIS does not include a validation of the necessity for translocation of the larger population.

Response: As noted in the concern 50 response, the objective of translocating mountain goats from the Olympic Peninsula to selected areas within the North Cascades forests is to bolster the native population, particularly in regions where habitat appears adequate but native populations have remained low. The long-term goal is to provide demographic and genetic connectivity, such that the North Cascades forests would support close to the number of mountain goats controlled by the habitat carrying capacity. The number of mountain goats proposed for translocation is based on an extensive review of the species’ population status with respect to its habitat suitability in Washington. The addition of as many as 325–375 mountain goats contributed by the Olympic Peninsula is well within the capacity of the North Cascades forests to absorb. Harris and Steele (2014), based on a survey and evaluation of 70 historic translocations

of mountain goats into native range, recommended that at least 25–30 mountain goats should be released within each individual release area in order to achieve a high likelihood of long-term success. Therefore, the recommendation to translocate fewer mountain goats is not feasible with respect to the project’s objectives.

Concern 40: Commenters provided alternative relocation options for mountain goats following removal from the park. One commenter suggested raising funds through an “adopt a goat” program, and using the funds for relocation to mountain goat friendly areas. Similarly, another commenter suggested building a sanctuary and relocating mountain goats there. A suggestion was made to relocate mountain goats to areas where they can be productive, such as for city-wide mowing.

Response: The suggestions by commenters for alternative relocation options were noted; however the proposed translocation areas analyzed in the draft plan/EIS were identified after an extensive analysis of which areas within native mountain goat range were most in need of mountain goats and also have the highest likelihood of restoration success (refer to Appendix I in the final plan/EIS). Some of the locations suggested by the commenter are not feasible because they are not native mountain goat habitat, which is where populations are adapted to survive and where WDFW is prioritizing restoration. The NPS appreciates the recommendation for an “adopt-a-goat” program to raise funds. However, such a program could not ensure that mountain goats would end up in native or even suitable habitat for wild mountain goats. Mountain goats are wild animals, and as such, are not appropriate animals to use for weed-control or mowing projects.

Consultation and Coordination: General Comments

Concern 41: Several commenters felt the public comment period was not well publicized and requested that NPS extend the public comment period. One commenter felt public scoping meetings should have been held near the release areas. Another commenter stated that the public should have another opportunity to review and provide comments if the alternatives are substantially revised for the final plan/EIS.

Response: Olympic National Park and the cooperating agencies sent a press release out to its mailing list and media outlets on July 24, 2017. Between July 24 and October 13, 2017, there have been at least 48 news articles in print or online, radio, or television. Of those 48 news articles, 35 were from media outlets throughout the state of Washington, five from Oregon, one from Utah, one from Idaho, two from California, and four were from nationwide outlets. The comment period opened on July 21, 2017 and was originally scheduled to end on September 26, 2017, which was longer than is required for an EIS. The comment period was instead extended an additional 14 days to October 10, 2017. Public meetings were held in Port Angeles, Olympia, Seattle, and Everett. Over 2,300 pieces of correspondence were received and came from 49 states and the District of Columbia, and 15 countries aside from the United States.

Concern 42: Commenters requested that the NPS provide information on any consultation with local and other governmental agencies during the draft EIS process and requested that NPS provide summaries in the plan/EIS. One commenter asked why North Cascades National Park is not part of the process, given its proximity to the release sites, while another asked if the NPS had consulted with Washington State on state-listed species and other agencies regarding assistance with translocation.

Response: Staff from North Cascades National Park were part of an interagency group that explored the potential for mountain goat population augmentation, and were involved in the final selection process for the sites chosen for proposed mountain goat releases. Because North Cascades National Park does not

provide as much suitable mountain goat habitat as other high priority areas (refer to appendix I in the final plan/EIS) it was removed from consideration as a translocation area with their consent.

The NPS worked closely with the USDA Forest Service and WDFW as cooperating agencies on this plan/EIS. The specific USDA Forest Service units included Olympic National Forest, Mt. Baker-Snoqualmie National Forest, Okanogan-Wenatchee National Forest, and the USDA Forest Service Pacific Northwest Regional Office. The NPS has also consulted with the State Historic Preservation Office (SHPO) and all affiliated tribes, including a formal government to government meeting with the Skokomish Tribe. Many local agencies are included on the project's mailing list and were apprised of information releases and public review periods. The project team has also formally consulted with the U.S. Fish and Wildlife Service (USFWS) in regard to threatened and endangered species.

The USDA Forest Service informally consulted with WDFW regarding state-listed species given WDFW manages wildlife within USDA Forest Service units. The NPS is not required to consult with WDFW on state-listed species.

Consultation and Coordination: Tribal Treaties and Consultation

Concern 43: One commenter requested that agencies develop a distribution list that includes all interested tribes for fair dispersion of mountain goat carcasses if there are mountain goat mortalities.

Response: Where feasible, the NPS would minimize any potential waste of edible mountain goat meat and would donate available carcasses to certified processors for distribution to local tribes and food banks. Once an alternative is selected, a project implementation plan will specify the standard operating procedures for many aspects of the project, including handling and donating mountain goat carcasses and useable meat, if the selected alternative includes a lethal removal action. If so, a full list of interested tribes would be included.

Impact Topic – Part One: Cumulative Impacts

Concern 44: One commenter asked if there was monitoring of plant communities in remote areas where mountain goats are located. The commenter inquired if there are reportable results on the monitoring efforts.

Response: The NPS recently started a long-term monitoring project in alpine and subalpine areas. There are no results from that effort to date. In addition, the data collected about alpine and subalpine plant communities pertains to specific ecological indicators and the objective of those efforts is not directly related to mountain goat impacts.

Concern 45: One commenter reported that blue bags are no longer collected on the Blue Glacier moraine.

Response: The blue bag repository was removed in the fall of 2016. Blue bags are still available for use and are expected to be packed out by the visitor and deposited in receptacles at the trailhead. The park no longer flies out blue bags.

Concern 46: One commenter cautioned that the short timeline obscures the cumulative impact of the alternatives and ignores impacts of mountain goat maintenance activities in the future. The commenter

also suggested that agencies should announce the schedule for the first helicopter flights at the time of the record of decision (ROD).

Response: The timeline proposed and analyzed for initial management is 5 years and up to 20 years for the overall project, which includes any potential maintenance activities. Actions and potential impacts beyond 20 years would be too speculative to predict. The activities proposed for each year vary by alternative and are described in chapter 2 of the final plan/EIS. The windows in which helicopter use would occur are described for each action alternative. For alternatives B, C, and D these would be two separate 2-week periods in a given year: once in mid- to late July, and the second in late August to mid-September. In each alternative description in chapter 2, the final plan/EIS has been updated to include more detailed information on the estimated number and hours of helicopter flights proposed for initial management in wilderness on the Olympic Peninsula. Maintenance activities under the preferred alternative are described on page 57 of the final plan/EIS and would include lethal removal of the remaining mountain goats. It is expected that these maintenance activities would be infrequent and of short duration, due to the removal of the majority of the mountain goats under initial management. An analysis of impacts to mountain goats from initial management and future maintenance activities is included in chapter 4 of the final plan/EIS. Although there would be monitoring of translocated mountain goats in the North Cascades forests, there would be no planned maintenance activities.

Maintenance activities on remaining mountain goats are long-term direct impacts of the project itself; they are not cumulative impacts. The NPS NEPA Handbook (NPS 2015: 62) states, “A cumulative impact is an ‘impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. A cumulative impact analysis must consider the overall effects of the direct and indirect impacts of the proposed action, when added to the impacts of past, present, and reasonably foreseeable actions on a given resource.” The beginning of chapter 4 of the final plan/EIS presents the “Cumulative Impact Scenario,” which describes all of the actions that could incrementally impact resources affected by the project alternatives. The cumulative impact analysis for each alternative considers all of these actions.

The NPS would comply with NEPA and implement the 30-day no-action period starting with the release of the final plan/EIS. Once the 30 days have passed the ROD would be signed and implementation can begin. It is not feasible to announce specific dates at the time the ROD is published due to the need for flexibility in timing and use of release sites and staging areas to allow wildlife managers to make decisions that account for human and mountain goat safety during flight operations while providing for the long-term success of the project. The minimum requirements analyses and final plan/EIS describe how the NPS and cooperating agencies would provide information to the public in advance of management activities through agency websites and trailhead signs.

As described in the Executive Summary of the final plan/EIS, the actions proposed on National Forest System lands are subject to the USDA Forest Service’s pre-decisional objection process at 36 CFR 218 Subparts A and B. The USDA Forest Service will circulate a draft decision document (draft ROD) prior to initiation of the objection period and signing of the final decision document (ROD).

Impact Topic – Part One: Mountain Goats

Concern 47: Commenters noted that the mountain goat, possibly being at Olympic National Park for a century, is part of the ecosystem and may contribute beneficially to the natural habitat with spreading seeds from what they eat as well as being a source of food for prey. Commenters questioned why

wilderness and biosphere reserve designations, made when mountain goats were in the park, apply even with the presence of mountain goats. One commenter referenced the publication *Anthropocene Magazine*, noting that mountain goats should remain at Olympic National Park to prevent further decline in functional large groups of herbivores. One commenter noted that having a stable mountain goat population in Olympic National Park could save the species as a whole from dangerous decimation of one geographic group, such as a parasite or disease, in the future.

Response: When compared to evolutionary time, 90 years is a very short period. Mountain goats have not co-evolved with this ecosystem as have the native deer and elk, and numerous species of endemic plants and wildlife.

A major benefit of the preferred alternative is to build up population numbers and increase genetic diversity in portions of the Cascades forests where they are native and depleted. This would further support strong and resilient mountain goat populations in an area that is more resilient to climate change. The Cascade Range is more extensive and has a greater elevation range than the Olympic Range (Mt. Olympus is less than 8,000 feet in elevation, whereas Mt. Baker is 10,781 feet in elevation.)

The Biosphere Reserve and World Heritage Site designations apply even with the presence of mountain goats. When the park was recommended for inclusion as a World Heritage Site in 1981, UNESCO recognized that the presence of nonnative mountain goats was a threat to the integrity of the site. Although the presence of exotic mountain goats impacts the wilderness character of federal lands on the Olympic Peninsula, the wilderness designations remain intact.

Concern 48: One commenter asked about the historical population distribution and if the mountain goat population has ever been larger than the current count.

Response: Over 1,000 mountain goats were estimated to be in the park following the 1983 mountain goat survey. For a discussion of this survey, and mountain goat distribution patterns at that time, refer to Houston et al. 1994 (the monograph).

Concern 49: Commenters discussed genetics in regard to translocating mountain goats from Olympic National Park to the North Cascades forests and noted the following concerns or questions:

- One commenter stated that translocating mountain goats from the Olympics to the North Cascades would dilute the native subspecies of mountain goats in the Cascades. A second commenter stated that if the North Cascades population needs to be augmented, the relocated mountain goats should come from within the North Cascades where populations are abundant, such as Chowder Ridge near Mount Baker.
- One commenter questioned whether other reasons for genetically stagnant herds, such as environmental, geographical, or vegetative restrictions, have been studied since the plan/EIS states that translocated mountain goats will improve the genetics of stagnant populations. Another commenter asked how importing hybridized mountain goats is consistent with section 4.4.4.2 of *NPS Management Policies 2006* (NPS 2006).
- One commenter encouraged NPS and state collaborators to engage in scientific studies and long-term monitoring to document effects of the proposed translocated mountain goats, particularly as related to genetics of Cascade mountain goat populations.
- One commenter stated that the Olympic mountain goat population is likely to differ genetically from both source Alaskan and local native North Cascades mountain goats. The commenter stated that a WDFW report states that genetically less diverse populations grow at the highest rates,

which disproves the hypothesis that lack of genetic diversity is depressing mountain goat recovery in the Cascades.

One commenter questioned the genetics of mountain goats on the Olympic peninsula relative to native populations found within the North Cascades and questioned if Executive Order 13112 was applicable to the proposed action.

Response: Mountain goats represent a unique taxon within the Caprinae subfamily of Bovidae (Shafer and Hall 2010). Although earlier biologists had considered up to four subspecies of mountain goat, rigorous justification or quantification never supported classification to the sub-specific level. Cowan and McCrory (1970) found insufficient spatial differentiation among skull characteristics to support any sub-specific designations, and investigators have thereafter accepted that the species exists as a single taxonomic unit (Côté and Festa-Bianchet 2003). The Cascades Range represents the southernmost extension of the western portion of historical mountain goat range (with a similar southerly extension existing in the Rocky Mountain states). As is clarified elsewhere in this document, mountain goats on the Olympic Peninsula originated from southeastern Alaska and from the Selkirk Range of southeastern British Columbia.

Despite lack of obvious morphological variation that would support recognition of subspecies, mountain goats do possess quantifiable differentiation at the genetic level. Shafer, Côté, and Coltman (2011) examined adaptively neutral microsatellites (i.e., those presumptively not under directional selection) from mountain goats throughout their native range (including the Cascades of Washington). They identified 17 geographic clusters of genetic similarity, and concluded, based on the existence of two “hotspots” of genetic diversity, that mountain goats had survived glaciation in two refugia. Washington Cascades mountain goats were identified as one of the 17 clusters, although Shafer, Côté, and Coltman (2011) also noted that some animals classified to this cluster were similar to those in other clusters (e.g., Canadian Rockies) and vice versa. Unlike results from Baranof Island in Alaska however, no evidence for a relict population or significant endemism was found (Shafer et al. 2012a). Working with a regional data set, Parks et al. (2015) found, as had Shirk et al. (2010), that genetic relatedness was better explained by connectivity as defined by landscape features and habitats (i.e., isolation by resistance) than simply by distance. They also found that the Washington Cascades mountain goats were most closely related to mountain goats sampled from the coast ranges of British Columbia.

In contrast to evidence of population structure among neutral markers, a group of genes typically assumed to adaptive and under selection—those associated with immune function and disease resistance—was found to have very low diversity not only at Caw Ridge (Mainguy et al. 2007), but also throughout the entire geographic range, and to be unrelated to spatial juxtaposition (Shafer et al. 2012b).

Mountain goats are also a relatively low-density species, and because of habitat constraints, populations are susceptible to isolation, concomitant low effective population sizes, thus loss of genetic diversity (Ortego et al. 2011; Shirk and Cushman 2014). There is evidence that genetic diversity in mountain goats affects demography (i.e., survival and reproduction). In the most intensively studied population (Caw Ridge, Alberta), the probability of survival for yearling mountain goats was positively correlated with their levels of neutral heterozygosity (Mainguy, Côté, and Coltman 2009). Mountain goats in the Washington Cascades, considered on the whole, were found to have lower levels of genetic diversity (heterozygosity and allelic diversity) than all but one of the native populations investigated by Shafer, Côté, and Coltman (2011), and levels of genetic diversity generally declined from north to south (Parks et al. 2015), consistent with its geographic status as a peninsular population. Of particular concern is the resistance to gene flow associated with the Interstate 90 corridor (Shirk et al. 2010); genetic diversity is lowest among mountain goats south of the highway. Cowan and McCrory (1970) noted that skulls from three Washington Cascades mountain goats were missing the first two molars on one or more tooth rows,

and suggested the possibility of a genetic mechanism for these abnormalities. If so, however, it is difficult to imagine how missing two of three molars would constitute a selective adaptation; it seems more likely to have resulted from expression of deleterious alleles. The portions of the Washington Cascades to which mountain goats would be translocated have very few if any mountain goats (Rice 2012), and are therefore likely susceptible to genetic impoverishment resulting from small neighborhood size (Shirk and Cushman 2014).

Thus, moving mountain goats whose origins lie in the northern part of the range (i.e., from Olympic National Park) to the Washington Cascades in the southern part of the range, suggests potential for either positive or negative consequences. A positive consequence could occur if the addition of unrelated animals to the native gene pool acts to restore alleles that may have been lost due to drift, and is able to mitigate deleterious effects from inbreeding (i.e., ameliorate inbreeding depression). Conversely, an adverse consequence could occur if local adaptations possessed by mountain goats in Washington's Cascades exist, and these adaptations were to be swamped or overridden by maladaptive traits possessed by Olympic Peninsula mountain goats (i.e., causing outbreeding depression (Sexton, Strauss, and Rice 2011)).

A full understanding of which—if either—of these consequences is more likely would require years of in-depth ecological and genetic monitoring (and even then, would likely leave uncertainties). That said, the balance of evidence supports the view that, if there is any genetic consequence of the proposed translocation, it is more likely to be positive than negative. That is, introduction of genetic material from Olympic National Park mountain goats is more likely to ameliorate inbreeding depression of Cascades mountain goats (and thus contribute to demographic health and better equip populations to cope with future stresses including climate change), than to produce maladaptive traits in future populations. This assessment is based on the following logic:

1. Although population structure among mountain goats has been documented at the molecular level, evidence thus far is restricted to differentiation at selectively neutral genetic markers. Although the possibility of locally adapted traits among Washington Cascades mountain goats cannot be eliminated, available data provide no evidence that they exist, or if they exist, are substantial, important, or related to demographic health. In short, there is evidence of population structure at the molecular level, but no evidence for genetically based local adaptation among mountain goats likely to interfere with natural selection and evolutionary processes.
2. If maladaptive alleles existed among the founders of the Olympic National Park population that were sufficient to produce lower survival or reproduction, they would likely have already been purged by selection during the approximately 90 years since introduction.
3. Any maladaptive alleles that would have survived in the Olympic National Park population until the present would still be vulnerable to purging in the face of eventual competition with locally adapted genes within the 1,000–1,500 native mountain goats extant in the Cascades.
4. Mountain goats of northern origin have prospered not only in ecologically similar (albeit not identical) habitats of the Olympic Mountains, but also in a number of other states where they have historically been translocated.

The primary benefits to Washington Cascades mountain goat populations from translocation are expected to be demographic; genetic benefits, if any, are considered subsidiary. That said, if genetic restoration was the primary objective and if logistics and funding were not limiting, the best available source population would be the coastal ranges of southwestern British Columbia (Parks et al. 2015) where genetic diversity remains high (Shafer, Côté, and Coltman 2011). However, the logistics and costs (initially estimated at approximately \$10,000 per individual animal) of acquiring these mountain goats, as well as the inherent limitations of those coastal British Columbia populations to provide animals, would greatly compromise

any genetic benefits. At best, only a few animals could be translocated, and experience suggests that only translocations of a large number of animals into each receiving patch are likely to result in breeding populations (Harris and Steele 2014).

NPS hopes to follow the translocations with research and monitoring of the effects of the translocation on mountain goat demography and genetics in the Cascades forests. However, funding for that research has not been secured. A foundation for that research will be laid through tracking movements and survival of mountain goats through the use of radio collars and ongoing aerial surveys.

Executive Order 13112, “Safeguarding the Nation from the Impacts of Invasive Species” applies to all federal agencies, including the NPS and the USDA Forest Service. The preferred alternative in the plan/EIS is consistent with the goals of Executive Order 13112 because it proposes to remove mountain goats from Olympic National Park and Olympic National Forest, where they are considered an exotic species. Mountain goats are considered a native species in the Cascade Range, so the action of augmenting an existing native species is also not in conflict with Executive Order 13112.

Concern 50: Commenters requested that the final plan/EIS include additional information on the existing mountain goat population in the Cascades Range, including the causes of the declining mountain goat population. Another commenter stated that no evidence is provided in the draft plan/EIS to support the conclusion that mountain goat populations in the North Cascades forests remain small, isolated, and unlikely to recover without additional reintroductions and/or augmentation. As a result, commenters requested a variety of actions that should take place in the Cascades Range instead of translocating the Olympic mountain goat population. Suggestions included performing an assessment on the carrying capacity of the mountain goat population, limited or elimination of hunting under WDFW, change in recreation use management, improving fragmented habitat, addressing barriers to movement such as highways or railroads, and improving marginal winter range. One commenter questioned who was responsible for deciding the appropriate number of mountain goats in an area. One commenter stated that the final plan/EIS should explain why earlier translocations did not result in the desired population goals, and how the agencies expect different results from the proposed translocations for this project.

Response: Neither existing documentation nor feasible analyses allow for a detailed, site-specific assessment of the historical carrying capacity of mountain goats for any given area within the North Cascades forests. Johnson (1983) estimated the number of mountain goats outside of national parks in Washington at 8,555 in 1961 (10,355 if including national parks); Rice (2012) estimated a total of between 2,400 and 3,200 mountain goats in 2007, including the three national park units. WDFW (unpublished data), using updated estimates where available and Rice (2012) where no additional information existed, estimated between 2,360 and 3,370 mountain goats as of 2017 in the North Cascades forests exclusive of national parks. Even if the numbers used by Johnson (1983) to characterize the pre-reduction mountain goat population in Washington are too high by a factor of two, it is clear that, as of 2017, mountain goats were considerably less abundant in the North Cascades forest than was the case historically. For example, Johnson (1983) thought there may have been 300 mountain goats in the South Methow area, where the best assessment is that there are 23–36 currently in the area. Similarly, Johnson (1983) believed that the greater Glacier Peak area might have held as many as 550 mountain goats but most recent estimates indicate that 73–112 mountain goats are in this area, and that the Snoqualmie area may have held as many as 450 mountain goats, where the current estimate is only 40–60. Thus, it is believed that, on balance, an addition of as many as 350 mountain goats contributed by the Olympic Peninsula is well within the capacity of the North Cascades forests to absorb. Harris and Steele (2014), based on a survey and evaluation of 70 historic translocations of mountain goats into native range, recommended that at least 25–30 mountain goats should be released within each individual release area in order to achieve a high likelihood of long-term success. Estimates WDFW made of potential population size within each translocation patch are shown in table 4 of Appendix I in the final plan/EIS.

The population of mountain goats in the North Cascades forests of Washington is considerably lower than its estimated long-term capacity (Rice and Gay 2010; Rice 2012; Harris 2016), and is patchily distributed. Although some areas of the North Cascades forests harbor mountain goat populations sufficiently abundant to sustain limited sport-hunting, other areas remain depressed, and are unlikely to recover for many decades absent a program to provide additional animals.

WDFW began decreasing the number of hunting permits (which were primarily located within the Cascades Range) in the 1970s (Rice and Gay 2010), and the decline continued until leveling off with the advent of new management plans in the 2000s. Some populations responded to the reduction in harvest, and have grown to the point where they support a modest recreational harvest (less than 4% of total mountain goats above kid age, with less than 30% of those removed being females), but most remain depressed. Where hunting takes place, mountain goats have recovered, and hunting at this level has a very modest impact on local population growth. Hunting does not take place where mountain goats have not recovered, and these are the focal areas for reintroduction, augmentation, and recovery. Even if WDFW were to further restrict or eliminate entirely recreational hunting where currently implemented, other mountain goat populations would receive very little if any benefit.

Mountain goat habitats, particularly in summer, are patchily distributed, and fragmentation is a long-term genetic concern. Shirk et al. (2010) and Parks et al. (2015) showed that the Interstate 90 corridor, in particular, is a partial barrier to long-term movement of genetic material between mountain goats North and South of it. Efforts are currently underway to provide safe movement pathways across the Interstate 90 corridor in and near the Snoqualmie Pass area (for example, refer to <https://i90wildlifewatch.org/>). Within the North Cascades region itself, most resistance to movement of genetic material results from factors beyond management control, in particular, distance to escape terrain (Parks et al. 2015: 1204); highways and railroads do not appear to be important factors in constraining movement or population growth in mountain goats within the North Cascades forests. The assessment is that the ability of management to decrease naturally occurring fragmentation of mountain goat habitat is very limited. However, mountain goats do occasionally move across atypical habitats; such movements become more likely when population densities in the source area are higher (Shafer, Côté, and Coltman 2011). Thus, an indirect way to reduce the negative effects of naturally occurring fragmentation is to bolster source populations.

Most mountain goats descend in winter to lower elevations, albeit they are still constrained by their need for proximity to escape terrain (Rice 2007; Poole and Heard 2003) and warm aspects. Rice and Gay (2010) found little support for hypotheses that winter habitat modification or fire suppression were causes of the large reduction in mountain goats seen in Washington during the 1950s through the 1980s. Relationships with specific age classes, volume classes, and types of forest cover during winter have been found to be weak and inconsistent (Taylor, Wall, and Kulis 2006; Poole, Stuart-Smith, and Teske 2009). It is therefore not clear which winter ranges the commenter considers to be marginal, or how they might be improved to enhance mountain goat populations.

Concern 51: One commenter specifically noted that that routine helicopter use in a wilderness area to facilitate wildlife population augmentation would set a precedent and appears to be based on WDFW goals and a desire for increased hunting opportunities. The commenter cited the court case *Wolf Recovery Foundation v. U.S. Forest Service* (692 F.Supp.2d at 1270) as support for why these prohibited actions in wilderness would not be justified. One commenter stated that the plan/EIS does not demonstrate the need to translocate mountain goats to the North Cascades forests.

Response: The Wilderness Act prohibits motorized equipment, mechanical transport, and landing of aircraft in wilderness areas except as necessary to meet the minimum requirements for administration of the area for the purpose of the Act. The use of helicopters in wilderness for any purpose is therefore not

routine and may only be allowed if it is found to be the minimum requirement necessary for administration of the area as wilderness. Minimum requirements analyses have been prepared for Olympic National Park, Olympic National Forest, and the North Cascades national forests wilderness areas to determine the necessity of action for the administration of the area as wilderness as well as to determine the minimum tool for that action (refer to appendix E in the plan/EIS). For each area, action in wilderness was determined to be necessary for the administration of the area as wilderness, specifically for the preservation of wilderness character.

Helicopter use (with limitations including the number, timing, purpose, and location of flights) was determined to be the minimum tool for both capture of mountain goats on the Olympic Peninsula and release of mountain goats in the North Cascades forests. Suitable habitat for mountain goats occurs predominantly within designated wilderness for all areas covered in this final plan/EIS. Additionally, the safety risks posed to personnel by rough and remote terrain could not be fully mitigated.

USDA Forest Service policy for wilderness management at FSM 2323.33a permits the use of motorized or mechanical transport for reintroduction of indigenous wildlife species if it is impossible to do the approved reintroduction by nonmotorized means. In the North Cascades, translocation of mountain goats would restore an indigenous species, consistent with USDA Forest Service policy for wilderness management at FSM 2323.33a. While translocation is a trammeling activity with short-term negative effect on the untrammled quality of wilderness character, the restored mountain goat populations would have a long-term positive effect on the natural quality of wilderness character in the North Cascades forests.

Mountain goat management goals for the state of Washington are described in WDFW's Game Management Plan (WDFW 2015). The first statewide goal is to "perpetuate and manage mountain goats and their habitats to ensure healthy, productive populations and long-term genetic connectivity." Mountain goats are classified as a game species under Washington State law, but are also managed for many other purposes such as scientific study, Native American cultural uses, wildlife viewing, and photography (WDFW 2015). Objective 70 of the Game Management Plan is specifically directed at determining the need for augmentation of mountain goats in the North Cascades forests. Recent mountain goat research supports the need to translocate mountain goats to suitable habitats in the North Cascades forests, as supported by the Game Management Plan.

The population of mountain goats in the North Cascades forests is considerably lower than its estimated long-term capacity (Rice and Gay 2010; Rice 2012; Harris 2016), and is patchily distributed. Although some areas of the North Cascades forests harbor abundant mountain goat populations, other areas remain depressed, and are unlikely to recover for many decades absent a program to provide additional animals. The objective of translocating mountain goats from the Olympic Peninsula to selected areas within the North Cascades forests is to bolster the native population, particularly in regions where habitat appears adequate but native populations have remained low. The long-term goal is to provide demographic and genetic connectivity, such that the North Cascades forests will support close to the number of mountain goats controlled by its habitat capability. As described above, the most suitable mountain goat habitat in the North Cascades forests is located in wilderness and the only way to reasonably access those areas requires the use of helicopters.

Although, according to state law, mountain goats are game species and mountain goat hunting is permitted in the North Cascades forests, it is unlikely that any areas selected for translocation would be the subject of recreational harvests authorized by WDFW for at least 25 years or more following translocation. While increasing hunting opportunities is not an objective of this final plan/EIS, taking action to increase mountain goat herds to allow for future recreational hunting would be appropriate in light of WDFW's statewide wildlife management goals.

Concern 52: The commenter stated that the draft plan/EIS is missing the analysis on effects of random reductions on the population, for example removal of males versus females.

Response: The purpose in taking action is to allow the NPS to reduce or eliminate impacts on park resources from exotic mountain goats, while reducing potential public safety issues associated with the presence of mountain goats in the park. The only feasible and practical way to do this is to target both sexes of mountain goats. Selection of just one sex for removal would not be possible, as both sexes look alike except upon close examination when they are in hand (and after they have already been captured or killed). In addition, just translocating one sex would not recover populations in the Cascades Range where mountain goats are absent.

Concern 53: A commenter provided technical corrections to the mountain goat affected environment and analysis, noting that the plan/EIS should be corrected because it currently states that mountain goats are found at elevations between 3,986 feet and 5,862 feet, but mountain goats can be found over 7,000 feet in elevation, in places such as the Mount Constance massif, Mount Deception, and the Needles.

Response: The suggested edit was noted and the text in the final plan/EIS was revised to state that mountain goats can be found above 3,900 feet in the summertime.

Concern 54: One commenter suggested a revision to the text of the analysis under alternative C, regarding extinction versus extirpation of the mountain goat population on the Olympic Peninsula (pages 135–136 of the draft plan/EIS).

Response: The suggested edit was noted and the text in the final plan/EIS was revised by changing “extinct” to “extirpated.”

Concern 55: Commenters requested that the draft plan/EIS include analysis of impacts to North Cascades National Park as well as Mt. Rainier National Park, because mountain goats may stray into these areas after relocation. Another commenter stated that the USDA Forest Service concluded that high population density and resource limitation may prompt male mountain goat dispersal into new territories. The commenter suggested that this conclusion be discussed within the final plan/EIS.

Response: Analyses of habitats in North Cascades and Mount Rainier National Parks were not included in the draft plan/EIS because they were not on the list of candidate sites for mountain goat releases (refer to appendix I in the final plan/EIS), and hence would not be affected by release activities. As stated earlier (refer to the concern 42 response), at North Cascades National Park there is not enough high-quality mountain goat habitat to make it a high priority for translocation. Conversely, Mount Rainier National Park was not included in the analysis because the population there is large enough that it did not warrant augmentation. If, in 20–30 years (refer to the concern 5 response for a discussion on mountain goat population growth rates), the mountain goat population in the release areas grow to the point that males or females disperse into North Cascades or Mount Rainier National Parks, it will have no significant effect on those ecosystems, as mountain goats are native there.

Concern 56: One commenter stated that the draft plan/EIS does not adequately address stress responses by mountain goats during translocation or handling. The commenter specifically noted that the draft plan/EIS arbitrarily dismissed the effects of the preferred alternative as being short term and a minimal adverse increment to the overall cumulative impact in the long term, when it is instead heavy-handed, ongoing wildlife management that can detrimentally impact wilderness and mountain goat populations.

Response: The mountain goats would experience some stress and wild animals are able to handle some level of stress. Stress reducing drugs would be used on captured mountain goats (e.g., midazolam,

haloperidol). These levels of stress, which cannot be quantified, would be minimized through (1) using only experienced, professional crews in capture operations; (2) having veterinarians at receiving staging areas to attend to any injuries that can be treated; (3) using professional ethics and vetted handling procedures to minimize stress at all times; (4) using refrigerated trucks to keep animals cool and away from distracting sights and sounds during translocation; and (5) administering the proper dosage of midazolam hydrochloride and haloperidol to mountain goats while in transit. Both of these drugs were successfully used on mountain goats translocated from eastern Oregon to lands owned by the City of Seattle in the North Cascades Range in summer 2016. After being released in the North Cascades forests, there is no plan to capture these individuals again for any reason.

Once the mountain goats are completely removed from Olympic National Park there would no longer be ongoing management within the park (i.e., no more helicopter flights to lethally remove mountain goats, to conduct mountain goat census surveys, or to collar mountain goats for tracking purposes; no more collaring of mountain goats for research; no more annual hazing of mountain goats; and no more area closures due to human-mountain goat conflicts), which is a major benefit of the preferred alternative (as well as alternative C) in that the exotic goats would be removed and the natural quality of wilderness character would be greatly enhanced as well as provide long-term beneficial impacts on the untrammelled, undeveloped, and opportunities for solitude and unconfined types of recreation qualities. The impacts assessed with this action are considered short-term as the flights would occur for two 2-week periods over the course of 2–3 years, and up to no more than 5 years. There may be random additional flights in subsequent years in the park for maintenance activities if there is a small remaining population of mountain goats (i.e., the potential for 10% to remain given difficulties in reaching full removal due to staff safety and location of mountain goats) and that population begins to expand instead of phasing itself out as anticipated.

In the North Cascades forests, translocation of mountain goats would restore an indigenous species, consistent with USDA Forest Service policy for wilderness management at FSM 2323.33a. As the minimum requirements analyses for the North Cascades national forests describes, although translocation is a trammeling activity with short-term negative effect on the untrammelled quality of wilderness character, the restored mountain goat populations would have a long-term positive effect on the natural quality of wilderness character.

Refer to page 228 in the final plan/EIS with regard to the analysis of the impacts of flights within the North Cascades forests on mountain goats that already reside there.

Concern 57: One commenter discussed the possible adverse impacts of collaring mountain goats. The commenter noted that tracking collars have been shown to impact survival rates in caribou and may have the same detrimental impacts on mountain goats. The commenter noted that the plan/EIS should discuss these issues and should further explain why other less-intrusive monitoring methods could not be used.

Response: WDFW considers it a professional responsibility to understand, to the degree feasible, the progress of the translocation project, both to refine and improve its own operations and methods, and to report to the funders and the scientific community generally. To accomplish this, radio collars that send GPS-acquired locations to satellites (which then relay that information to investigators) are acknowledged as the safest and most effective means to learn if mountain goats are alive, and if so, where they are located. (Ground-based investigations can be important to gain additional information, but these require information on the locations of mountain goats.) At the same time, it is acknowledged that placing radio collars on animals can be stressful.

Wildlife scientists have attempted to learn whether, and under what conditions, radio collars (or other devices that must be attached to animals) affect behavior, breeding activity, or survival. Opportunities for

conducting rigorous investigations on the effects of collars on free-roaming ungulates are limited, because instrumenting with radio collars is typically a prerequisite to quantifying behavior, breeding success, and survival; it is rare that one can obtain comparable data with un-instrumented animals.

Studies have generally shown that the weight of the collar (or similar device) is an important determinant. Lightweight attachments have generally been shown to have negligible or undetectable effects on animals, whereas negative effects have been documented when devices are heavier. For example, Brooks, Bonyongo, and Harris (2008) documented reduced travel when foraging among plains zebras (*Equus burchelli*) when equipped with collars greater than 0.6% of total body mass compared with those equipped with collars two-thirds as heavy. Rasiulis et al. (2014) documented an 18% reduction in survival of caribou (*Rangifer tarandus*) already in poor condition equipped with heavy radio collars (approximately 1.6% of animal body weight) compared with those wearing a lighter version (approximately 0.3% of animal body weight). GPS collars intended for use on mountain goats are approximately 1.1% of body weight for nannies and 0.6% for billies.

Concern 58: One commenter stated that the draft plan/EIS does not analyze a USDA Forest Service study that describes the extent to which past fire suppression may have limited recovery of mountain goat populations in the North Cascades forests, as fire in alpine and subalpine habitats may lead to increases in mountain goat populations. The commenter suggested that the effects of fire and fire suppression in relation to mountain goat population management should be analyzed in the plan/EIS, and currently the draft plan/EIS translocation plan is not consistent with the USDA Forest Service policy recommendation to consider the combined management strategy of prescribed fires and mountain goat population restrictions as a method of increasing mountain goat populations.

Response: There probably has been some impact from fire suppression on mountain goat forage and cover, however past fire suppression activities are not expected to negatively affect mountain goat translocation success, and are not expected to have greatly suppressed mountain goat recovery following years of no hunting, throughout all the designated reintroduction areas. Fewer fires occurred historically on the west slope, where most of the proposed translocation areas are located, which generally has long fire return intervals. Due to long return intervals, fire effects to mountain goats and their habitat is less pronounced than in other drier ecosystems.

Impact Topic – Part One: Wilderness Character

Concern 59: One commenter stated that the presence of mountain goats is much more damaging to wilderness overall than the proposed mountain goat removal actions. The commenter stated that the analysis of impacts to wilderness associated with these two actions are presented equally in the plan/EIS, and that this was confusing. The commenter subsequently disagreed with a statement in the plan/EIS regarding mountain goat removal as an action that would trammel wilderness, and felt that the removal of nonnative mountain goats will ultimately protect and restore the quality of untrammelled wilderness. The commenter also requested clarification on the cumulative impact conclusion sentence on page 146 of the draft plan/EIS, regarding the overall environmental consequences of alternative D to wilderness character, stating that the wording makes it difficult to understand.

Response: Removal of mountain goats from wilderness is an intentional manipulation of the biophysical environment and therefore constitutes a trammeling (Landres et al. 2015). Sometimes, as in this case, the act of trammeling benefits another quality of wilderness character. The removal of the exotic species would restore or enhance the natural quality of wilderness character. Also, the absence of this exotic species would eliminate the need for mountain goat management activities (such as hazing or lethal

removal of nuisance or hazardous mountain goats) that would use helicopters. This would therefore eliminate a source of noise disturbance as well as the need for area closures, thus enhancing opportunities for solitude and primitive or unconfined recreation. The plan/EIS discloses all impacts to wilderness character, including those that result in both beneficial and adverse impacts to wilderness character.

Concern 60: Commenters felt the use of helicopters in designated wilderness areas in the Olympic Peninsula is in violation of the Wilderness Act and should not be allowed under the minimum requirements for administration exception. Commenters stated that the Wilderness Act does not require agencies to remove nonnative species if removal would negatively impact wilderness.

Commenters requested that the final plan/EIS include the total number of flights (including takeoffs and landings, and hours over wilderness) to demonstrate compliance with a minimum requirements analysis for all action alternatives and allow readers to compare alternatives. As a result, commenters requested that the NPS incorporate an alternative that does not involve the use of helicopters in the park to prevent impacts (such as trammeling) to wilderness areas. Commenters requested that the NPS consider elements such as mountain goat removal by foot or nonmotorized mechanisms and other alternatives that are less harmful to wilderness.

One commenter specifically disagreed with multiple conclusions under alternative D, noting that adverse impacts from temporary motorized use is not offset by beneficial impacts from the removal of nonnative species and that no alternative would completely eradicate mountain goats from the park.

Response: The NPS retains discretion to determine management actions necessary for the administration of wilderness.

The Wilderness Act prohibits motorized equipment, mechanical transport, and landing of aircraft in wilderness areas except as necessary to meet the minimum requirements for administration of the area for the purpose of the Act. Use of helicopters in wilderness may be allowed only if it is found to be the minimum tool necessary for administration of the area as wilderness. Minimum requirements analyses have been prepared for actions proposed for the Daniel J. Evans Wilderness in Olympic National Park, for five wilderness areas on the Olympic National Forest, and for three wilderness areas on the North Cascades forests to determine whether the action was necessary for the administration of the areas as wilderness as well as to determine the minimum tool (refer to appendices E and F in the final plan/EIS). These minimum requirements analyses have been revised based on public comments and are included in the appendix of the final plan/EIS. For each area, it was determined that action in wilderness was necessary for the administration of the areas as wilderness specifically for the preservation of wilderness character. In particular, this action would lead to the long-term enhancement of all four universal qualities of wilderness character (untrammeling, natural, undeveloped, and opportunities for solitude and primitive or unconfined recreation). The removal of all exotic mountain goats from wilderness areas on the Olympic Peninsula would greatly enhance the natural quality of wilderness character, would eliminate trammeling activities that occur for the management of a nonnative species, would eliminate the need for future, indefinite helicopter flights to lethally remove nuisance or hazardous mountain goats, and would eliminate the need for area closures due to human-mountain goat conflicts. The agencies acknowledge that there would be short-term adverse impacts from helicopter use. However, in the long term, all universal qualities of wilderness character would be greatly enhanced after the removal of the mountain goats. For all areas, helicopter use—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given the importance that mountain goat translocation take place in alpine habitats that mountain goats require during summer, the importance of releasing as many mountain goats as possible into each selected area at each event, and the safety risks posed to personnel by the remote and rugged terrain. Throughout chapter 2, the final plan/EIS has been updated to

include more detailed information on the estimated number and hours of helicopter flights proposed over wilderness on the Olympic Peninsula.

The removal of exotic mountain goats from the Olympic Peninsula also supports the following five of the six public purposes of wilderness as noted in section 4(3)(b) of the Wilderness Act: conservation, scenic, recreational, scientific, and educational. The discussion can be found within the minimum requirement analysis for Olympic National Park (refer to appendix E in the final plan/EIS).

The Organic Act of 1916, which established the NPS, states that, “[the] purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” By removing nonnative mountain goats from Olympic National Park, the opportunity for impairment of sensitive resources (such as heather huckleberry communities and archeological resources) would be avoided. The removal of nonnative mountain goats would also reduce the impacts on visitor enjoyment of all the park’s resources (i.e., no further hazing, lethal removal, or human-mountain goat interactions). Also, as mountain goats remain on the landscape and there continues to be human-mountain goat encounters, habituated and aggressive mountain goats would continue to be hazed and may eventually be lethally removed which may require the intermittent use of a helicopter and could take place in marbled murrelet or spotted owl habitat during nesting season. The protection of these species is directed by the Endangered Species Act. With the continued presence and increase in exotic mountain goat populations, archeological resources have been and would continue to be unearthed and possibly damaged from wallowing. The protection of these resources is guided by the National Historic Preservation Act.

The Wilderness Act, section 2(a), states, “...and these areas shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment of wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness...” Section 2(c) of the Wilderness Act provides a definition of wilderness, “A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” The presence of exotic mountain goats within the Daniel J. Evans Wilderness represent a “work of man” given they were purposely introduced to the Olympics in exchange for Roosevelt elk in the 1920s. As exotic mountain goat populations increase, their presence becomes more widely distributed within the Daniel J. Evans Wilderness, as do their impacts on sensitive vegetation, archeological resources, and visitor enjoyment. An unchecked population of exotic mountain goats in the Daniel J. Evans Wilderness could eventually lead to the impairment of the park’s natural, and subsequently wilderness, resources. Impairment of these resources is prohibited by both the Organic Act of 1916 and the Wilderness Act.

The alternatives analyzed in the draft plan/EIS were constructed to reduce impacts to wilderness character as much as practicable while also addressing all other applicable laws, policies, regulations, and the overall objectives of the plan. The planning team considered and dismissed options that do not involve helicopter use, because those alternatives would not be feasible given that the majority of mountain goats reside in alpine habitats during the summer; the importance of releasing as many mountain goats as possible into each selected translocation area for each event in an effort to reduce impacts on wilderness character as well as reduce pressure on available resources (time, staff, and funding); and the safety risks posed to personnel by the remote and rugged terrain. The final plan/EIS has incorporated options that reduce helicopter use in alternatives C and D in an effort to limit the short-term adverse impacts on wilderness character. Also, under alternatives C and D, park staff and other personnel would access wilderness areas on foot to lethally remove exotic mountain goats in all areas that are accessible by foot.

To remove nonnative mountain goats by ground-based efforts only would take a tremendous amount of time and resources and even with these resources, would likely be impossible. Without the use of helicopters to remove mountain goats, the population would increase more rapidly than removal efforts would be able to address. This would lead to further, long-term damage to wilderness resources and increased issues with visitor experience, and may eventually lead to impairment of the park's natural and wilderness resources. The minimum requirements analyses in the final plan/EIS have been updated to more thoroughly address the necessity for helicopter use in carrying out this wildlife management action.

Refer to the concern 82 response regarding the use of helicopters in wilderness areas in the North Cascades forests.

Concern 61: One commenter stated that preserving wilderness character should be a defined objective of the plan and would provide an improved framework and argument that more strongly supports the elimination of mountain goats from the park.

Response: Preservation of wilderness character *is* a stated objective of the plan (pages ii and 2 in both the draft plan/EIS and final plan/EIS).

Concern 62: One commenter noted that the draft plan/EIS incorrectly attributed the definition of wilderness character to the 1964 Wilderness Act defines. The commenter provided the correct citations as well as recommended replacement text for the final plan/EIS.

Response: The commenter is correct. This quote is not from the Wilderness Act. This quote is from page 6 of "Keeping it Wild 2: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System" (Landres et al. 2015) and this change has been made in the final plan/EIS.

Concern 63: One commenter noted that mountain goats should be considered special features of value since they predate park establishment. The commenter used the example of reconstructed shelters in wilderness areas of the park that are historic in nature and therefore deemed compliant with the Wilderness Act even though structures are prohibited. The commenter noted that the Wilderness Act does not prohibit established wildlife populations.

Response: The "Other Features of Value" quality of wilderness character for Olympic National Park includes only those qualities that are addressed in park legislation. Keeping it Wild 2 (Landres et al. 2015) provides guidance on what features should be considered "Other Features of Value." The guidance includes the following considerations: Is the feature specifically identified in the enabling legislation for the wilderness? Does the feature define how people think about the wilderness or how they value the wilderness? Is the feature nationally recognized or considered a priority heritage asset? The preservation of exotic species is not a mandate of the NPS, nor of the Wilderness Act. The protection of exotic mountain goats has not been included in either the park's enabling or wilderness designation legislations. While the Wilderness Act does not prohibit the existence of established wildlife populations, it also does not prohibit their removal.

Concern 64: One commenter disagreed with the cumulative impacts discussion for wilderness character under each alternative. The commenter requested that qualitative impacts on wilderness character from all three action alternatives be described as provided under alternative A, and that the text better describe that it is the quantitative impacts between all action alternatives that differ. The commenter also stated that the cessation of helicopter surveys is a positive impact to wilderness character, and that the text in the plan/EIS on page 146 should be corrected to reflect this positive impact. The commenter also requested short and concise analyses in this section of the text.

Response: In regard to the cumulative impact scenario and analysis, the impacts on wilderness character from past, present, and reasonably foreseeable future actions under alternatives B, C, and D would be the same as under alternative A. The cumulative scenario outlines actions that have occurred, are occurring, or may occur not relative to the actions described in the alternatives. The cumulative scenario are those actions that are independent of actions described in the alternatives for the draft plan/EIS, but that may add additional impacts to the impacts described for the alternatives in the plan. So, all the alternatives would have the same baseline cumulative scenario, but the *conclusion* of those impacts may be different based on a combination of the cumulative scenario with the actions for each alternative (because the actions in each alternative are different).

The qualitative impacts differ on wilderness character for all three action alternatives.

The commenter misunderstood the sentence, “Furthermore, future helicopter-based population surveys would become unnecessary, which negatively affect the undeveloped quality of wilderness.” This sentence has been changed to read, “Furthermore, future helicopter-based population surveys, which negatively affect the undeveloped quality of wilderness character, would become unnecessary.”

Concern 65: One commenter noted that the use of stock can spread nonnative plants into wilderness. The commenter stated that the proposed staging area at Sweets Field is comprised of nonnative grasses and weeds.

Response: There will not be any staging of stock at Sweets Field. The sentence on page 77 of the draft plan/EIS that reads, “While the seed of nonnative plants can be dispersed by wind and wildlife, human clothing and equipment are also vectors for dispersal” has been changed to read, “The seed of nonnative plants can be dispersed by wind and wildlife; in addition, livestock, human clothing, and equipment can be vectors for dispersal.” (Refer to page 81 of the final plan/EIS.)

Impact Topic – Part One: Wildlife & Special Status Species

Concern 66: Commenters requested additional information about vegetation that supports wildlife. One commenter inquired about the current impact of mountain goats on vegetation, and inquired if data or evidence exists of other mammals in the subalpine/alpine areas of the park that have been impacted by lack of vegetation as a result of mountain goat activity. Another commenter suggested a post-action analysis of the native plant and animal community be conducted to record any changes to species that were previously impacted by mountain goat activity.

Response: The NPS has no additional information on vegetation impacts other than what is presented. No additional vegetation studies were conducted after 1992, principally because the mountain goat population was reduced to around 300 animals and was primarily restricted to remote and inaccessible areas making vegetation research effectively not possible. When the mountain goat population appeared to be increasing in 2005, the park’s limited research budget was focused on assessing mountain goat population trends and movement patterns. There is a need to act now, while the population is still less than 1,000 individuals, and vegetation and soils impacts are less than what was observed in the 1980s.

There is currently no funding in the project for post-action analysis of vegetation. Also, this would be difficult to accomplish as the intent of taking action now is to intervene before impacts revert to the levels in the 1980s.

There would not be any “rounding up of animals” and therefore no impacts to vegetation from such action. Capture by helicopter has no measurable impacts on vegetation.

Concern 67: One commenter inquired about predators of mountain goats and how those predators might be affected by the removal of mountain goats.

Response: As stated earlier, due to their habitat use patterns (use of cliffs) there is very little predation occurring on mountain goats. Consequently, removal of mountain goats would have no significant effects on predators on the Olympic Peninsula.

Concern 68: One commenter questioned whether the plan/EIS had adequately assessed the impacts of repeated low-level helicopter flights and net-gunning on wildlife.

Response: The effects of aerial activities (mountain goat capture and lethal removal) are addressed starting on page 154 of the final plan/EIS. There would be no discernible impact to other wildlife from the use of net guns for capturing mountain goats.

Impact Topic – Part One: Vegetation, including Special-Status Plant Species

Concern 69: Two commenters asked about vegetation restoration following removal of mountain goats from the park. One commenter indicated that vegetation on the Klahhane Ridge and large or severe wallows should be specifically treated, and that the NPS should include a comprehensive vegetation restoration plan in the final plan/EIS.

Response: The NPS does not have plans for future vegetation restoration activities in the park related to mountain goat damage as many sites would naturally recover after 20 years without mountain goats in the park, as witnessed after the mountain goat removals in the 1980s. There is a need to act now, while the mountain goat population is still less than 1,000 individuals and vegetation and soils impacts are less than what was observed in the 1980s.

Concern 70: One commenter requested that the NPS include more consistent nomenclature for milkvetch throughout the plan/EIS.

Response: The taxonomic status (nomenclature) of Cotton’s milkvetch (*Astragalus cottonii*) has been reviewed and made consistent throughout the entire final plan/EIS.

Impact Topic – Part One: Threatened or Endangered Species

Concern 71: One commenter requested that the NPS take protective measures at the Sweets Field staging area, which is close to potential habitat for the northern spotted owl. Additionally, the commenter advised implementing cautionary measures with the two southern staging areas (Mt. Ellinor and Hamma Hamma), which are within areas mapped as critical habitat for the northern spotted owl and the marbled murrelet because of potential impacts during the breeding season. Further, the commenter suggested restricting helicopter activities in the early mornings and late evenings during murrelet nesting season.

Response: The impacts of proposed operations on northern spotted owls and marbled murrelets at all proposed staging areas were evaluated. The five areas selected are far enough away from suitable habitat for there to be no impacts. There are specific flight paths from staging areas that the helicopter would be required to use in order to mitigate the potential for impacts.

Mountain goats are most often out in the open, and hence available for capture, in the early morning, therefore capture or lethal removal operations would need to take place near dawn.

Finally, surveys have been conducted for northern spotted owls in the Elwha Valley, and there are no longer any northern spotted owls near Sweets Field.

Impact Topic – Part One: Acoustic Environment

Concern 72: One commenter asserted that the consideration of wilderness buffer zones is unconstitutional per the Washington Park Wilderness Act of 1988 and should not be considered in the decision-making process. The commenter stated that this interpretation applies not only to those areas designated in the act, but to all wilderness areas in the state, and that the acoustic impact of actions in the non-wilderness staging areas should be considered only as they affect the staging areas themselves, not the adjacent wilderness. To do so would treat them as de facto “buffer zones” contrary to statutory intent.

Response: This analysis does not constitute a buffer zone. NEPA requires the disclosure of all impacts associated with an alternative. If the impact of an alternative extends beyond a boundary, it is important to disclose those impacts. Therefore, the disclosure of noise impacts on adjacent wilderness is not prohibited, but rather required.

Concern 73: One commenter indicated that the simultaneous operation of piston and turbine helicopters might produce a greater impact on the wilderness soundscape than what is discussed because of the different qualities of their sounds. The commenter suggested using a helicopter that can be quieted by a muffler. Furthermore, the commenter suggested that there is only minimal analysis of soundscape impacts in the plan/EIS and this should be studied more intensively.

Response: The NPS recognizes that different models of helicopters can produce differing levels of noise. However, as stated on page 37 of the final plan/EIS, the NPS anticipates using a Bell 206, Hughes 500, or similar type of helicopter because they are the appropriate size and have the necessary maneuverability to handle wildlife transport activities such as those proposed in the plan/EIS. Therefore, the NPS used the noise profile of a Bell 206 helicopter to estimate impacts to the acoustic environment of the park.

The draft plan/EIS did not specifically mention the interaction of two different helicopters operating at the same time and in the same vicinity. Although the NPS would like to have two separate helicopters in use during mountain goat translocation activities because it would make for a much more efficient operation, it is dependent on the availability of helicopters that the selected contractor has access to and the cost to the government. Ideally, a larger helicopter would be used for capture and darting and a second smaller helicopter would be used for spotting mountain goats and potentially moving crew around the project area. If the NPS were able to use two helicopters during aerial operations, they would not be flying in tandem so overall noise impacts would not necessarily be more intense than described in the draft plan/EIS. Also, with two helicopters in use, it is likely that the operations could be accomplished more quickly than using one helicopter, therefore reducing the amount of overall flight hours needed. Text has been added to page 37 of the final plan/EIS to indicate the potential for two helicopters participating in mountain goat management activities.

Furthermore, any aircraft used in the implementation of this plan must be approved by the Office of Aviation Services Aviation Safety Program. For aerial operations, the NPS would use private contractors, who would be the owners and operators of the helicopters. The NPS cannot dictate a specific helicopter type to be used, as long as the helicopter is approved by the Office of Aviation Services and is the appropriate type for capturing and translocating wildlife in mountainous terrain.

Impact Topic – Part One: Soils

Concern 74: Several commenters suggested additional data that should be presented and evaluated regarding soil erosion and inquired if there is a specific number of mountain goats or threshold under which soil degradation would be avoided. One commenter requested data that quantifies the amount of erosion that has been caused by mountain goats.

Response: Similar to studies of mountain goat impacts on vegetation (refer to the concern 66 response), there have been no further studies of mountain goat impacts to soils in the Olympic Range due to the decrease in mountain goat numbers following the removals in the 1980s. The NPS focused its limited research funds on monitoring the rebounding mountain goat population since 2005, and the desire to manage the mountain goat population now, prior to the mountain goat population growing to over 1,000 animals and causing significant, measurable impacts to soils. An exercise was not conducted to try to determine a specific number of mountain goats at which impacts would be acceptable, because there is no data for that effort, and any remaining mountain goat population under that management scenario would eventually increase. This scenario would be similar to the long-term effects of alternative B.

Impact Topic – Part One: Archaeological Resources

Concern 75: A commenter stated that there is evidence of Native American use of and association with mountain goats in the North Cascades forests, and requested that a better assessment of potential impacts of mountain goats on cultural or archeological sites in the North Cascades forests be conducted.

Response: A review of existing site data was conducted for the staging areas and release sites proposed on the Mt. Baker-Snoqualmie National Forest. There are no known significant archaeological or cultural sites in the proposed locations. In addition, the proposed staging and release activities do not have the potential to adversely affect cultural resources. In accordance with 36 CFR 800.3(a)(1), no consultation was necessary and the agency official has no further obligations under section 106 of the *National Historic Preservation Act*.

The activities of a native species on the landscape is not an undertaking as defined per 36 CFR 800.11. Therefore, the agency has no consultation responsibilities in regards to the presence of mountain goats and the National Historic Preservation Act.

Concern 76: One commenter noted that alternative A constitutes an undertaking under section 106 of the National Historic Preservation Act because there would be a change to the existing conditions. The commenter believes there would be continued deterioration and adverse effects under alternative A. The commenter further stated that there is no exemption for "no action" under section 106 of the National Historic Preservation Act.

Response: Alternative A would constitute an undertaking under section 106 of the *National Historic Preservation Act* because the mountain goats would remain and the mountain goat population in the park would increase over time. This would be expected to result in a continued and increased adverse effect on archeological sites, which would be a change in (worsening of) existing conditions. If this alternative is selected and implemented, robust consultation and coordination with the SHPO and affiliated tribes would take place to develop and implement a strategy combining archeological inventory, assessment, and mitigation sufficient to document and protect significant archeological resources to the greatest extent practicable.

The text on page 199 of the final plan/EIS has been revised to indicate that the selection of the no-action alternative would constitute an undertaking.

Impact Topic – Part One: Visitor Use and Experience

Concern 77: Commenters requested that the NPS consider the following items to mitigate impacts to visitor use under the preferred alternative: use only one release site in the North Cascades forests at a time, reduce trail closures where possible, terminate removal activities by helicopter if a visitor is present, provide advance notice of closures, and close the park for a month after the peak visitation season to complete all mountain goat management activities. One commenter requested that the impacts to visitors who study plants in the park should be included in the analysis.

Response: There are two reasons plans under alternative B and alternative D call for having two release sites (and associated staging areas) “active” at any given time during the operational window: (1) weather conditions may render one site inoperable, while another one may yet be used; (2) in order to maximize the probability of long-term success, the sex and age representation of mountain goats released at any given site should reflect a good mixture of males and females, older and younger animals. Because gender or age of mountain goats delivered to the receiving staging areas cannot be predicted, there must be the ability to adjust the selection of animals going to each area, and having only a single release site active at any given time would allow for no flexibility.

The preferred alternative mitigates impacts to visitors as much as is possible while still meeting the purpose and need of the plan. The NPS will provide advance notice of both trail closures and the potential for management actions (helicopter-based capture or lethal removal and ground-based lethal removal) in areas that are not closed. Areas where the NPS expects to have both a high density of mountain goats and visitors will be closed during capture operations (e.g., Klahanne Ridge, High Divide) to allow for safe, efficient and expeditious capture operations. Once mountain goats are removed from a closed area, the closure will be lifted. In areas where there are lower densities of both mountain goats and visitors there will be no closures and the operator will not capture mountain goats in close proximity to visitors. However, in order to minimize the number of closures needed, the NPS plans to have these areas open and visitors advised that if they do hike or camp in those areas during operation periods, they may either see or hear mountain goat management operations.

Refer to the concern 12 and 17 responses for a discussion on the seasonal timing of operations.

The NPS recognizes how important endemic and native plants are to botanists and other visitors and that the presence of mountain goats is a threat to sensitive vegetation in the park. The analysis discusses the impacts of mountain goats on park visitors in general, but the NPS does not believe that it is necessary to call out specific user groups. One of the purposes of taking action is to protect the native vegetation in the park.

Refer to the concern 90 response for a discussion of impacts to visitors at specific areas of the North Cascades forests.

Concern 78: Commenters stated that visitors enjoy seeing mountain goats in the park and that removing the opportunity to view mountain goats would result in significant impacts on visitor experience. Another commenter stated that aerial operations and potential presence of carcasses throughout the park from lethal removal activities would have significant adverse impacts to visitors, and requested that the analysis include greater emphasis on the impacts of lethal removal of mountain goats to both visitors and others outside the park.

Response: The hope is that park visitors would still enjoy seeing native wildlife (black-tailed deer, Roosevelt elk, black bears, and the endemic Olympic Marmots). If people wish to see mountain goats, they can visit parks or forests in the Cascades Range and see them in their native habitat.

There is no intention to leave rotting carcasses within sight or smell of visitors. There are several factors which would mitigate this: (1) Capture operations would focus on mountain goats near visitor use areas first. By the time removal operations would switch to lethal removal actions, most mountain goats near visitor use areas would be gone. (2) Lethal removal via ground operations would occur in the fall, after the peak visitor use season. Volunteers would be requested to carry as much meat out as they safely can. Remaining carcasses would be consumed by other wildlife or decompose over the winter. (3) Aerial operations would primarily be in remote and inaccessible areas far away from where visitors would encounter a carcass. If there are aerial lethal removal actions near visitor use areas, the contractors would be required to remove the animals if they can safely land nearby.

Concern 79: Commenters felt that the impact analysis related to visitor enjoyment of seeing mountain goats in the park is overstated and should not be a factor in the decision-making process. One commenter stated that the positive attributes and contributions mountain goats have to the park and visitor experience are not included in the plan/EIS.

Response: There are many different user groups that visit Olympic National Park, many of them with differing viewpoints and expectations for what they want to experience at the park. Throughout the planning process for mountain goat management, the public has expressed strong opinions regarding the presence of mountain goats in the park. Many visitors enjoy seeing mountain goats in the park and others would rather not encounter mountain goats during their visit. The NPS always tries to consider the viewpoints of multiple park users when undertaking a project that may impact visitor experience. The purpose and need for this project are centered around reducing the impacts of mountain goats on the natural resources of the park. Although the final plan/EIS acknowledges that there may be some changes to visitor experience that could result from implementation of the alternatives, these changes to visitor experience were not the focus of the project or the driver for the identification of the preferred alternative.

Impact Topic – Part One: Visitor and Employee Safety

Concern 80: Some commenters felt that the plan/EIS exaggerates the danger that mountain goats pose to visitors. Commenters stated that mountain goats do not threaten visitor and employee safety in the park and that typically, mountain goats do not approach people and do not frequent visitor use areas. Commenters stated that the limited human safety incidents that have occurred are not a basis to eliminate, remove, or translocate mountain goats from the area, and inquired why one fatality has prompted considerations of mountain goat removal from the park, and questioned the levels of aggression of mountain goats towards visitors.

Other commenters requested that the NPS provide clarification of the levels of harm mountain goats pose to visitors and employees in the park. Commenters stated that previous safety incidents between visitors and mountain goats were either minimized or omitted from the plan/EIS. Specifically, one commenter felt that the draft plan/EIS incorrectly states that the 2010 fatality raised new safety concerns. The commenter stated that the mountain goat in question was a known hazard that was often reported as aggressive by visitors and known to NPS staff upwards of three years before the fatal incident in the park, which is not acknowledged in the draft plan/EIS.

Commenters provided specific references they felt were missing from the plan/EIS regarding impacts to visitor and employee safety. One commenter stated that reference to the Mount Ellinor trail closures in 2012 due to aggressive mountain goats was missing.

Response: The NPS does not believe that the plan/EIS exaggerates the threat that mountain goats pose to public safety. Mountain goats are a nuisance and a hazard in many areas of the park, due to their easy habituation and salt-seeking behaviors, and the lack of natural salt licks in the park. As indicated in the purpose and need chapter of the final plan/EIS, the NPS is proposing to take action based on many factors (ecological damage, wilderness character, etc.) and not only in response to the one fatality. The male mountain goat that caused the fatal attack was not provoked into such behavior by people harassing it. On the contrary, the mountain goats in the region of the attack were getting increasingly close to people and aggressive in their seeking of salt up to and including barring visitors' egress on trails and chasing people. The NPS responded to the mountain goats' behavior with aversive conditioning, which is the tool employed by wildlife management professionals to alter animal behavior. There are many documented instances of mountain goat behaviors that could pose a safety concern to park visitors. Refer to page 111 and tables 14 and 15 in the final plan/EIS for information on the many human-mountain goat interactions that have been documented in the park.

Mountain goats are more of an issue in Olympic National Park because the park has the combination of a lack of natural salt sources that mountain goats seek, a larger population of mountain goats, and mountain goats interacting with visitors and becoming habituated due to visitors being a source of salt.

Data on mountain goat-visitor interactions presented in the plan/EIS are from 2011–2013 and not earlier, because 2011 was the year researchers started gathering and classifying mountain goat observation and behavior data in a systematic and consistent way. Data from these years are the best to use to show the current amount and types of mountain goat-human interactions in the park.

The NPS acknowledges that the concerns about mountain goat impacts on human safety were not “new” in 2010, and has changed the wording on page 1 of the final plan/EIS to more accurately reflect that the fatality in 2010 heightened concerns.

Information regarding the 2012 closure of the Mount Ellinor Trail was provided on page 111 of the draft plan/EIS.

Concern 81: Commenters expressed concern for the overall safety of employees who would be involved in mountain goat removal activities in the park, and specifically with regard to the use of helicopters, noting that helicopter crashes have occurred during past removal efforts.

Another commenter requested that the NPS further clarify safety risks for employees involved in mountain goat removal from the park and that a safety scorecard for each alternative should be provided, so that safety risks to employees under each alternative can be compared.

One commenter suggested that the NPS review and consider a 1992 risk assessment of personnel removing mountain goats from the park.

One commenter stated that the overall impacts to employee safety and total helicopter flights and landings involved under alternatives C and D were missing from the cumulative impacts section under alternative D in the plan/EIS.

One commenter requested further clarification on the risks to staff engaged in lethal removal that would result in the discontinuation of lethal removal activities under alternative C.

Response: Helicopter safety is discussed in the conclusion on page 216 of the final plan/EIS. A safety scorecard, or GAR (Green-Amber-Red Risk Calculation Model), is not necessary at this stage of the analysis, but a risk analysis and GAR would be included in the aviation safety plan and operations would not proceed if the operation is not evaluated to be in the green.

The NPS has reviewed the 1992 report (Machlis, Tuler, and Kasperon 1990). Although no NPS employees would be involved in capture operations, contractors are treated the same as employees for the purposes of NEPA. Skilled animal capture experts that are approved and vetted by the Office of Aviation Services, and who have a good safety record would be hired.

The discussion of employee safety under alternative D starts on page 218 of the final plan/EIS and includes a comparison of the impacts that could occur under the other action alternatives. A full description of the impacts of actions that contribute to cumulative effects on employee safety can be found under the analysis of alternative B. This discussion was not repeated under alternatives C and D to avoid unnecessary duplication. The estimated number of helicopter flights is included under each alternative description in chapter 2 and these numbers are summarized in table 1 in the plan/EIS.

The NPS would follow all mandated safety guidelines regarding mountain goat removal and capture activities. In addition, as the plan states, once capture is evaluated as no longer safe, it would stop and removal operations would switch to lethal removal. The helicopter operator would determine whether it is no longer safe to capture mountain goats due to one or several factors (such as no safe landing spot, terrain too steep, or mountain goats fleeing the area). Specific weather conditions could also shut down operations for the day (heat, wind, rain, fog). Guidelines in the aviation safety plan would be followed, an ACETA (Aerial Capture, Eradication, and Tagging of Animals) plan would be in place, and risk assessment would be developed with park aviation staff and the selected contractor. Similar plans have been used in the past for the safe capture of mountain goats and elk in Olympic National Park.

Impact Topic – Part Two: Wilderness Character

Concern 82: The commenter felt that the use of helicopters in designated wilderness areas in the North Cascades forests violates the Wilderness Act and would not be allowed under the minimum requirements for exception of administering the area for the purposes of wilderness.

Several commenters questioned the proposed release sites and indicated that release areas should be located outside the designated wilderness boundary.

One commenter stated that WDFW's objectives are at odds with the USDA Forest Service Manual, whose objective is to maintain wilderness so that ecosystems are unaffected by human manipulation and influences.

Response: The Wilderness Act prohibits motorized equipment, mechanical transport, and landing of aircraft in wilderness areas except as necessary to meet the minimum requirements for administration of the area for the purpose of the Act. Use of helicopters in wilderness may be allowed only if it is found to be the minimum tool necessary for administration of the area as wilderness. A minimum requirements analysis has been prepared for the North Cascades national forests wilderness areas to determine the necessity of any action to occur within wilderness as well as the minimum tool (refer to appendix F in the plan/EIS).

The minimum requirements analysis prepared for the North Cascades forests determined that action in wilderness—specifically, the translocation of mountain goats—is necessary to preserve wilderness character which has been negatively impacted by the extirpation and threat of additional extirpation due to lack of genetic diversity in reduced populations of native mountain goat populations within the wilderness areas of the North Cascades forests. Therefore, it was determined that action in North Cascades forests was necessary for the administration of the areas as wilderness.

For the North Cascades forests, use of helicopters for transport of mountain goats, personnel, and equipment—with limitations including the number, timing, purpose, and location of flights—was determined to be the minimum tool given the distance between mountain goat habitat and staging areas as well as the safety risks posed to personnel by the remote and rugged terrain. Other options considered included more limited use of helicopters with transportation of personnel and equipment by foot or pack stock. Nonmotorized methods to transport mountain goats were not fully analyzed because there are no feasible nonmotorized methods given the rugged terrain and the timing requirements for translocation.

The USDA Forest Service worked with WDFW to identify and evaluate potential release sites (refer to appendix I in the final plan/EIS), including release sites outside of wilderness. However, as described in the minimum requirements analysis in appendix F in the plan/EIS, action is necessary in wilderness because of a lack of sufficient sites outside of wilderness for successful reintroduction of mountain goat populations in appropriate areas of the North Cascades forests. Release of mountain goats outside of wilderness in the North Cascades forests was not expected to be successful due to lack of suitable escape terrain in noncontiguous habitat patches outside of wilderness.

USDA Forest Service policy for wilderness management at FSM 2323.33 allows the reintroduction of wildlife species indigenous to the area that have been extirpated by human induced events. For North Cascades forests' mountain goat populations, the decline and local extirpation or threat of extirpation of mountain goat populations in these wilderness areas is described in the draft plan/EIS. FSM 2323.33a permits the use of motorized or mechanical transport for reintroduction of indigenous wildlife species if it is impossible to do the approved reintroduction by nonmotorized means.

Concern 83: One commenter requested that the USDA Forest Service review the designated release sites to ensure there are no unanticipated impacts from helicopter landings and to ensure no crates or debris remain after relocation activities are complete.

Response: The minimum requirements analysis and the final plan/EIS analyze the effects of mountain goat releases, including the use of helicopters, crates, and fencing. The minimum requirements analysis describes how the crates would be returned to the staging area for removal (not left in wilderness) by helicopter. Other equipment, including fencing, would also be removed from wilderness by helicopter.

Concern 84: One commenter provided multiple comments about the use of radio telemetry collars on translocated mountain goats within designated wilderness areas. The commenter stated that placing radio collars constituted a trammeling action. The commenter stated that the draft plan/EIS does not recognize the trammeling action and the USDA Forest Service must demonstrate that radio collars meet the

minimum requirements for administration purposes. The commenter noted that radio collars can allow the public to know the location of the animals. The commenter requested additional information regarding how the radio collar information would be used.

Response: The minimum requirements analysis for the North Cascades forests has been updated to include documentation of the impact of the release of collared mountain goats on wilderness character. Because collars would be placed on mountain goats at staging areas outside of wilderness, the act of collaring is not a trammeling action. Upon the release of collared mountain goats in wilderness, the presence of collars negatively affects the undeveloped quality of wilderness character for the duration of the presence of the collar. However, the collars allow managers to collect data that is critical to successful implementation of this project and, ultimately, the recovery of mountain goats in wilderness areas where they are indigenous. Successful recovery of mountain goats has a long-term positive effect on the natural quality of wilderness character. The minimum requirements analysis considered whether data critical to implementation could be gathered through other means and found that radio collars are the minimum requirement.

The public would not be allowed to access the data on the location of collared mountain goats. Radio collars would be used by WDFW and participating tribes to monitor movements of the mountain goats and whether they are still alive. The collars could also allow WDFW, tribes, and potentially participating university cooperators, to observe animals from the ground to document reproductive success in the future.

Impact Topic – Part Two: Wildlife, Including Sensitive and Management Indicator Species

Concern 85: One commenter believes there would be an adverse effect on the bighorn sheep population in the relocation areas, because the two species will compete for the same habitat and forage. The commenter provided literature on disease transmission between mountain goats and bighorn sheep.

Response: Bighorn sheep living on the east slopes of the Cascades Range very rarely venture through habitats they would have to cross in order to reach mountain goat release areas or mountain goat habitat. In Washington, bighorn sheep and mountain goats do not use the same habitats or forage, and existing distributions overlap only minimally.

Both bighorn sheep and mountain goats can become infected with the bacteria *Mycoplasma ovipneumoniae*. This bacteria, which is not part of the naturally occurring bacterial load in either wild ungulate but which is common in domestic sheep and mountain goats, can cause pneumonia in mountain goats and bighorns, and can be transmitted among these species. To date, there are no data suggestive of pneumonia among mountain goats on the Olympic Peninsula.

WDFW began a surveillance program for *M. ovipneumoniae* in mountain goats harvested legally by hunters (in 2013), to complement surveillance already being conducted among bighorn sheep. Surveillance has provided no reason to suspect the presence of *M. ovipneumoniae* in mountain goats in either the Olympic Peninsula or the North Cascades Range. Blood and nasal mucosal samples will be collected from all mountain goats captured under either alternative B or D, in order to confirm the absence of this pathogen. If the pathogen is discovered, appropriate actions would be taken to prevent the pathogen from spreading to other mountain goats.

In the unlikely event that *M. ovipneumoniae* was present but undetected in any mountain goats translocated to the North Cascades Range, the probability of transmission to bighorn sheep is very low. There are no bighorn sheep populations in the North Cascades Range; the smallest distance between a bighorn sheep herd and a proposed mountain goat release site is more than 46 miles (75 km).

Concern 86: One commenter noted that the draft plan/EIS does not assess predator populations in the relocation area and the impact of these predators on the translocated mountain goats.

Response: Because of their ability to take refuge in cliff habitats, mountain goats are typically less susceptible to predation than most other ungulates, and predation rarely rises to the level of being a population-limiting factor. In both the Olympic Mountains and the North Cascades Range, the primary predator capable of killing adult mountain goats is the mountain lion, or cougar. It is known that cougars sometimes prey on mountain goats in Washington, and it is suspected that, at times, individual cougars learn to specialize on mountain goats. If this occurs where mountain goat populations are small or isolated, the recovery or restoration of a mountain goat population can be compromised.

Currently, there is a lack of evidence that specialized goat-killing cougars are a common occurrence or problem in the North Cascades Range. That said, translocated mountain goats are likely to be more vulnerable to any such cougars, and mountain goat populations are likely to remain small for a number of years. Indeed, such possible predation effects are one reason that bolstering existing mountain goat populations is a goal: larger, better connected populations are more likely to sustain themselves when exposed to predation than smaller, more isolated populations.

It can be determined whether predation is causing a population-level concern, or threatening to compromise the success of the translocation, only by monitoring individual translocated mountain goats, preferably using GPS collars. For that reason, WDFW is partnering with participating tribes and other interested parties, to equip as many translocated mountain goats as possible with monitoring devices, and to initiate a program of monitoring, investigations of mortalities, and assessment of translocation success for the first few years of the project. If predation is determined to be a substantial issue, WDFW will work with cooperators to address it.

Impact Topic – Part Two: Vegetation

Concern 87: Several commenters were concerned that the North Cascades forests' habitat currently available and suitable for mountain goats is small and fragile and questioned the impacts of mountain goat grazing or transfer operations on native vegetation in that area. One commenter expressed a preference that the control or elimination of the nonnative mountain goats should be resolved within the boundaries of the Olympic ecosystem and not involve the North Cascades forests, and stated that additional safeguards for the Cascades ecosystem need to be assessed in the final plan/EIS for alternative D.

Response: As noted, alpine ecosystems in this area co-evolved with mountain goats. Although the number of mountain goats has decreased over the last few decades, they have remained a part of the ecosystem in the area of proposed augmentation. Current alpine plant communities have persisted in the presence of lower mountain goat abundance and have not changed in composition (similar to when mountain goats were more abundant in the project area) such that an increase in mountain goats would not disrupt plant community assemblages or alpine ecosystem function.

There has been some habitat modeling out of Western Washington University that demonstrates that the North Cascades forests have a lot of suitable unoccupied habitat. Areas of unoccupied habitat were

considered in the selection of release sites. Historically there were far greater numbers of mountain goats in the Cascades Range.

Concern 88: One commenter suggested that translocating mountain goats into the North Cascades forests could provide an indirect beneficial impact on the composition of alpine plant communities and suggested that mountain goat translocation would restore more natural conditions. The commenter stated that the absence of mountain goats affects the natural conditions through loss of selective browsing or physical disturbance and suggested that this indirect impact should be more fully analyzed in the final plan/EIS.

Response: NPS agrees with the commenter that translocating mountain goats into the North Cascades forests “could provide an indirect beneficial impact on the composition of alpine plant communities and suggested that mountain goat translocation would restore more natural conditions.” Augmenting mountain goats in the proposed release areas has the potential to return natural disturbances and restore conditions under which the alpine plant community has evolved. However, because mountain goats are native to the North Cascades forests and have historically been present in these areas, there is no need to more fully analyze the beneficial impact to vegetation in the final plan/EIS.

Impact Topic – Part Two: Threatened and Endangered Species

Concern 89: One commenter expressed concern about noise during the marbled murrelet nesting season and requested consideration for avoidance of occupied habitat in the Mt. Baker-Snoqualmie National Forest as much as possible. Another commenter requested more information regarding the methods that would be used to protect threatened and endangered species from the effects of translocation of the mountain goats in the North Cascades forests.

Response: A total of approximately 16 acres of marbled murrelet nesting habitat occurs near four staging areas on the Mt. Baker-Snoqualmie National Forest. Due to the lack of surveys, it is assumed that these areas could be occupied by nesting murrelets. Given the overlap of the marbled murrelet nesting season and the proposed project activity, some potential impacts are unavoidable. The project team is currently in consultation with the USFWS to minimize adverse impacts to nesting murrelets such as: To the extent practicable, helicopter use at these staging areas would occur in late-August into September to minimize disturbance during the early nesting season (95% of murrelets fledged by August 5). Also, after leaving the staging areas, helicopters would maintain a height at least 500 feet above suitable nesting habitat to minimize impacts from noise and rotorwash. No adverse effects are expected to other federally listed species in the North Cascades forests. If any federally listed species are detected during project activities, the USDA Forest Service will initiate further consultation with the USFWS before activities continue in the area of the detection.

Impact Topic – Part Two: Visitor Use and Experience

Concern 90: One commenter stated that the proposed management activities in the Cascades would directly impact day hikers, backpackers, climbers, and horseback riders both visually and acoustically, as there are several popular trails and backpacking/climbing areas near the proposed staging and relocation sites.

Response: There would be some short-term adverse effects to the visitor use and experience as a result of management activities associated with transporting and releasing mountain goats, including visual and

acoustic impacts from the use of helicopters. Specifically, the noise and visual impacts on visitors to a number of popular recreation sites in the project area, including many of the sites identified by the commenter, were described. The commenter noted potential impacts to visitors to the LaRush/Bear Lake Trail, a low-use trail that would be affected if the Irene Creek Rock Pit is used as a staging area, in which case the Bear Creek Trailhead would be closed to visitors during helicopter operations. The commenter also noted potential impacts to the experience of visitors to Stillaguamish Peak. This location was not called out specifically in the description of noise and visual impacts to popular hiking trails or camping areas, because no National Forest System trails access the peak. However, there would be short-term adverse effects to the experience of visitors to Stillaguamish Peak from noise and visual effects of helicopter use for release of mountain goats at the nearby Mt. Stillaguamish release site. The commenter stated that the Goat Lake Trail is one of the top 100 most-viewed hikes on the Washington Trails Association website and expressed concern about impacts to the visitor experience on the trail and at Goat Lake. With the proposed configuration of the staging areas and the Cadet Lake Ridge release site, no noise or visual impacts are expected for visitors to Goat Lake and the Goat Lake Trail.

Impact Topic – Part Two: Visitor and Employee Safety

Concern 91: Commenters expressed concern about the safety of visitors in the North Cascades forests due to maladaptive mountain goats. One commenter referenced a previous study where a hiker was wounded from a translocated mountain goat. One commenter stated there is no consideration in the draft plan/EIS for the difference in impact on visitors between the North Cascade forests' mountain goats that have developed a fear of humans from being hunted versus the introduced Olympic mountain goats that have no fear of human interaction and requested additional assessments of the problems translocated mountain goats could create.

Response: Visitor safety in the North Cascades is discussed started on page 242 of the final plan/EIS.

All native wildlife can potentially be a danger to humans, and mountain goats should always be treated as potentially posing a risk to human safety. However, mountain goats generally fear and keep their distance from humans. Hikers using common sense most often can enjoy viewing mountain goats with little chance of an unpleasant interaction. However, some mountain goats on the Olympic Peninsula have become conditioned to seek a reward (generally salt from bodily fluids) from humans. Mountain goats that the NPS believes have become aggressive would not be translocated to the North Cascades forests. Further, mountain goats that are probably habituated to humans (i.e., lost their natural wariness) would be translocated only to those locations with few human visitors, where they are likely to regain their typical caution around humans.

Mountain goats can become particularly habituated to people where (1) mountain goat habitat is excellent and particularly concentrated; and (2) human use is particularly heavy. These conditions exist in Olympic National Park, Mt. Ellinor on the Olympic National Forest, and the Enchantments section of the Alpine Lakes Wilderness on the Okanogan-Wenatchee National Forest. Elsewhere, mountain goats are tolerant of humans and allow observation from a respectful distance, but have not caused appreciable concern. Areas such as near Mt. Baker, the Goat Rocks Wilderness, and in Mt. Rainier National Park are examples of the latter.

WDFW has partnered with USDA Forest Service staff to provide an ongoing system of monitoring public reports of mountain goat interactions with people, available on both paper at USDA Forest Service offices and on the web (<https://wdfw.maps.arcgis.com/apps/GeoForm/index.html?appid=4c0479db591a4686b78762b6960a597c>).

WDFW has also developed a step-down plan with the Olympic National Forest that guide a joint response to mountain goats reported by the public as being a nuisance. These responses include simply monitoring, to lethal removal, depending on the documentation of the severity of the situation and true threat to human safety (“Problem goat step down plan v. 21. 032813”).

There is no reason to suspect that mountain goats currently living on the Olympic Peninsula are maladapted to the environment they would encounter in the North Cascades forests. There is also no evidence that recreational hunting, at least at levels similar to those characterizing hunts managed by WDFW in recent years, has an appreciable effect on the likelihood of mountain goats becoming either habituated or conditioned.

Studies documenting a hiker having been wounded by a translocated mountain goat are unknown.

Other NEPA Issues: General Comments

Concern 92: Commenters suggested disclosure of the costs incurred to date for the mountain goat management effort as well as future costs for each alternative. A concern was expressed over budgetary constraints leading to inhumane methods of mountain goat removal. A commenter also inquired whether funding for the Olympic National Park portion has been secured, as well as whether funding was approved for WDFW to participate.

Response: The purpose of NEPA documents is to analyze environmental effects of the alternatives so that these environmental analyses can be considered in concert with economic and other factors as part of the decision-making process. In addition, analyzing and disclosing the cost of implementing different alternatives is not a requirement under either Council on Environmental Quality (CEQ) or US Department of the Interior NEPA regulations. That being said, the project team did discuss relative costs of implementing alternatives during the planning process for the EIS. This information was considered by NPS management prior to identifying a preferred alternative in the plan/EIS.

The NPS has secured preliminary funding for activities that could be implemented on the Olympic Peninsula as part of the action alternatives. WDFW has allocated funding within its Game Division for translocating up to 360 mountain goats, as well as needed veterinary testing and treatment. WDFW budgeting envisions using the safest and most humane methods currently known of handling and moving mountain goats.

Regarding animal welfare issues, the NPS and cooperating agencies are committed to the humane treatment of mountain goats under any of the project alternatives. There are inherent uncertainties regarding the federal budget. If these uncertainties result in budget issues that prevent implementation of the preferred alternative, the agencies are not able to merely switch to a “cheaper” option such as lethal removal only (alternative C) without re-engaging the public through a supplemental NEPA process.

Concern 93: One commenter questioned the need to prepare an EIS for this project and proposed that an option to eliminate the mountain goats could be considered to avoid multiple agency coordination and NEPA. One commenter suggested that policies and procedures to address nonnative animal management should be universal and that national parks should have national programmatic NEPA compliance related to managing nonnative animals.

Response: Before this project was initiated, staff at Olympic National Park considered developing an environmental assessment for a short-term, targeted mountain goat translocation effort. However, further

discussions indicated a need to expand the scope of the project to include a study of additional alternatives and to develop a more-detailed, long-term management plan that would allow the park to manage mountain goats at the population level into the future. The NPS determined that an EIS would be the proper NEPA pathway due to the size and scope of the project and the potential for significant impacts to the sensitive resources of the park.

While the park has the ability to remove individual mountain goats under specific circumstances described in the 2011 Olympic National Park Mountain Goat Action Plan (refer to appendix A in the plan/EIS), these actions would not address the issues associated with a sizable population of exotic mountain goats in the park.

The NPS does have programmatic NEPA documents in place that cover invasive species management (and other resource issues) for multiple parks and continues to encourage those types of planning documents when applicable. However, a national, programmatic approach to invasive species management was not pursued for mountain goat management at Olympic National Park due to the unique environmental conditions and species at the park and the wildlife management opportunities provided by the cooperating agencies in this case. In the future, other parks may choose to use any applicable parts of this mountain goat management plan as a template for their own invasive animal species planning efforts.

Concern 94: One commenter questioned if the NPS Director's Order 77 document is still current and if the park follows the document's guidance regarding management of nonnative species.

Response: NPS Director's Order 77 is not current and not particularly relevant to nonnative species management as numerous newer Executive Orders (13112, 13751) have provided updated, more specific direction on invasive and nonnative species. In addition, NPS *Management Policies 2006* (NPS 2006, sections 4.4.4.1 and 4.4.4.2) have newer direction on the removal of exotic species already present, which is more recent and relevant to the situation with mountain goats at Olympic National Park.

Concern 95: One commenter questioned the adequacy of the draft plan/EIS and requested new NEPA documents or significant revisions. The commenter asserted that the draft plan/EIS represents piecemeal decision making and that key USDA Forest Service decisions regarding helicopter use in wilderness would not be revealed until after the NPS signs its ROD.

The commenter noted that the USDA Forest Service does not provide its own signature responsibility to the document under NEPA and WDFW does not provide adequate justification and NEPA consideration for the translocation plan. The commenter stated that the draft plan/EIS does not provide a full range of viable alternatives and that the decisions made and choice of a preferred alternative are not supported by the content of the draft plan/EIS.

The commenter recommended a supplemental plan/EIS that includes all alternatives, analyses, justifications, decisions, and signatory responsibilities of the NPS, USDA Forest Service, and WDFW, not just those of the NPS.

Response: The final plan/EIS (and the draft plan/EIS) contains sufficient information regarding proposed helicopter use in wilderness. Beginning on page 38 of the final plan/EIS, NPS describes specific staging and release areas, including an approximation of the number of helicopter flights and amount of flight time for translocation operations in the North Cascades forests. It is impossible to predict the exact sequencing of translocation actions and the exact number of mountain goats that will be translocated into wilderness areas, because these specific details are dependent upon the success and timing of the capture operations on the Olympic Peninsula. Information regarding helicopter flight times, number of flights,

and the number of translocated mountain goats contained in table 2 in the final plan/EIS are approximate maximums, so as to not underestimate the potential impact on wilderness resources.

The USDA Forest Service, as a cooperating agency, will adopt the draft EIS and the final EIS and sign their own ROD which will cover actions in the national forests that must be authorized by the USDA Forest Service prior to implementation. The actions include helicopter use in wilderness and associated closure orders. Adopting the NPS EIS is consistent with the CEQ regulations at: 40 CFR 1500.4(n) “Eliminating duplication with State and local procedures, but providing for joint preparation (1506.2) and with other Federal procedures, by providing that an agency may adopt appropriate environmental documents prepared by another agency (1506.3);” and 40 CFR 1506.3 (a) “ An agency may adopt a Federal draft of a final environmental impact statement or portion thereof provided that the statement or portion thereof meets the standards for an adequate statement under these regulations.” The USDA Forest Service decision will be informed by the NPS decision. The timing of the USDA Forest Service issuance of their draft ROD will closely follow the NPS ROD. The issuance of the USDA Forest Service final ROD will be at the close of their 36 CFR 218 objection process.

Because WDFW is a state agency, it is not subject to NEPA. However, under the preferred alternative in the EIS, WDFW would be the agency responsible for releasing mountain goats into wilderness using helicopters, which does trigger compliance with NEPA. Therefore, the EIS analyzes the impacts of WDFW actions in the wilderness areas on national forest lands in the North Cascades forests.

The EIS fully analyzed a no-action alternative as well as three action alternatives for the management of exotic mountain goats in the park. However, according to the US Department of the Interior NEPA Regulations and CEQ’s *NEPA’s Forty Most Asked Questions* (CEQ 1981), the term “range of alternatives” refers to the set of all reasonable alternatives as well as other alternatives considered but eliminated from detailed analysis (46.420(c); Q1a). The interdisciplinary and multi-agency project team considered numerous alternatives and alternative elements throughout the planning process for the EIS. While the team decided to fully analyze four alternatives in the EIS, several options for managing mountain goats were considered and dismissed for reasons described in the draft EIS. The alternatives considered but dismissed are listed starting on page 61 of the final plan/EIS, and include such options as fertility control, introduction of wolves, and fencing. Although these alternatives were not fully analyzed, they are still included in the range of alternatives considered in this NEPA process. This section of the final EIS also incorporates a discussion of why alternatives not involving the use of helicopters were considered but dismissed from further analysis.

Refer to the concern 15 response and page 73 of the final plan/EIS for a discussion of the rationale for the selection of the preferred alternative.

A supplemental EIS would be necessary only if there are substantial changes to the alternatives that result in new impacts outside the impacts analyzed in the EIS or there are significant new circumstances that are relevant to environmental impacts. The project team is not aware of any new circumstances or required changes to alternatives that would necessitate the preparation of a supplemental EIS. The NPS and the cooperating agencies have undergone a thorough planning process in the development of this EIS and believe that it meets the requirements of the NEPA regulations regarding a range of reasonable alternatives and environmental impact analysis, and that it contains the necessary information for the team to make informed decisions regarding the management of exotic mountain goats.

Concern 96: One commenter stated that the draft plan/EIS does not provide measurable criteria so that the public can distinguish the impacts of the alternatives, and requested a new analysis that provides objective, measurable, and distinguishable criteria so that the direct, indirect, and cumulative impacts of each alternative can be fully understood.

Response: The project team believes that the draft plan/EIS does contain enough detail for readers to understand the differences in expected impacts among the alternatives. While it is true that the draft plan/EIS often uses similar terminology when describing levels of impact (e.g., short-term, long-term, beneficial, adverse), there are detailed descriptions of the types and locations of impacts within the text of each impact analysis for each resource topic in chapter 4.

What one must realize is that many of the actions under alternatives B and D (for example) are similar, as both involve the use of helicopters to capture and translocate mountain goats, so these impacts would be expected to be described similarly. However, when there are differences in the location and duration of expected impacts, those are explained in the narrative for each resource topic. For example, on page 153 of the draft plan/EIS, the impact analysis for alternative C provides a description of how lethal removal activities would affect other wildlife, by describing the adverse impacts of helicopter noise, including when most of the flights would occur, and how long it may take to lethally remove the mountain goats under this alternative. The analysis also refers the reader to alternative B for more detail of the specific impacts of helicopters, since the effects would be similar. However, the analysis also describes why the impacts of alternative C would be less adverse than alternative B due to the quicker decline in mountain goat populations and the number of helicopter flights that would be needed.

Because some of the management elements contained in the alternatives are similar (e.g., helicopter use, staging areas), a comparative analysis was provided in the conclusion paragraphs at the end of the impact analysis for each alternative. The conclusion paragraphs contain a description of the level of impact of the alternative when compared to the other alternatives, providing the reader with the differences in impacts among the alternatives.

Concern 97: One commenter inquired if compliance with the State Environmental Policy Act is required by WDFW.

Response: The State Environmental Policy Act is not required for routine small-scale movements of wildlife within native ranges. However, because this is a large, multi-agency project, WDFW will complete the State Environmental Policy Act process, which allows the state to adopt this federal NEPA document.

Concern 98: Commenter suggested that the NPS should redraft the plan as a long-term plan with its analysis period extended to 40 years to determine the greatest difference in the alternatives, including impacts from climate change.

Response: In the NPS, extensive park-wide planning efforts generally cover no more than 20 years. This is a programmatic planning effort that should cover 5 to 20 years maximum. Impact analysis becomes speculative beyond 20 years, especially in light of potential natural hazards, visitation rates, and similar factors. The NPS minimally and generally addresses potential impacts from climate change due to the high level of uncertainty of those potential impacts.

Concern 99: One commenter suggested that the full text of the NPS management policy related to nonnative species, including the statement that “lower priority will be given to exotic species that have almost no impact on park resources,” should be included in the plan/EIS to provide both the extent and the priority of exotic species management. The commenter also requested that the plan/EIS include a statement to indicate that all of the alternatives considered further (including alternative A) should be consistent with this policy.

Response: The following text from section 4.4.4.2 of *NPS Management Policies 2006* (NPS 2006) was added to the final plan/EIS on page 5:

“High priority will be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled. Lower priority will be given to exotic species that have almost no impact on park resources or that probably cannot be successfully controlled. Where an exotic species cannot be successfully eliminated, managers will seek to contain the exotic species to prevent further spread or resource damage.”

Purpose and Need for Taking Action

Concern 100: Commenters stated that the draft plan/EIS does not sufficiently demonstrate that mountain goats are not native to Olympic National Park and therefore there is no justifiable reason to eradicate them. Commenters suggested suspending the current planning process and provide a supplemental draft EIS providing a detailed and objective analysis of all evidence regarding whether mountain goats are native or nonnative to Olympic National Park.

Response: The Noss report (Noss et al. 2000), cited in the draft plan/EIS, provides clarification that mountain goats are not native to Olympic National Park. There is no new information to conclude that mountain goats in Olympic National Park are native. On the contrary, recent genetic work (Parks 2013) supports the conclusion that they are not native to the park.

Per section 4.4.4.2 of NPS *Management Policies 2006* (NPS 2006), the NPS has the authority and an obligation to remove exotic species under these circumstances.

Concern 101: One commenter stated that there are inconsistencies regarding agency mountain goat management, as demonstrated by the proposed elimination of mountain goats in the Olympics and agency actions that seek to increase the same nonnative species in wildernesses in the Wasatch Mountains in Utah.

Response: The commenter referred to the State of Utah’s mountain goat management activities in Utah. Those activities were not USDA Forest Service actions and have no bearing on this project.

In this project, the USDA Forest Service is a cooperating agency working with the NPS and WDFW to manage wildlife in a manner consistent with the Wilderness Act and USDA Forest Service policy for management of wildlife in wilderness according to FSM 2323.3. As explained in the concern 102 response, the proposed removal of nonnative mountain goats from Olympic National Park is consistent with NPS management policies.

Concern 102: Commenters stated that the draft plan/EIS fails to provide scientific evidence to validate the purpose and need in taking action to remove mountain goats, specifically regarding impacts to natural and cultural resources in the park. Without scientific basis, commenters felt the draft plan/EIS and the purpose and need do not meet legal requirements under NEPA. Commenters requested additional study of impacts to vegetation and archeological resources before taking action on mountain goat management.

Another commenter noted that legal authority cited for removal of nonnative species (NPS *Management Policies 2006* (NPS 2006, section 4.4.4.2) has recently been singled out for clarification by the NPS Science Board Advisory Committee, regarding the criteria for when exotic wildlife can or should be removed. As such, the commenter suggested the final plan/EIS needs to make it clear that a decision is not merely following existing NPS policy, but is establishing a new extension or clarification of NPS policy regarding nonnative species.

Response: Section 4.4.4.2 of NPS *Management Policies 2006* (NPS 2006) explicitly calls for management of nonnative species, up to and including eradication if control is prudent and feasible and the nonnative species interferes with, disrupts, or damages park resources; significantly hampers management of park or adjacent lands; or poses a public health or safety hazard. The policy explicitly calls for superintendents to “evaluate the species’ current or potential impact on park resources.” The NPS Organic Act does not require the Secretary of the Interior to wait until damage has taken its toll before taking action to control wildlife impacts (as has been confirmed in many court decisions upholding NPS wildlife management). The NPS has determined that a number of these factors apply with regard to mountain goats in the park, and does not believe a new extension or clarification of policy would be established should the preferred alternative be selected for implementation.

As described in the draft plan/EIS, the presence of nonnative mountain goats interferes with, disrupts, and damages park resources. The presence of nonnative mountain goats is currently adversely impacting the wilderness character of the park, both from a natural standpoint (presence of substantial number of exotic ungulates) and an “opportunity for solitude” standpoint (need for closures and hazing operations in wilderness). Park staff have also documented the unearthing of archeological resources by mountain goat wallowing in the park (refer to page 13 of the final plan/EIS for the discussion of impacts to archeological resources). In addition, mountain goat wallows and trailing have the potential to impact sensitive soils and vegetation in the park. With the population of mountain goats growing at approximately 8% a year, the potential for these types of resource damage will continue to increase unless the NPS takes action.

There is also evidence that the presence of mountain goats in the park creates a hazard to public safety. As described on pages 111–115 of the final plan/EIS, mountain goat-human interactions occur in areas of the park where mountain goats are habituated to human presence and have become conditioned to seeking salts from humans. Although mountain goat attacks are rare in the park, there was an attack that resulted in a fatality in 2010, and the potential for future public safety hazards due to the presence of mountain goats in the park remains.

While the report the commenter mentioned (NPS 2014) indicates that there is a need for clarification of NPS policies regarding the management of nonnative ungulates, it does not argue that managing nonnative species, as proposed in the preferred alternative, is a “new” policy. The authority to manage wildlife populations is derived from the NPS Organic Act (USC 100101 et seq.), which states that the Secretary of the Interior maintains discretion to “provide for the destruction of such animals and plant life as may be detrimental to the use of any System unit” (54 USC 100752). NPS *Management Policies 2006* (NPS 2006) provides further clarification on when specific wildlife management actions should be taken. In this case, the NPS has determined that mountain goats are a nonnative species that has had and, if not properly managed, will likely continue to have adverse impacts on park resources and visitor safety.

For the above reasons, the NPS has the authority and responsibility to remove exotic mountain goats from Olympic National Park.

Concern 103: Commenters suggested that the NPS strengthen the purpose and need statement by changing “reduce” the nonnative mountain goat population to “eliminate” the nonnative mountain goat population. Commenters noted that the purpose and need should mention impairment and recognize the issue of the impairment that has occurred over the last 28 years due to the mountain goat presence.

Response: The purpose and need statement includes both “reduce” and “eliminate” because it may be impossible to completely eliminate every mountain goat from the Olympic Peninsula with the available options at this time. Revising the purpose and need in the manner stated by the commenter would result in the dismissal of existing alternatives because there would remain a very small number of isolated mountain goats that would be uncatchable and/or inaccessible for lethal removal. As stated in the draft

plan/EIS, the NPS would seek to reduce or eliminate the population to the greatest extent possible as outlined under each proposed alternative.

This plan/EIS does describe the existing conditions of park resources in chapter 3, which would include the current state of resources that have been subject to the presence of exotic mountain goats on the Olympic Peninsula. However, the plan/EIS does not include a discussion of impairment because that is not a determination made under NEPA. The concept of impairment is derived from the NPS Organic Act of 1916, which requires NPS decision-makers to ensure that park resources are left unimpaired for the enjoyment of future generations.

The conclusions regarding impacts to park resources that are described in this plan/EIS are used by NPS managers when making resource decisions, including when assessing whether or not an action would result in impairment to park resources. Per the NPS NEPA Handbook (NPS 2015), a written non-impairment determination for the selected action will be appended to the ROD for this project.

Concern 104: Commenters questioned if the NPS has the legal authority to eradicate mountain goats from Olympic National Park. One commenter discussed 16 USC 256b. As interpreted by the commenter, the statute does not allow killing or capturing of animals for wildlife management purposes. As a result, the commenter stated that all proposed actions under the action alternatives were in violation of this statute. The commenter requested that the NPS provide the regulations that give the authority in taking the action.

Response: As the commenter points out, 16 USC 256b (the park's enabling legislation) prohibits the hunting, killing, or capturing of wild animals in the park. However, as the federal courts have repeatedly stated in cases involving similar enabling act provisions at other parks, such text does not preclude the NPS itself from using its express authority to destroy "detrimental" animals under the Organic Act.

Concern 105: One commenter stated that the objective for translocating mountain goats to the North Cascades forests, for the purposes of furthering mountain goat conservation and improving genetic diversity as described in the plan/EIS, is not supported by any scientific evidence and the explanations provided in the plan/EIS do not justify the large number of mountain goats proposed to be translocated.

Response: The objective of translocation mountain goats from the Olympic Peninsula to selected areas within the North Cascades is to bolster the native population, particularly in regions where habitat appears adequate but native populations have remained low. The long-term goal is to provide demographic and genetic connectivity, such that the North Cascades will support close to the number of mountain goats controlled by its habitat capability. The population of mountain goats in the North Cascades of Washington is considerably lower than its estimated long-term capacity (Rice and Gay 2010; Rice 2012; Harris 2016), and is patchily distributed. Although some areas of the North Cascades harbor mountain goat populations sufficiently abundant to sustain limited sport-hunting, other areas remain depressed, and are unlikely to recover for many decades absent a program to provide additional animals.

Johnson (1983) estimated the number of mountain goats outside of national parks in Washington at 8,555 in 1961 (10,355 if including national parks); Rice (2012) estimated that a total of between 2,400 and 3,200 mountain goats in 2007, including the three national park units. WDFW (unpublished data), using updated estimates where available and Rice (2012) where no additional information existed, estimated between 2,360 and 3,370 mountain goats as of 2017 in the North Cascades exclusive of national parks. Even if the numbers used by Johnson (1983) to characterize the pre-reduction mountain goat population in Washington are too high by a factor of two, it is clear that mountain goats as of 2017 are considerably less abundant in the North Cascades than was historically the case. For example, Johnson (1983) thought there may have been 300 mountain goats in the South Methow area, where the best assessment is

currently that there are 23–36. Similarly, Johnson (1983) believed that the greater Glacier Peak area might have held as many as 550 mountain goats where most recent estimates are that 73–112 mountain goats reside, and that the Snoqualmie area may have held as many as 450 mountain goats, where the current estimate is only 40–60. Thus, on balance, an addition of as many as 350 mountain goats contributed by the Olympic Peninsula is well within the capacity of the North Cascades to absorb. Harris and Steele (2014), based on a survey and evaluation of 70 historic translocations of mountain goats into native range, recommended that at least 25–30 mountain goats should be released within each individual release area in order to achieve a high likelihood of long-term success.

Refer to the concern 49 response for a detailed discussion regarding the genetic reasons for translocating mountain goats to the North Cascades forests.

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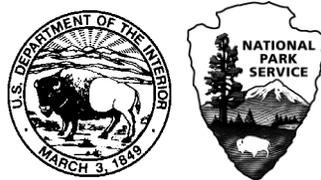
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