



Lower Thunder Creek Trail and Camp Modifications Environmental Assessment Appendices

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North Cascades National Park Service Complex

MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

“...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...”

-- The Wilderness Act of 1964

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 1: Determination

Determine if Administrative Action is Necessary

Description of the Situation

What is the situation that may prompt administrative action?

Recent changes in environmental and social factors have forced the NPS to consider changes in locations of trails and campsites in lower Thunder Creek:

- A large bluff above Thunder Creek just west of McAllister Stock Camp has been eroding and encroaching on the main trail in recent years. There is limited space to incrementally move the trail east because of the blocking location of McAllister Stock Camp. One corner on the trail has been infringed upon by erosional encroachment to the point it is out of standard for stock use.
- In 2017 a large number of hazard trees (~30 large diameter and many smaller ones) were identified in the McAllister Hiker camp necessitating closure of the entire camp. This camp includes one large group site for up to 12 people and four smaller sites designed to accommodate up to 4 backpackers each. Normally, following NPS policy, the NPS will fell hazard trees in designated camps to abate the risk of dead and dying trees falling on visitors cooking and sleeping in designated sites (which is required under the terms of an NPS overnight backcountry camping permit). However, when there are many hazard trees, the NPS will close the camp until a solution that minimizes impacts to resources is found. Coincidentally, a large flood on Thunder Creek in November 2017 completely washed out the pedestrian bridge that has provided convenient access from the main trail to the hiker camps (Figure 3). It is possible to ford Thunder Creek in this area under low flow conditions by

the most experienced and intrepid hikers/mountaineers. There may also be natural crossings available on fallen trees or log jams that span Thunder Creek in the area.

- Overnight visitors have demonstrated demand for use of the relatively large capacity of McAllister Hiker Camps as the most highly utilized camp in the area. All camps have seen increasing trends since 2006. McAllister Hiker and Stock camps are relatively low elevation (~2000 ft) and provide early season backpacking opportunities. As they are within ROLA, where dogs are allowed on leash, these sites also popular with hikers travelling with their dogs.
- In the last decade backcountry overnight use in Thunder Creek has increased dramatically. In addition in 2016 the NPS began offering fee-based public reservations that makes 60% of camp space available across the Park Complex. These two factors have caused conflicts between public use and the camping needs of the NPS trail crew.

Options Outside of Wilderness

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

- YES **STOP – DO NOT TAKE ACTION IN WILDERNESS**
 NO **EXPLAIN AND COMPLETE STEP 1 OF THE MRDG**

Explain:

These issues cannot be addressed outside of wilderness because they address questions central to managing visitor use in wilderness and are inextricably linked to the public purposes of wilderness.

Criteria for Determining Necessity

Is action necessary to meet any of the criteria below?

A. Valid Existing Rights or Special Provisions of Wilderness Legislation

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.*

- YES NO

Explain:

Not Applicable.

B. Requirements of Other Legislation

Is action necessary to meet the requirements of other federal laws? Cite law and section.

YES NO

Explain:

Visitor use management must be addressed in North Cascades National Park Service Complex in order to prevent impairment as stipulated in the NPS Organic Act.

The Organic Act of the National Park Service: (PL 39-535) “Sec.1. 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 purpose 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.”

Enabling Legislation for North Cascades National Park, Ross Lake National Recreation Area and Lake Chelan National Recreation Area, as amended (PL 90-544)

“In order to preserve for the benefit, use, and inspiration of present and future generations certain majestic mountain scenery, snowfields, glaciers, alpine meadows, and other unique natural features...there is hereby established...the North Cascades National Park” (Title 1, Section 101)

“In order to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, there is hereby established...the Ross Lake National Recreation Area” (Title 2, Section 201)

“The Secretary shall administer the recreation areas in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment.” (Title 4, Section 402(a))

C. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character, including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?

UNTRAMMELED

YES NO

Explain:

Action is not necessary to preserve the untrammeled quality.

UNDEVELOPED

YES NO

Explain:

Action is not necessary to preserve the undeveloped quality.

NATURAL

YES NO

Explain:

Some action is necessary to address visitor use impacts on components of the natural quality. Such components may include water quality, fish, wildlife, and/or habitat. Strategies for visitor use management are designed to address and minimize potential impacts to these resources.

Proactively addressing the eroding trail is necessary so that an intentional solution to the problem is devised instead of more reactive short-term solutions such as incrementally moving the trail as the back as the bluff erodes.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

YES NO

Explain:

Some action is necessary to address visitor use impacts on outstanding opportunities for solitude and a primitive and unconfined type of recreation.

Strategies for visitor use management are designed to address and minimize potential impacts to these values.

Overnight camping in this area is an established use and under the current backcountry camp and permit system maintaining these opportunities helps preserve visitor opportunities for primitive and unconfined recreation.

OTHER FEATURES OF VALUE

YES NO

Explain:

Some action is necessary to address visitor use impacts on cultural resources. Strategies for visitor use management are designed to address and minimize potential impacts to these resources.

Step 1 Decision

Is administrative action necessary in wilderness?

Decision Criteria

- | | | |
|--|---|--|
| A. Existing Rights or Special Provisions | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| B. Requirements of Other Legislation | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |
| C. Wilderness Character | | |
| Untrammelled | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Undeveloped | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Natural | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |
| Outstanding Opportunities | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |
| Other Features of Value | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |

Is administrative action necessary in wilderness?

YES

EXPLAIN AND PROCEED TO STEP 2 OF THE MRDG

NO

STOP – DO NOT TAKE ACTION IN WILDERNESS

Explain:

Relevant laws support providing for visitor enjoyment and outdoor recreation use, as long as these areas are maintained unimpaired and wilderness character is preserved.

Both the Wilderness Act and NPS Organic Act acknowledge that National Parks and designated Wilderness are for the enjoyment of people and the preservation/conservation of resources.

In summary, action is necessary to manage visitor use while also preserving natural and cultural resources and providing outstanding opportunities for solitude and a primitive and unconfined type of recreation. Proactively addressing the eroding trail is necessary so that an intentional solution to the problem is devised instead of more reactive short-term solutions. Overnight camping in this area is an established use and under the current backcountry camp and permit system maintaining these opportunities helps preserve visitor opportunities for primitive and unconfined recreation.

MRDG Step 2

Determine the Minimum Activity

Other Direction

Is there “special provisions” language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?

AND/OR

Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?

YES

DESCRIBE OTHER DIRECTION BELOW

NO

SKIP AHEAD TO TIME CONSTRAINTS BELOW

Describe Other Direction:

NOCA’s trail system has a history of recreational use predating both park and wilderness designation. The NPS established standards for the trail system in 1982 that predate wilderness designation, and the Wilderness Act specifically states that “the designation of any area of any park, monument, or other unit of the national park system as a wilderness area pursuant to this Act shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system...” (section 4(a)(3)). Thus these standards are key to guiding what the minimum tools and activities are in Step 2.

See also the Stephen Mather Wilderness Camp Preferred Design Features in Appendix A of the environmental assessment.

NPS Management Policies 2006 and NPS DO-41: 6.3.10.2 Trails in Wilderness. “Trails will be maintained at levels and conditions identified within the approved wilderness management plan or other planning document.”

Management standards in the Wilderness Management Plan for North Cascades National Park Service Complex (1989) state:

- “390 miles of trail are maintained annually in North Cascades National Park Service Complex” (page 15)
- “Non-power tools will be preferred. The Wilderness District Ranger will have final approval for the use of power tools. All contracts will consider the use of non-power tools. Any use of power tools will be limited as far as possible to before the 4th of July and after Labor Day. All power tools will use a modified muffler that reduces decibel level...Power tools will be limited

to chain saw, brushers, rock drills, chain saw winches, and explosives. Contractors will be required to meet these standards" (page 16).

- "Aircraft may only be used if stock use is not permitted on trails, trail conditions prevent stock use, or it is impractical to use stock and there is no other practical way to accomplish the work. Aircraft use will be confined to Monday through Thursday and as much as possible to before the 4th of July and after Memorial Day. Emergency operations are exempt. All helicopter operations will comply with NCNPSC's Helicopter Use Management Plan" (page 16).

- "In Day Use...and Trail/Camp Areas, the use of power tools is permitted when the Trails Supervisor has considered non-power tools and found them to be ineffective, inappropriate, unsafe, or when it would be impossible to complete the work load or maintain the standards outlined in this plan" (page 17).

- "Power tools will be permitted when non-power tools have been considered and found to be ineffective or inappropriate for the job. Consideration will be type of work, safety, weather, distance, amount of work to be accomplished, number of visitors using the area, and the effect on wildlife...Acceptable power tools are chain saws, power winches, and handheld rocks drills, hand-held power brushers and explosives. All power tools will be equipped with a modified muffler that reduces the decibel level" (page 36).

- "Bridges may be constructed in locations that, without a bridge, would present significant safety hazards..."

- "Trails are to be maintained to standards as specified in the Wilderness Trails Standards."

Pacific West Region Directive PW-062, Hazard Tree Management (2015):

The park conducts a hazard tree abatement program in accordance with National Park Service Pacific West Region Directive PW-062. The objective of this directive is, "To provide parks with a framework for a hazard tree program that will minimize threats to life and property from the failure of hazard trees within developed areas, consistent with the NPS mission of conserving parks' natural and cultural resources." The directive expressly addresses designated campsites in wilderness, "Where wilderness or backcountry campsites or other developments are designated and assigned by the NPS, e.g., permitted campsites, these areas should be identified for inclusion in the hazard tree management program, and such sites should be surveyed and hazards abated/mitigated."

Time Constraints

What, if any, are the time constraints that may affect the action?

There are no specific environmental constraints that would dictate the timing of the action.

Components of the Action

What are the discrete components or phases of the action?

Component X: *Example: Transportation of personnel to the project site*

Component 1: Camping opportunities in McAllister area

Component 2: Camping opportunities in Junction area

Component 3: Thunder Creek Bridge to McAllister Camp

Component 4: Tools for construction

Component 5: Short-term administrative presence

Component 6: Long-term administrative presence

Component 7: McAllister Stock Cook Area

Component 8: Condition of the trail/campsite system as result of this alternative (Is it kept to standards?)

Component 9:

Proceed to the alternatives.

Refer to the [MRDG Instructions](#) regarding alternatives and the effects to each of the comparison criteria.

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternatives

Alternative 1: Proposed Action with prohibited uses

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

The Proposed Action would:

- reroute ~1500 feet of the Thunder Creek trail in the vicinity of McAllister Stock Camp;
- relocate the McAllister Hiker camps to the vicinity of McAllister Stock camp;
- expand McAllister Stock camp by building a cook area 100 feet from tent pads; and
- construct a new administrative camp near Junction Stock camp.

Construction of the trail relocation and camps would take an eight person trail crew approximately 64 days and require various hand tools, power saws, and other small power tools such as hand drills. The crew would hike themselves in and all tools and materials would be transported by pack string.

The bridge abutments which include a mix of native rock, concrete, and wood would be demolished and removed.

The washed out bridge would be disassembled and the bridge components removed from the wilderness by helicopter. This would require up to 3 flights to remove the bridge. It is not feasible to pack the steel I-beams out with stock due to their size and weight (~50 long, weighing ~2,300 lbs). It may be feasible to cut up the I-beams with a motorized cut-off wheel or other such device but this would be time consuming and produce motorized noise in the wilderness of longer duration than the helicopter flight. Also, there are concerns about sparks from the cutting igniting forest vegetation. For these reasons a helicopter is chosen instead.

In this alternative the use of motorized tools matched with the available size of the trail crew and stock program allows trails and campsites to be kept to standard, thus considered a positive impact to the wilderness character qualities as noted below.

Component Activities

How will each of the components of the action be performed under this alternative?

Component of the Action	Activity for this Alternative
X <i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1 Camping opportunities in McAllister area	Relocated McAllister Hiker camp with preferred design features.
2 Camping opportunities in Junction area	New Administrative camp, Junction Hiker and Junction Stock
3 Thunder Creek Bridge to McAllister Camp	Bridge is removed from wilderness by helicopter
4 Tools for construction	Chainsaws and hand tools
5 Short-term administrative presence	~64 days occupying public space in McAllister and Junction Areas.
6 Long-term administrative presence	moves NPS presence out of public camps at Junction.
7 McAllister Stock Cook Area	New McAllister Stock Cook Area
8 Condition of the trail/campsite system as result of this alternative (Is it kept to standards?)	All wilderness trails and campsites kept closer to standards
9	

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 New Administrative camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Chainsaws and hand tools	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 ~64 days occupying public space in McAllister and Junction Areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 New McAllister Stock Cook Area	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8 All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	1	0	NE
Untrammeled Total Rating	1		

Explain:

If trails and campsites are kept to standards then this promotes effective drainage and use of the facilities that minimizes trammeling effects. In addition, by maintaining designated campsites this keeps backpackers from camping too close to lakeshores and other sensitive resources. Frequent human traffic in these areas are short-term small area manipulations that may cumulatively be significant, to soils, vegetation, and wildlife using the lake and shoreline areas.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	New Administrative camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Chainsaws and hand tools	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	~64 days occupying public space in McAllister and Junction Areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock Cook Area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	4	NE
Undeveloped Total Rating		-3		

Explain:

For the proposed McAllister Hiker there is no net change in camp facilities since this is a relocation of an existing camp. The addition of the McAllister Stock cook area is a slight expansion of the camp and therefore a slight negative effect on this quality. The Junction administrative camp is a new development and therefore a negative long-term effect to the undeveloped quality. Helicopter and chainsaw use would result in short-term effects to the undeveloped quality. Maintenance level of the trail system and presence of trail crews and other NPS staff is considered to have no effect on this quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	New Administrative camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Chainsaws and hand tools	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	~64 days occupying public space in McAllister and Junction Areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock Cook Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		3	3	NE
Natural Total Rating		0		

Explain:

In addition all camps with proposed changes would have layouts and features (such as bear wires) to help reduce human-wildlife conflicts. The new McAllister Stock cook area is designed to increase the separation between cooking and sleeping areas which should reduce human-wildlife conflicts improving the natural quality. The Junction administrative camp is a new development and therefore will have some long-term effects to the natural quality in the local area by creating a space occupied by people which may displace some wildlife and create an area that is no longer in a wholly natural condition. Use of the helicopter and chainsaws result in short-term effects to the natural quality primarily due to noise disturbance to wildlife that will be in the area. Presence of Trail Crews and other NPS staff has a minimal effect on this quality. Maintaining the trail and camp system to standard has a positive impact on the Natural Quality in that it minimizes negative impacts (trail braiding, bare ground near water or in fragile meadows, impacts to stream banks or lake shores, unmanaged human waste) that would occur by unmanaged visitor use. Maintaining trail tread and structures protect the natural quality in high use areas because they prevent visitors from departing the trail and trampling vegetation to find the easiest way around an obstruction or across a stream. With a sufficient crew capacity to keep up with annual clearing, brushing, repair, and replacement this prevents problems from happening and by keeping up with maintenance reduces future workloads.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No_Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 New Administrative camp, Junction Hiker and Junction Stock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Chainsaws and hand tools	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 ~64 days occupying public space in McAllister and Junction Areas.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 New McAllister Stock Cook Area	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Gain in solitude opportunities at Junction Camps			
Totals	5	4	NE
Solitude or Primitive & Unconfined Recreation Total Rating	1		

Explain:

For the new McAllister Camps there is no net change in camp facilities since this is a relocation of an existing camp. The Junction administrative camp would be a new development and therefore would have some long-term effects on this quality. The effects on opportunities for solitude would likely be mixed. The presence of a new development could negatively impact solitude if visitors were to come across the camp or NPS staff camping there. However, by moving administrative use out of the existing camps this means that those camps will have fewer users at times and therefore more opportunities for solitude for visitors camping there. Opportunities for primitive recreation would be improved by constructing the administrative camp by creating more opportunities for camping visitors by moving trail crew and other administrative camping use out of the Junction Hiker and Stock Camps. The sight and sound of the helicopter, chainsaws, and any other motorized tools would have short-term negative affects on opportunities for solitude for any visitors in the area at the time of use.

Opportunities for solitude will be maintained with the trail and camp system maintained because users are able to travel in predictable timeframes from camp to camp thus preventing overcrowding in campsites and often on the trails, in short this condition allows for the efficacy of the backcountry permit system. For that subset of more self-reliant users seeking a primitive and unconfined type of recreation maintenance of the trails adversely affects their experience. However, these users have ample opportunities if they get off the maintained trail system and travel cross-country in NOCA and surrounding Wilderness areas managed by the USFS.

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	New Administrative camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Chainsaws and hand tools	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	~64 days occupying public space in McAllister and Junction Areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock Cook Area	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	1	NE
Other Features of Value Total Rating		0		

Explain:

Following the identification of site FS-343, archeologists were able to design the layout of the camp to avoid the site as much as possible. However, due to the restrictions of the local geography, there is not as much separation of the site and campground as is desired. There is still a chance that the site may be incidentally damaged due to use and maintenance of the campground.

Keeping the trail system maintained to standards keeps most visitors on the trail and reduces the risk of disturbance to sensitive historic or cultural sites. In addition the trail system allows visitors to access and enjoy historic structures and cabins that are preserved for visitor enjoyment and education. Use of power saws would eliminate potential localized cross-cut saw impacts.

Summary Ratings for Alternative 1

Wilderness Character	
Untrammeled	1
Undeveloped	-3
Natural	0
Solitude or Primitive & Unconfined Recreation	1
Other Features of Value	0
Wilderness Character Summary Rating	-1

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternatives

Alternative 2: No Action - leave bridge in wilderness

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

Under this fully no action alternative, the Thunder Creek Trail would likely undergo incremental rerouting to respond to future erosion of the river bluff, likely by a combination of user-created social trail formation and perhaps some minor trail rerouting by the NPS in the future. McAllister Hiker camps would remain closed. Administrative use would continue as is with NPS staff sharing McAllister Stock and Junction Stock camps capacity with the public.

There would be limited restoration of the abandoned trail near McAllister Stock Camp and campsites at McAllister Hiker Camp as access, staffing, and funding allow. Any structures, such as fire grates/rigs, tent pad cribbing logs, and trail structures would be removed. Old tent pads would be scarified. Further restoration would rely on natural processes such as forest decay and regrowth. Abandoned trails would be scarified, "naturalized" by spreading logs, brush, and duff across the surface, and then planted with seeds or seedlings of native plants.

Washed out bridge debris too large to remove without prohibited uses would be left in place. The bridge I-beams were originally flown in by helicopter to construct the bridge. It is not feasible to pack the steel I-beams out with stock due to their size and weight (~50 long, weighing ~ 2,300 lbs). It also is not feasible to cut the I-beams into manageable pieces to fit on pack stock with a hand saw. The non-motorized physical effort to accomplish this would likely require many years and would also pose undue risk of repetitive stress injuries to any staff or volunteers tasked with this. In this alternative the steel I-beams would be left in the wilderness to avoid the use of motorized tools and helicopter.

The washed out bridge would be disassembled but left in the wilderness. As needed, decking or other small parts could be used in future maintenance projects in the area. Otherwise, what is not able to be feasibly hiked or packed out by stock would remain in the wilderness. The bridge stringers would be hidden in the forest near the bridge abutments which include a mix of native rock, concrete, and wood would be left in place.

Component Activities

How will each of the components of the action be performed under this alternative?

Component of the Action	Activity for this Alternative
X <i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1 Camping opportunities in McAllister area	McAllister Stock Camp Only
2 Camping opportunities in Junction area	Junction Hiker and Junction Stock
3 Thunder Creek Bridge to McAllister Camp	Not utilized and not removed from Wilderness.
4 Tools for construction	No new construction, only restoration with hand tools.
5 Short-term administrative presence	Minimal presence for camp restoration and bridge removal
6 Long-term administrative presence	NPS shares McAllister and Junction Camps with public.
7 McAllister Stock Cook Area	No improvements to McAllister Stock Camp
8 Condition of the trail/campsite system as result of this alternative (Is it kept to standards?)	Less project work more time for maintenance, trails kept closer to standards.
9	

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Not utilized and not removed from Wilderness.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Less project work more time for maintenance, trails kept closer to standards.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	0	NE
Untrammeled Total Rating		1		

Explain:

If trails and campsites are kept to standards then this promotes effective drainage and use of the facilities that minimizes trammeling effects. In addition, by maintaining designated campsites this keeps backpackers from camping too close to lakeshores and other sensitive resources. Frequent human traffic in these areas are short-term small area manipulations that may cumulatively be significant, to soils, vegetation, and wildlife using the lake and shoreline areas.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Not utilized and not removed from Wilderness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Less project work more time for maintenance, trails kept closer to standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	1	NE
Undeveloped Total Rating		0		

Explain:

In this alternative the McAllister Hiker camp would not be replaced and the existing site would be restored. This would result in a long-term positive effect for the undeveloped quality since there would be one less developed campground in the wilderness.

Leaving the washed out bridge in wilderness would continue to have a negative effect on the undeveloped quality for years to come because it is composed of steel stringers that would be a clear sign of human development.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Not utilized and not removed from Wilderness.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Less project work more time for maintenance, trails kept closer to standards.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		2	1	NE
Natural Total Rating		1		

Explain:

This alternative would have a long-term positive effect on the natural quality because the abandoned McAllister Hiker camp would be restored and allowed to return to natural conditions. The close proximity of the cook area to sleeping areas and lack of a bear wire in McAllister Stock camp would continue to have a negative effect on human-wildlife conflict.

Maintaining the trail and camp system to standard has a positive impact on the Natural Quality in that it minimizes negative impacts (trail braiding, bare ground near water or in fragile meadows, impacts to stream banks or lake shores, unmanaged human waste) that would occur by unmanaged visitor use. Maintaining trail tread and structures protect the natural quality in high use areas because they prevent visitors from departing the trail and trampling vegetation to find the easiest way around an obstruction or across a stream. With a sufficient crew capacity to keep up with annual clearing, brushing, repair, and replacement this prevents problems from happening and by keeping up with maintenance reduces future workloads.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Junction Hiker and Junction Stock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Not utilized and not removed from Wilderness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 NPS shares McAllister and Junction Camps with public.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8 Less project work more time for maintenance, trails kept closer to standards.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	4	4	NE
Solitude or Primitive & Unconfined Recreation Total Rating	0		

Explain:

Restoring the closed McAllister Camps would have a long-term positive effect on opportunities for solitude by removing a sight associated with people and keeping this camp closed would result in less people allowed to camp in the area, increasing opportunities for solitude. However, this would have a long-term negative effect on opportunities for primitive recreation since it would mean the elimination of a camping opportunity in this area popular with backpackers. Refraining from constructing an administrative camp at Junction would also result in mixed effects. By limiting capacity and thus the number of people in the area this continues to preserve opportunities for solitude. However, this would continue to result in Trail Crew competing for camping space in Junction Stock camp with continued loss of opportunities for primitive recreation for the public.

Opportunities for solitude will be maintained with the trail and camp system maintained because users are able to travel in predictable timeframes from camp to camp thus preventing overcrowding in campsites and often on the trails, in short this condition allows for the efficacy of the backcountry permit system. For that subset of more self-reliant users seeking a primitive and unconfined type of recreation maintenance of the trails adversely affects their experience. However, these users have ample opportunities if they get off the maintained trail system and

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Not utilized and not removed from Wilderness.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Less project work more time for maintenance, trails kept closer to standards.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	0	NE
Other Features of Value Total Rating		1		

Explain:

Keeping the trail system maintained to standards keeps most visitors on the trail and reduces the risk of disturbance to sensitive historic or cultural sites. In addition the trail system allows visitors to access and enjoy historic structures and cabins that are preserved for visitor enjoyment and education. Use of power saws would eliminate potential localized cross-cut saw impacts.

Summary Ratings for Alternative 2

Wilderness Character	
Untrammeled	1
Undeveloped	0
Natural	1
Solitude or Primitive & Unconfined Recreation	0
Other Features of Value	1
Wilderness Character Summary Rating	3

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternatives

Alternative 3: Proposed Action with no prohibited uses

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

This action mirrors the Proposed Action but would be accomplished with no motorized tools:

- reroute ~1500 feet of the Thunder Creek trail in the vicinity of McAllister Stock Camp;
- relocate the McAllister Hiker camps to the vicinity of McAllister Stock camp;
- expand McAllister Stock camp by building a cook area 100 feet from tent pads; and
- construct a new administrative camp near Junction Stock camp.

Construction of the trail relocation and camps would take an 12-person trail crew approximately 120 days and require various hand tools such as hand saws, axes, pulaski, shovels, pick mattock, rock bars, rigging, and blasting hazard trees that are not safe to cut with a crosscut saw and blasting unforeseen geology (bedrock, boulders).

The crew would hike themselves in and all tools and materials would be transported by pack string.

The bridge abutments which include a mix of native rock, concrete, and wood would be demolished and removed with hand tools and stock.

Washed out bridge debris is too large to remove without prohibited uses would be left in place. The bridge I-beams were originally flown in by helicopter to construct the bridge. It is not feasible to pack the steel I-beams out with stock due to their size and weight (~50 long, weighing ~ 2,300 lbs). It also is not feasible to cut the I-beams into manageable pieces to fit on pack stock with a hand saw. The non-motorized physical effort to accomplish this would likely require many years and would also pose undue risk of repetitive stress injuries to any staff or volunteers tasked with this. In this alternative the steel I-beams would be left in the wilderness to avoid the use of motorized tools and helicopter.

In this alternative the use of non-motorized tools matched with the available size of the trail crew and stock program does not allow trails and campsites to be kept to standard, thus considered a negative impact to the wilderness character qualities as noted below.

Component Activities

How will each of the components of the action be performed under this alternative?

Component of the Action	Activity for this Alternative
X <i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1 Camping opportunities in McAllister area	Relocated McAllister Hiker camp with preferred design features.
2 Camping opportunities in Junction area	New Administrative Camp, Junction Hiker and Junction Stock
3 Thunder Creek Bridge to McAllister Camp	Bridge is left in wilderness
4 Tools for construction	Non-motorized hand tools and saws
5 Short-term administrative presence	~120 days occupying public space in McAllister and Junction Areas for construction.
6 Long-term administrative presence	moves NPS presence out of public camps at Junction.
7 McAllister Stock Cook Area	New McAllister Stock cook area
8 Condition of the trail/campsite system as result of this alternative (Is it kept to standards?)	Trail crew capacity is limited; Trails and campsites are NOT kept to standards.
9	

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 New Administrative Camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Bridge is left in wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Non-motorized hand tools and saws	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 ~120 days occupying public space in McAllister and Junction Areas for construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 New McAllister Stock cook area	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8 Trail crew capacity is limited; Trails and campsites are NOT kept to standards.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	1	NE
Untrammed Total Rating	-1		

Explain:

If trails and campsites are kept to standards then this promotes effective drainage and use of the facilities that minimizes trammeling effects. If the trail prism is not properly maintained it will dam water and cause muddy areas and slope instabilities. In addition, by maintaining designated campsites this keeps backpackers from camping to close to lakeshores and other sensitive resources. Frequent human traffic in these areas are short-term small area manipulations that may cumulatively be significant, to soils, vegetation, and wildlife using the lake and shoreline areas.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	New Administrative Camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bridge is left in wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Non-motorized hand tools and saws	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	~120 days occupying public space in McAllister and Junction Areas for construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock cook area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Trail crew capacity is limited; Trails and campsites are NOT kept to standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	3	NE
Undeveloped Total Rating		-3		

Explain:

For the new McAllister Camps there is no net change in camp facilities since this is a relocation of an existing camp. However, the Junction administrative camp and the McAllister Cook areas are a new developments and therefore long-term negative effects to the undeveloped quality.

Use of non-motorized hand tools and the pack train are not prohibited uses and therefore do not effect this quality.

Leaving the washed out bridge in wilderness would continue to have a negative impact on the undeveloped quality for years to come because it is composed of steel stringers that would be a clear sign of human development.

Presence of Trail Crews and other NPS staff has no effect on this quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	New Administrative Camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bridge is left in wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Non-motorized hand tools and saws	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	~120 days occupying public space in McAllister and Junction Areas for construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock cook area	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Trail crew capacity is limited; Trails and campsites are NOT kept to standards.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		2	3	NE
Natural Total Rating		-1		

Explain:

For the new McAllister Camps there is no net change in camp facilities since this is a relocation of an existing camp. However, the Junction administrative camp is a new development and therefore has some impact to the natural quality by creating a space occupied by people which may displace some wildlife and create an area that is no longer in a wholly natural condition. The improved layouts of McAllister Hiker and Stock camps are long-term positive effects.

With the use of cross cut saws, there is the tendency to choose the path of least resistance for construction of a new trail. This would result in a curvier trail. The straighter the alignment of the trail typically the better drainage it has. With less sediment build-up in ditches and drains it would require less maintenance in the long-term and less disturbance to the natural environment for maintenance and repair. Presence of Trail Crews and other NPS staff has a minimal effect on this quality.

Because it takes longer to clear trails using non-motorized equipment, the trails across the wilderness will remain blocked for longer and each year not all needed maintenance would always be done. This will lead to significant natural impacts in busy areas from social trails, vegetation trampling at informal campsites (if visitors are not able to make the designated site as a result of having to crawl over downed trees), etc. Impacts from erosion of unmaintained trails, (plugged culverts, dip drains, water bars), will increase.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 New Administrative Camp, Junction Hiker and Junction Stock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Bridge is left in wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Non-motorized hand tools and saws	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 ~120 days occupying public space in McAllister and Junction Areas for construction.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 moves NPS presence out of public camps at Junction.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 New McAllister Stock cook area	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8 Trail crew capacity is limited; Trails and campsites are NOT kept to standards.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9 Gain in solitude opportunities at Junction Camps	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	4	4	NE
Solitude or Primitive & Unconfined Recreation Total Rating	0		

Explain:

For the new McAllister Camps there is no net change in camp facilities since this is a relocation of an existing camp. The Junction administrative camp would be a new development and therefore has some impact on this quality. In fact a motivation for constructing the administrative camp is to create more opportunities for primitive recreation for visitors by moving trail crew and other administrative camping use out of the Junction Hiker and Stock Camps. The effects on opportunities for solitude would likely be mixed. The presence of a new development could negatively impact solitude if visitors were to come across the camp or NPS staff camping there. However, by moving administrative use out of the existing camps this means that those camps will have fewer users at times and therefore more opportunities for solitude for visitors camping there. There would be a short-term negative impact for ~120 days to opportunities for primitive recreation for visitors because the trail crew will be camping at McAllister and Junction stock camps. The old McAllister camp is not safe for visitors or park staff due to hazard trees. Less maintained and more primitive trail conditions would increase opportunities for primitive recreation in some areas. This may also increase opportunities for solitude in some areas because fallen trees and washouts will slow travel times and discourage some visitors from continuing further or even choosing the hike over others. However, some overnight visitors could get backed up and be forced to stay at other designated campsites for which they don't have an overnight permit for. This would negatively impact visitors who do have a permit for a respective camp on those nights. Some visitors may also camp next to the stream or on the floodplain outside thereby affecting other hikers opportunity for solitude by their presence and impacts of informal campsites.

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Relocated McAllister Hiker camp with preferred design features.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	New Administrative Camp, Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is left in wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Non-motorized hand tools and saws	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	~120 days occupying public space in McAllister and Junction Areas for construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	moves NPS presence out of public camps at Junction.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	New McAllister Stock cook area	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Trail crew capacity is limited; Trails and campsites are NOT kept to standards.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	1	NE
Other Features of Value Total Rating		-1		

Explain:

Not keeping the trail system maintained to standards increases the risk of disturbance to sensitive historic or cultural sites. In addition the trail system will not provide as easy of travel that allows visitors to access and enjoy historic structures and cabins that are preserved for visitor enjoyment and education.

Summary Ratings for Alternative 3

Wilderness Character	
Untrammeled	-1
Undeveloped	-3
Natural	-1
Solitude or Primitive & Unconfined Recreation	0
Other Features of Value	-1
Wilderness Character Summary Rating	-6

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternatives

Alternative 4: No camp modifications - remove bridge from wilderness

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

In this case the Thunder Creek Trail would undergo incremental rerouting likely by a combination of formation of social trails and perhaps some minor trail construction in the future. to respond to erosion of the river bluff. McAllister Hiker camps would remain closed. Administrative use would continue as is with NPS staff sharing Junction Stock camp capacity with the public.

There would be limited restoration of abandoned campsites. Any structures, such as fire grates/rigs, tent pad cribbing logs, and trail structures would be removed. Old tent pads would be scarified. Further restoration would rely on natural processes such as forest decay and regrowth. Abandoned trails would be scarified, “naturalized” by spreading logs, brush, and duff across the surface, and then planting seeds or seedlings of native plants.

The bridge abutments which include a mix of native rock, concrete, and wood would be demolished and removed. The washed out bridge would be disassembled and the stringers removed from the wilderness by helicopter. This would require up to 3 flights to remove the bridge.

Component Activities

How will each of the components of the action be performed under this alternative?

Component of the Action	Activity for this Alternative
X <i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1 Camping opportunities in McAllister area	McAllister Stock Camp Only
2 Camping opportunities in Junction area	Junction Hiker and Junction Stock
3 Thunder Creek Bridge to McAllister Camp	Bridge is removed from wilderness by helicopter
4 Tools for construction	No new construction, only restoration with hand tools.
5 Short-term administrative presence	Minimal presence for camp restoration and bridge removal
6 Long-term administrative presence	NPS shares McAllister and Junction Camps with public.
7 McAllister Stock Cook Area	No improvements to McAllister Stock Camp
8 Condition of the trail/campsite system as result of this alternative (Is it kept to standards?)	All wilderness trails and campsites kept closer to standards
9	

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	0	NE
Untrammeled Total Rating		1		

Explain:

If trails and campsites are kept to standards then this promotes effective drainage and use of the facilities that minimizes trammeling effects. By maintaining designated campsites this keeps backpackers from camping too close to lakeshores and other sensitive resources. Frequent human traffic in these areas are short-term small area manipulations that may cumulatively be significant, to soils, vegetation, and wildlife using the lake and shoreline areas.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		2	1	NE
Undeveloped Total Rating		1		

Explain:

In this alternative the McAllister Hiker camp would not be replaced and the existing site would be restored. This would result in a positive outcome for the undeveloped quality since there would be one less developed campground in the wilderness.

Use of the helicopter result in short-term impacts to the undeveloped quality.

Removal of the bridge is a long-term positive effect on the undeveloped quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		2	2	NE
Natural Total Rating		0		

Explain:

This alternative would have a positive impact on the natural quality because the abandoned McAllister Hiker camp would be restored and allowed to return to natural conditions. The close proximity of the cook area to sleeping areas and lack of a bear wire in McAllister Stock camp would continue to have a negative effect on human-wildlife conflict.

Use of the helicopter result in short-term impacts to the natural quality primarily due to noise disturbance to wildlife that will be in the area. Presence of Trail Crews and other NPS staff has a minimal effect on this quality.

Maintaining the trail and camp system to standard has a positive impact on the Natural Quality in that it minimizes negative impacts (trail braiding, bare ground near water or in fragile meadows, impacts to stream banks or lake shores, unmanaged human waste) that would occur by unmanaged visitor use. Maintaining trail tread and structures protect the natural quality in high use areas because they prevent visitors from departing the trail and trampling vegetation to find the easiest way around an obstruction or across a stream. With a sufficient crew capacity to keep up with annual clearing, brushing, repair, and replacement this prevents problems from happening and by keeping up with maintenance

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Junction Hiker and Junction Stock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		5	4	NE
Solitude or Primitive & Unconfined Recreation Total Rating		1		

Explain:

Restoring the closed McAllister Camps would have a positive impact on opportunities for solitude by removing a sight associated with people and keeping this camp closed would result in less people allowed to camp in the area, increasing opportunities for solitude. However, this would have a negative impact on opportunities for primitive recreation since it would mean the elimination of a camping opportunity that once existed in this area popular with backpackers.

The sight and sound of the helicopter would have short-term adverse affects on opportunities for solitude for any visitors in the area at the time of use.

Refraining from constructing an administrative camp at Junction would also result in mixed impacts. By limiting capacity and thus the number of people in the area this continues to preserve opportunities for solitude. However, this would continue to result in Trail Crew competing for camping space in Junction Stock camp with continued loss of opportunities for primitive recreation for the public.

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	McAllister Stock Camp Only	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Junction Hiker and Junction Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Bridge is removed from wilderness by helicopter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	No new construction, only restoration with hand tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Minimal presence for camp restoration and bridge removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	NPS shares McAllister and Junction Camps with public.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	No improvements to McAllister Stock Camp	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	All wilderness trails and campsites kept closer to standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		1	0	NE
Other Features of Value Total Rating		1		

Explain:

Keeping the trail system maintained to standards keeps most visitors on the trail and reduces the risk of disturbance to sensitive historic or cultural sites. In addition the trail system allows visitors to access and enjoy historic structures and cabins that are preserved for visitor enjoyment and education. Use of power saws would eliminate potential localized cross-cut saw impacts.

Summary Ratings for Alternative 4

Wilderness Character	
Untrammeled	1
Undeveloped	1
Natural	0
Solitude or Primitive & Unconfined Recreation	1
Other Features of Value	1
Wilderness Character Summary Rating	4

MRDG Step 2: Alternatives Not Analyzed

Alternatives Not Analyzed

What alternatives were considered but not analyzed? Why were they not analyzed?

Other Locations Considered

Several other locations to replace and redistribute the camp capacity of McAllister Hiker Camps were considered but dismissed:

- A potential new location was identified just north of and across Fisher Creek from Tricouni Camp. This location was dismissed because it was located in excellent suitable nesting habitat for northern spotted owl.
- The option was discussed to replace the capacity of McAllister Hiker camps by adding on to already existing camps such as Neve, McAllister Stock, Tricouni, and Junction Camps. Alternatives with various combinations of these were dismissed after the proposed action site was identified. It is challenging to find a site that meets as many PDFs as possible and the proposed action site meets some of the most critical. Expanding the footprint at several different locations introduces a higher level of uncertainty as to what the environmental impacts would be. In addition the location of McAllister camps along the trail provides a desirable distance for many people (~7 miles) for a first day of backpacking up the Thunder Creek trail.

Capacity Changes

While there would be a small increase in capacity in the proposed action with the construction of an administrative camp near Junction Stock, addressing changes in capacity (either increases or decreases) in lower Thunder Creek was dismissed because this is beyond the scope of this particular review. Addressing overnight capacity beyond the site specific level is a larger question that needs to be addressed systematically across the Stephen Mather Wilderness. The NPS plans to take this up in the next few years in a comprehensive wilderness stewardship plan.

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternative Comparison

Alternative 1: Proposed Action with prohibited uses

Alternative 2: No Action - leave bridge in wilderness

Alternative 3: Proposed Action with no prohibited uses

Alternative 4: No camp modifications - remove bridge from wilderness

Wilderness Character	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Untrammeled	1	0	1	0	0	1	1	0
Undeveloped	1	4	1	1	0	3	2	1
Natural	3	3	2	1	2	3	2	2
Solitude/Primitive/Unconfined	5	4	4	4	4	4	5	4
Other Features of Value	1	1	1	0	0	1	1	0
Totals	11	12	9	6	6	12	11	7
Wilderness Character Rating	-1		3		-6		4	

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Alternative Comparison

Alternative 1: Proposed Action with prohibited uses

Alternative 2: No Action - leave bridge in wilderness

Alternative 3: Proposed Action with no prohibited uses

Alternative 4: No camp modifications - remove bridge from wilderness

Wilderness Character	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	short-term	long-term	short-term	long-term	short-term	long-term	short-term	long-term
Untrammeled	1	0	0	1	1	0	0	0
Undeveloped	-2	-1	0	0	0	-3	-1	2
Natural	-1	1	0	1	0	-1	-1	1
Solitude or Primitive and Unconfined Recreation	-2	2	0	0	-2	1	-1	2
Unique / Other Features	0	0	0	1	0	-1	0	1
Total	-4	2	0	3	-1	-4	-3	6

Project Title: Lower Thunder Creek Trail and Camp Modifications

MRDG Step 2: Determination

Refer to the [MRDG Instructions](#) before identifying the selected alternative and explaining the rationale for the selection.

Selected Alternative

- Alternative 1: Proposed Action with prohibited uses
- Alternative 2: No Action - leave bridge in wilderness
- Alternative 3: Proposed Action with no prohibited uses
- Alternative 4: No camp modifications - remove bridge from wilderness

Explain Rationale for Selection:

Alternative 1 is selected which is to remove the washed out McAllister Bridge by helicopter and construct the trail and camp relocations with motorized tools. Although this alternative does not have the highest wilderness character score in this worksheet, this is primarily due to short-term negative impacts. The balance of long-term benefits versus adverse impacts is acceptable in order to provide for the public purpose of recreation.

The No Action alternative clearly does best preserve wilderness character because it would result in less long-term development and few short-term impacts since there would be no construction. However, this would mean a long-term loss of primitive recreation opportunities (at least under the current permit system). No action is unacceptable because it eliminates the overnight camping opportunities that have existed for many years, which relates to the recreation public purpose of wilderness. Both the Wilderness Act and NPS Organic Act acknowledge that National Parks and designated Wilderness are for the enjoyment of people and the preservation/conservation of resources. Great care was taken to site the proposed camps in locations that would have minimal impacts to sensitive resources.

NOCA's trail system has a history of recreational use predating both park and wilderness designation. The NPS established standards for the trail system in 1982 that predate wilderness designation, and the Wilderness Act specifically states that "the designation of any area of any park, monument, or other unit of the national park system as a wilderness area pursuant to this Act shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system..." (section 4(a)(3)). Thus these standards are key to guiding what the minimum tools and activities are in Step 2.

If more space is needed, continue on the next page...

Explain Rationale for Selection, Continued:

The answer to the question of what the minimum tools are for construction of the new trail and camps (alternative 1 vs. alternative 3) is related to the additional time required for conducting the construction work with motorized tools has two implications for this project:

1) The additional time spent in the field (~60 days) by a crew with non-motorized tools means that they will be occupying camp space for additional time and displacing the public resulting in a negative impact on opportunities for primitive recreation for a good portion of a hiking season.

2) The time required to complete this project relates to maintaining the entire trail system in the SMW. There is no additional crew for this project so the same crew is expected to contribute to cyclic trail maintenance in other locations. Thus the longer this project takes the fewer trails will be able to be kept up to the Complex's trail standards. Keeping the trail system to standard prevents widespread localized impacts to soils, vegetation, and cultural resources along the trail corridor. This point has been documented in the programmatic MRA for trails maintenance (PEPC 46436 and 86784).

Describe Monitoring & Reporting Requirements:

Approvals

Which of the prohibited uses found in Section 4(c) of the Wilderness Act are approved in the selected alternative and for what quantity?

<u>Prohibited Use</u>	<u>Quantity</u>
<input type="checkbox"/> Mechanical Transport:	
<input checked="" type="checkbox"/> Motorized Equipment:	Chainsaws and small motorized hand tools for camp construction.
<input type="checkbox"/> Motor Vehicles:	
<input type="checkbox"/> Motorboats:	
<input checked="" type="checkbox"/> Landing of Aircraft:	3 flights for long-line operations to remove washed out bridge
<input type="checkbox"/> Temporary Roads:	
<input type="checkbox"/> Structures:	
<input checked="" type="checkbox"/> Installations:	New camp structures such as signs, fire rings, hitching posts, etc.

Record and report any authorizations of Wilderness Act Section 4(c) prohibited uses according to agency policies or guidance.

Refer to agency policies for the following review and decision authorities:

Prepared	Name		Position	
	Rob Burrows		Environmental Protection Specialist	
	Signature		Date	
Recommended	Name		Position	
	Luke Daquila		Project Leader	
	Signature		Date	
Recommended	Name		Position	
	Jordan Mammel		Wilderness Coordinator	
	Signature		Date	
Approved	Name		Position	
	Karen F. Taylor-Goodrich		Superintendent	
	Signature		Date	

APPENDIX B: Preferred Design Features for Stephen Mather Wilderness Camps

- Sited away from dynamic geologic processes and landforms that may disrupt the camp or endanger visitors (floodplains, debris cones, and rockfall areas)
- Does not occupy suitable or sensitive wildlife habitat (northern spotted owl and/or marbled murrelet suitable nesting habitat, grizzly or black bear, other species as applicable).
- Does not occupy rare plant habitat.
- Does not occupy sensitive archeological sites.
- If in forest, sited so that hazard tree risks are minimized and will be for the foreseeable future
- Camp at least 100 feet away from a water body
 - Personal experiences and social science show that visitors want to camp as close as possible to waterbodies. Depending on the local conditions (soils, vegetation, wildlife, and visitor use patterns), campsites could be located closer to water but would require a site specific evaluation and containment strategy (see Marion, Wimpey, and Lawhorn 2018).
- Camp is not so far away from a water source as to be inconvenient to the user (15 min walk max?)
- Toilet is at least 200 feet away from a water body
- The cooking and food storage area are combined and is at least 100 feet away from tent pads/sleeping area to reduce risks of human bear conflict.
 - Cooking and food storage areas may be communal for multiple campsites or each individual site may have its own area. A rule of thumb could be 1 cook site for a large group camp and 1 cook site for every 2 small group campsites within the same camp area.
 - A concerted effort is needed to provide guidance to public to show where the proper cook/food storage area is.
 - A cooking area should not be so screened by topography or vegetation so that when approaching on trail you can see it if a bear was hanging around or if in the cook area one can see an approaching bear.
- Meets privacy standards: out of sight of both the main trail and other campsites.
- Camp areas are contained on terrain or in a vegetation type that resists growth of barren ground (e.g. sidehill campsites)
- As appropriate and applicable may have the following installations for visitor use mitigation:
 - Fire rings – Rock fire rings where fires are allowed.
 - Food storage – Depending on the site the NPS will provide either a wire suspended between trees in forested areas or a metal wildlife resistant storage box or will require use of a bear resistant food container.
 - Toilet (Wallowa or Composter):
 - Large group camps should have separate toilets from small group camps in the same area.

- Stock Users have some different needs and Stock Camps need to have some different PDFs:
 - Need <20% slopes as stock don't navigate steep slopes as well as people.
 - Needs generally larger area to accommodate animals
 - Not too far from water so watering is not overly time consuming (for example if animals need to be led singly to water).
 - Needs well-constructed trail to water access
 - Need a tent pad next to the hitchrails for the packer(s).
- Administrative camps have a few different standards:
 - Admin camps can have Knaack boxes
 - Some ranger camps have wood platforms (Pelton Basin and Boston Basin)
 - New camps ideally extension of existing camps to concentrate all human camping impacts in a locale.

References and Recent Literature

Marion, J. L., Y. F. Leung, H. Eagleston, and K. Burroughs. 2016. A review and synthesis of recreation ecology research findings on visitor impacts to wilderness and protected natural areas. *Journal of Forestry* 114(3): 352–362.

Marion, J. L., J. Wimpey, and B. Lawhorn. 2018. Conflicting Messages about Camping Near Waterbodies in Wilderness: A Review of the Scientific Basis and Need for Flexibility. *International Journal of Wilderness* 24(2): 68-81.

Marion, J. L., J. Arrendondo, J. Wimpey, and F. Meadema. 2018. Applying Recreation Ecology Science to Sustainably Manage Camping Impacts: A Classification of Camping Management Strategies. *International Journal of Wilderness* 24(2): 84-101.

Marion, J. L., J. Wimpey, J. Arredondo, and F. Meadema. 2019. Sustainable Camping “Best Management Practices.” USDI U.S. Geological Survey, Virginia Tech Field Unit. Final Research Report to the USDI, National Park Service, Appalachian Trail Park Office, and the Appalachian Trail Conservancy, Harpers Ferry, WV. 57 p.

Appendix C: Proposed Action Landform Maps

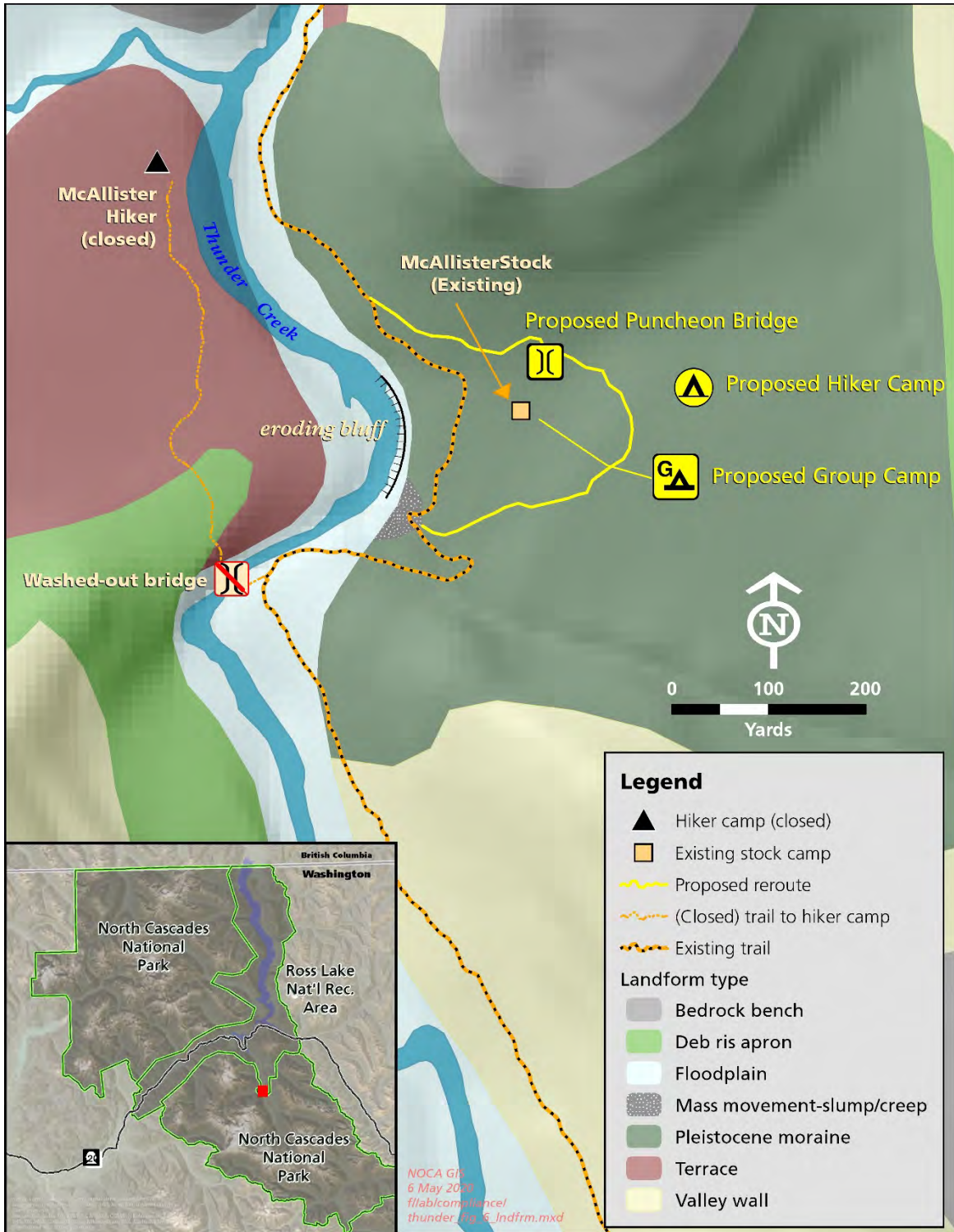


Figure C-1. Map of the McAllister camps area superimposed over geologic landforms as mapped by the NPS (Riedel and Probala 2005). The proposed trail reroute and relocated McAllister Hiker camp are entirely on the stable landform of a Pleistocene moraine. Once corner of the existing trail close to the eroding bluff is also in a mass movement-slump/creep.

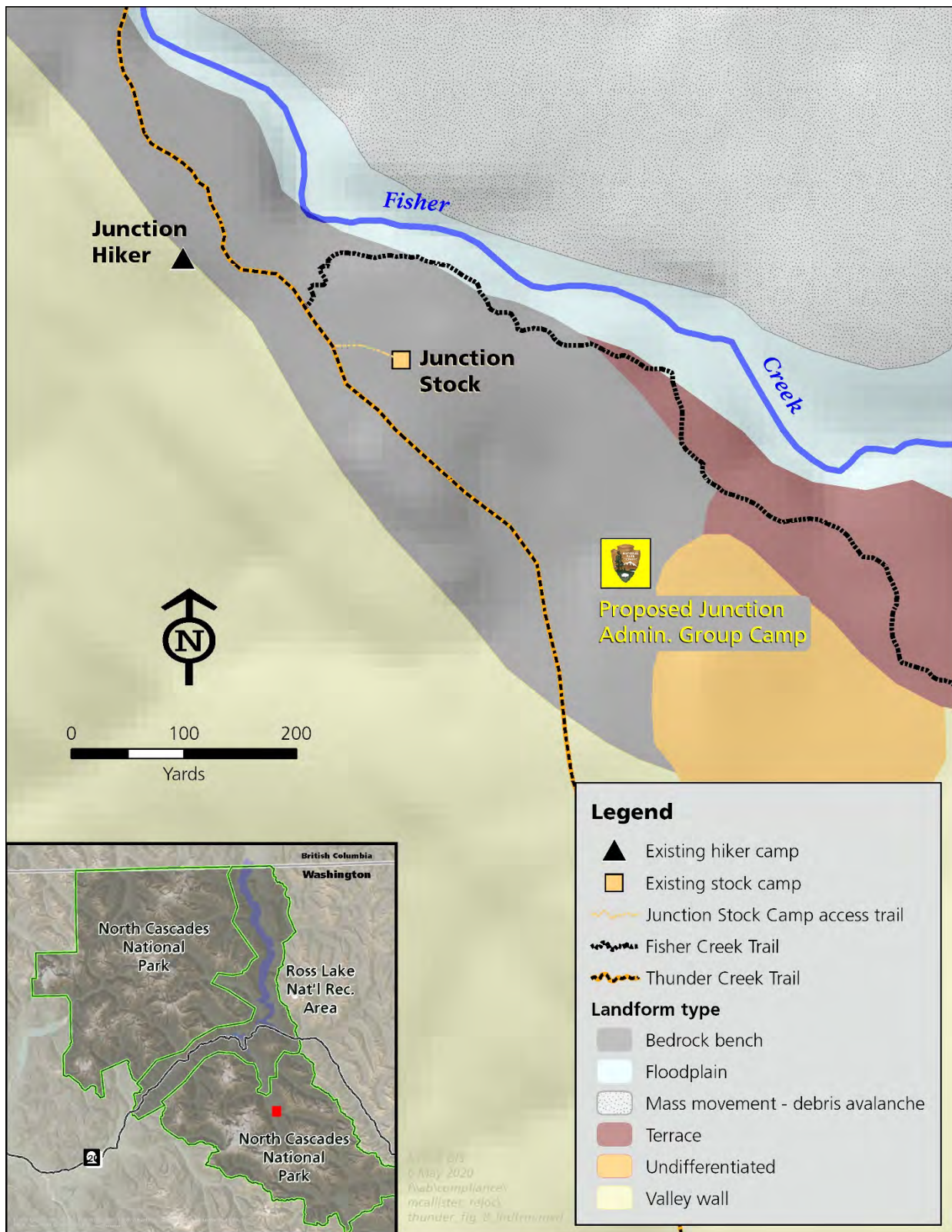


Figure C-2. Map of the Junction camps area superimposed over geologic landforms as mapped by the NPS (Riedel and Probala 2005). The proposed Junction Administrative camp are entirely on the stable landform of a bedrock bench.

Reference

Riedel J and Probala J. 2005. Mapping ecosystems at the landform scale in Washington state. *Park Science*. 23(2):37–42

Appendix D: Biological Assessment



Lower Thunder Creek Trail and Camp Changes Biological Assessment



Lower Thunder Creek Trail and Camp Changes Biological Assessment

Prepared by:

North Cascades National Park Complex
810 State Route 20
Sedro-Woolley, WA 98284

December 2019

U.S. Department of the Interior
National Park Service

ON THE COVER

Photo showing the forest in the vicinity of the proposed new McAllister Hiker Camps, Thunder Creek Valley, North Cascades National Park Service Complex.
NPS photo/Rob Burrows

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Introduction

The Endangered Species Act of 1973 (16 U.S.C. 153 et seq.), as amended (ESA) in section 7(a) (1) directs federal agencies to conserve and recover listed species and use their authorities in the furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species so that listing is no longer necessary (50 CFR §402). Furthermore, the Act in section 7(a) (2) directs federal agencies to consult (referred to as section 7 consultation) with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) when their activities “may affect” a listed species or designated critical habitat.

Purpose of this Biological Assessment

This biological assessment (BA) analyzes the potential effects that could result from the proposed action as described in this document in North Cascades National Park Service Complex (the Complex) on federally listed threatened, endangered, proposed species, and critical habitats, pursuant to section 7(a)(2) of the ESA.

Consultation History

This project was brought to the attention of Jamie Hanson with the USFWS during a site visit to the proposed camp areas with NPS staff including Rob Burrows, Roger Christophersen, Bill Zimmer, and Luke Daquila on August 5 and 6, 2019.

Proposed Management Action and Alternatives Considered

PURPOSE AND NEED FOR ACTION

The NPS is proposing to reroute 1500 feet of trail and relocate a hiker and group camp in the vicinity of McAllister Camps on the Thunder Creek Trail. Additionally the NPS proposes to construct a new administrative camp near Junction Camp another 3.5 miles up the same trail. See the Proposed Action in the Alternatives section for additional detail.

The purpose this action is to preserve wilderness character in lower Thunder Creek by continuing to provide designated campsite development to contain the impacts of overnight camping in discrete areas. The preservation of wilderness character includes natural and cultural resources and wilderness-centered visitor opportunities.

The need for the project flows primarily from the Organic Act of 1916 and the Wilderness Act of 1964 through the North Cascades National Park Wilderness Management Plan (1989) and Ross Lake National Recreation Area General Management Plan (2012) in addressing visitor use management in light of recent environmental changes.

BACKGROUND

The Thunder Creek Trail is located in North Cascades National Park Service Complex (Park Complex) including portions of Ross Lake National Recreation Area (ROLA) and North Cascades National Park (NOCA). The trail and associated designated campsites are almost entirely located in the Stephen Mather

Wilderness (Figure 1). The NPS has maintained a trail to standards for pack stock and designated hiker and stock user campsites up Thunder Creek for over 50 years.

For more information on the Park Complex including purpose and significance see the [Foundation Document](#) (NPS 2017). For a summary of more detailed management guidance relevant to lower Thunder Creek see the [ROLA General Management Plan](#) (NPS 2012).

Recent changes in environmental and social factors have forced the NPS to consider changes in locations of trails and campsites in lower Thunder Creek:

1. A large bluff above Thunder Creek just west of McAllister Stock Camp has been eroding and encroaching on the main trail in recent years (Figure 2). There is limited space to continue to incrementally move the trail east because of the location of McAllister Stock Camp. One corner on the trail has been infringed upon by erosional encroachment to the point it is out of standard for stock use.

2. In 2017 a large number of hazard trees (~30 large diameter and several smaller ones) were identified in the McAllister Hiker camp necessitating closure of the entire camp. This camp includes one large group site for up to 12 people and four smaller sites designed to accommodate up to 4 backpackers each. Normally, following NPS policy, the NPS will fell hazard trees in designated camps to abate the risk of dead and dying trees falling on visitors cooking and sleeping in designated sites (which is required under the terms of an NPS overnight backcountry camping permit). However, when there are many hazard trees, the NPS will close the camp until a solution that minimizes impacts to resources is found. Coincidentally, a large flood on Thunder Creek in November 2017 completely washed out the pedestrian bridge that has provided

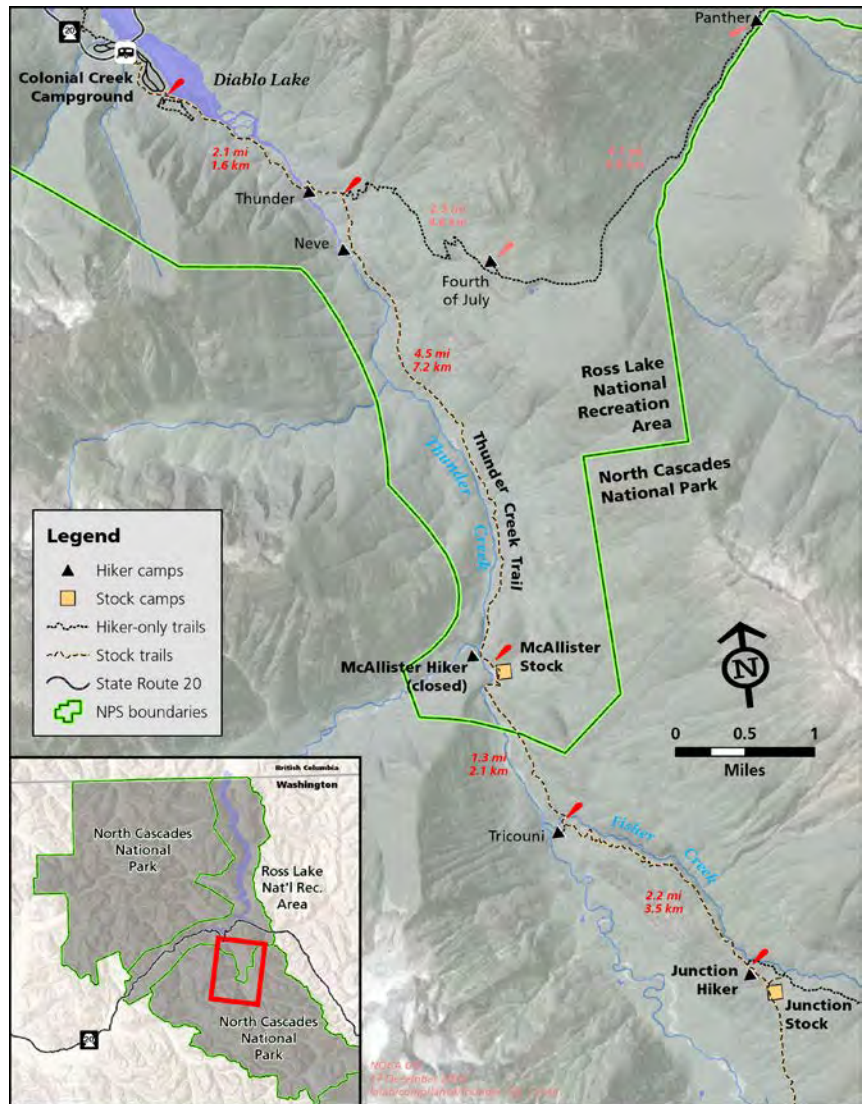


Figure 1. Map showing the Thunder Creek Trail, current locations of camps in lower Thunder Creek, the boundary between Ross National Recreation Area and North Cascades National Park, and surrounding topography.

convenient access from the main trail to the hiker camps (Figure 3). It is possible to ford Thunder Creek in this area under low flow conditions by the most experienced and intrepid hikers/mountaineers. There may also be natural crossings available on fallen trees or log jams that span Thunder Creek in the area.

3. Overnight visitors have demonstrated demand for use of the relatively large capacity of McAllister Hiker Camps as the most highly utilized camp in the area (Figure 4). All camps have seen increasing trends since 2006. McAllister Hiker and Stock camps are relatively low elevation (~2000 ft) and provide early season backpacking opportunities. As they are within ROLA, where dogs are allowed on leash, these sites also popular with hikers travelling with their dogs.
4. In the last decade backcountry overnight use in Thunder Creek has increased dramatically (Figures 4 and 5). In addition in 2016 the NPS began offering fee-based public reservations that makes 60% of camp space available across the Park Complex. These two factors have caused conflicts between public use and the camping needs of the NPS trail crew.

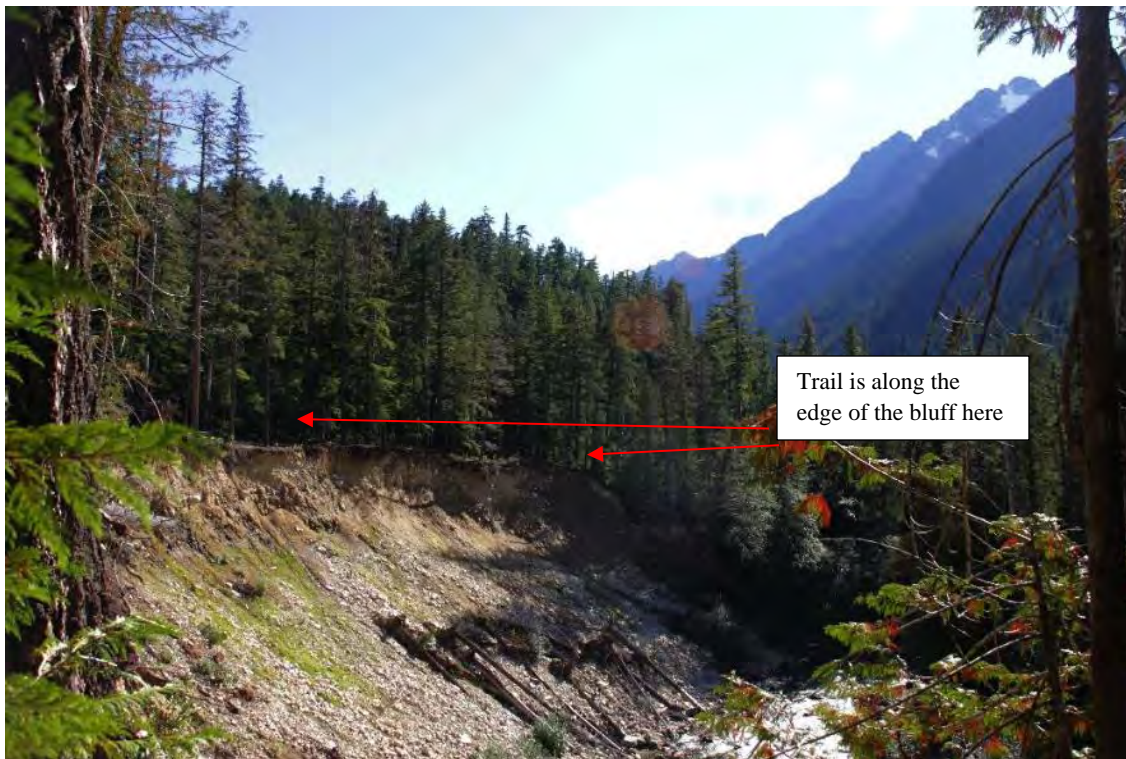


Figure 2. Photo showing the eroding bluff above Thunder Creek in the vicinity of the McAllister camps. The trail follows the edge of the bluff on the middle left side of the photo.



Figure 3. The bridge abutment in the foreground and Thunder Creek in a small gorge in the background where the bridge was washed out during the flood in late November 2017. Note the bent over bolts on the abutment.

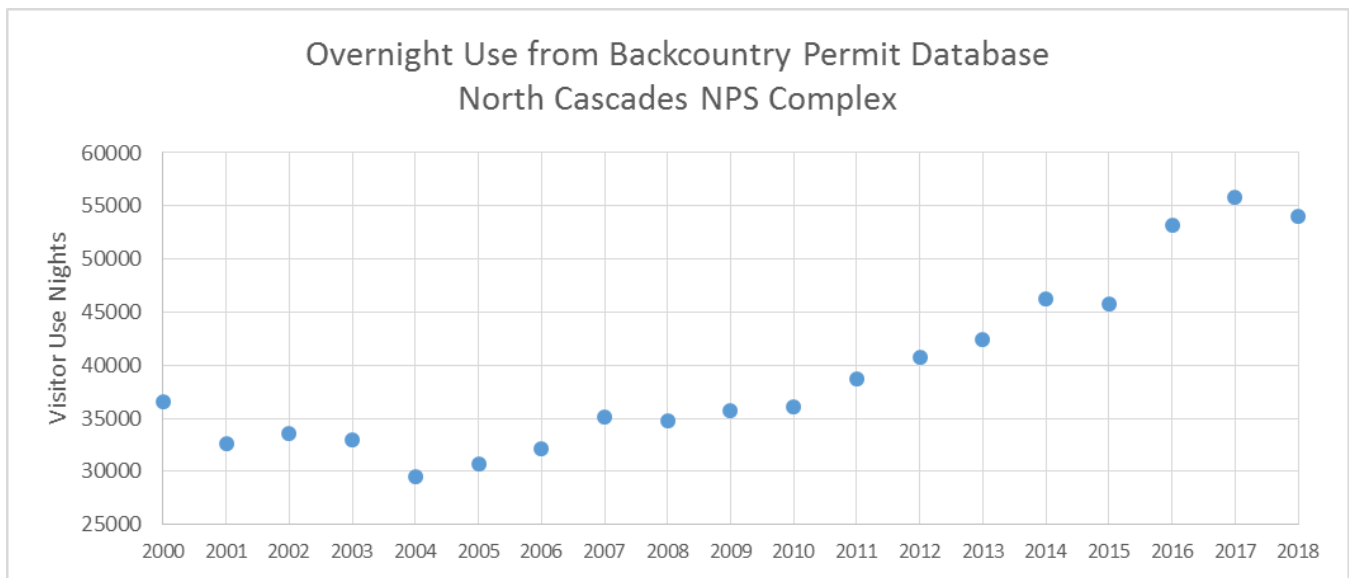


Figure 4. Total overnight use form backcountry permit data in North Cascades National Park Service Complex from 2000 to 2018.

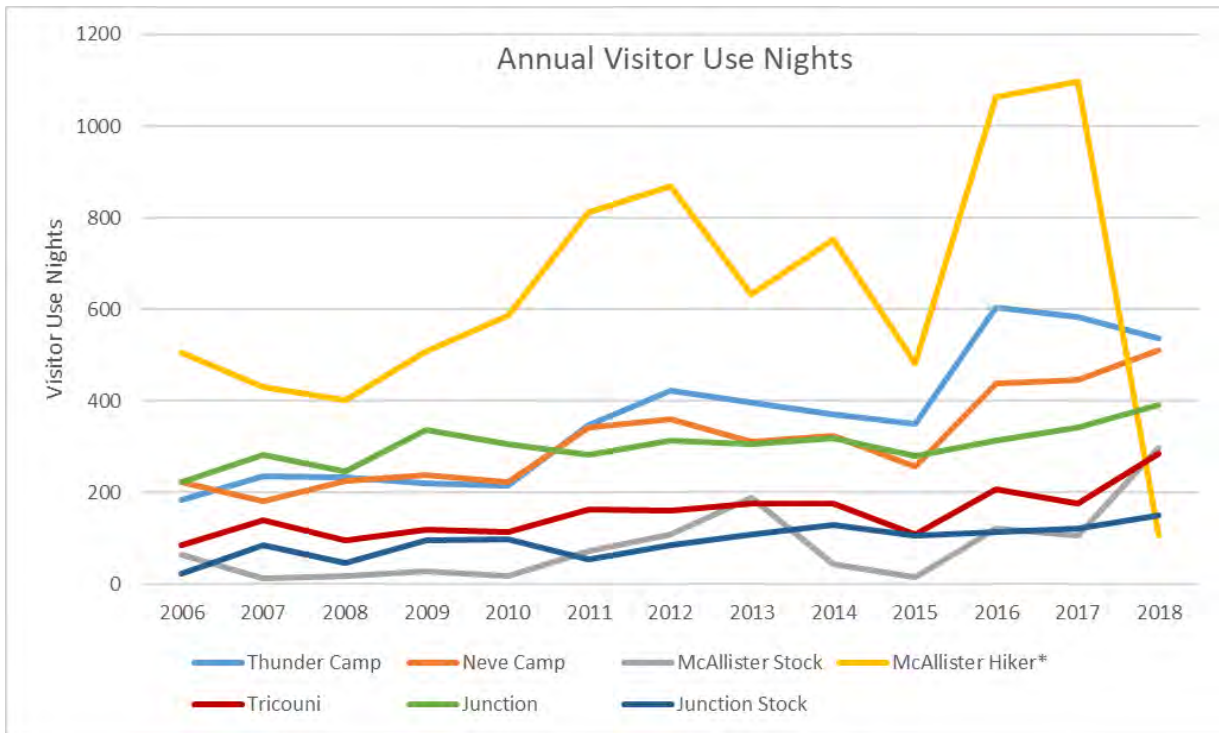


Figure 5. Total overnight use from backcountry permit data for camps in lower Thunder Creek including Thunder, Neve, McAllister Stock, McAllister Hiker, Tricouni Hiker, Junction Hiker, and Junction Stock. McAllister Hiker camp was closed in 2018 resulting in no public use. The visitor nights shown are from the NPS trail crew.

PROPOSED ACTION

The Proposed Action would:

- reroute ~1500 feet of the Thunder Creek trail in the vicinity of McAllister Stock Camp;
- relocate the McAllister Hiker camps to the vicinity of McAllister Stock camp;
- expand McAllister Stock camp by building a cook area 100 feet from tent pads; and
- construct a new administrative camp near Junction Stock camp.

The ~1500-foot long trail relocation is in response to the eroding bluff impacting the Thunder Creek Trail just west of McAllister Stock camp (Figure 6). The new trail would be constructed to current “All Purpose” trail standards with a 24” wide trail tread and vegetation cleared along the corridor 8-feet wide by 10-feet high. During construction the trail crew would endeavor to remove as few trees as possible but up to 20 trees ranging in size from 12 to 18 inches diameter at breast height (DBH) may be removed. A small puncheon trail bridge (10-foot span) (Figure 7) would be built onsite using primarily native material including trees smaller than 18” diameter at breast height (DBH) and decking from the old Thunder Creek Bridge that washed out. The work would require various hand tools, power saws, and other small power tools such as hand drills. Trail relocation would take an eight person trail crew approximately 32 days.

To address the loss of the previous group site at McAllister Hiker camp, a new group site would be constructed ~500 feet east of the current McAllister Stock camp (Figure 6). This would include a single separate cook area at least 100 feet away from four tent pads that can accommodate up to four 2 to 3-person tents. The tent pads would be organized in two separate campsites so that the site could be used as two separate sites as well as for up to a 12-person group. This camp would have a new open air pit toilet with a [Wallowa toilet](#) box. Up to 400 feet of new access trails would be constructed with an 18-inch wide tread and vegetation clearing in a 4-foot wide by 8-foot high corridor. Construction of all the camp elements would remove up to 15 standing dead trees ranging in size from 12 to 24 inches diameter at breast height (DBH).



Figure 7. An example of a recently built puncheon bridge on the Thunder Creek Trail

To replace the previous four, 4-person campsites at McAllister Hiker, new sites would be constructed ~800 feet northeast of the current McAllister Stock camp (Figure 6). This new camp would accommodate up to four 4-person parties with two tent pads for up to two 2 to 3-person tents (with a total of eight tent pads for the camp). Two cook areas would be constructed meant to be shared by two campsites each. This camp would have a new Wallowa toilet. New access trails with an 18-inch wide tread and vegetation clearing in a 4-foot wide by 8-foot high corridor. Up to 500 feet of new access trails would be constructed in the new camp. Construction of all the camp elements would remove up to 15 standing dead trees ranging in size from 12 to 24 inches DBH.

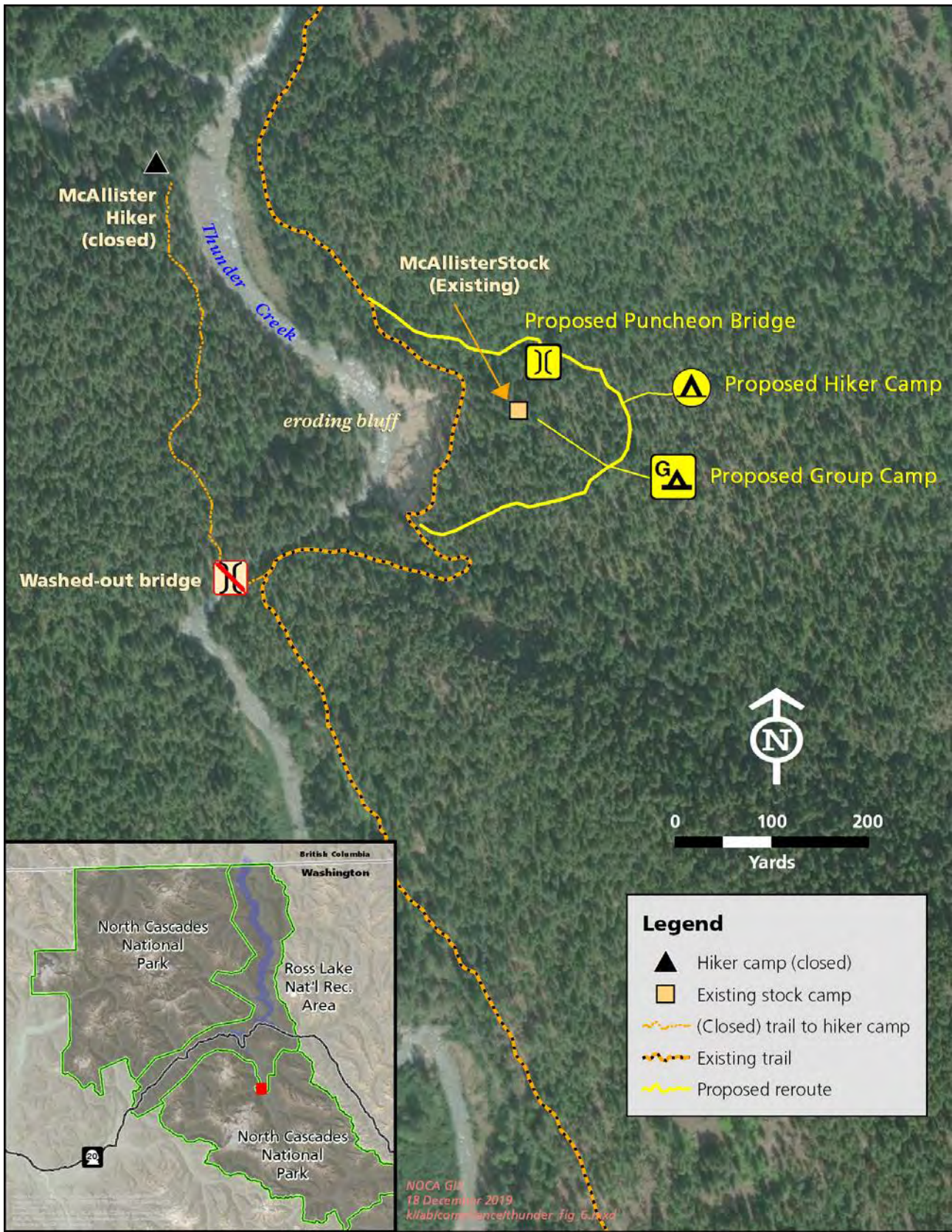


Figure 6. McAllister area trail and camp proposed relocations.

To provide NPS staff space to camp that will not conflict with public use, the NPS would construct a new administrative camp E-SE of Junction Stock Camp (see Figure 8). This new camp would have up to four tent pads, a cook area, a new Wallowa toilet, two hitch rails, and up to 400 feet of access trails (the portion to the hitch rails would be cleared for the wider standard for stock access and the hiker camp standard above for human only access). Construction of all the camp elements would remove up to 10 trees ranging in size from 12 to 18 inches DBH.

Construction of the camps would take an eight person trail crew approximately 32 days and require various hand tools, power saws, and other small power tools such as hand drills (See MRA in Appendix B). The dimensions of the tent pads will be approximately 8-feet by 10-feet and the cook areas up to 20-feet by 24-feet. Tent pads would be elevated so that they are clearly delineated for use as a tent pad, using logs or rocks as cribbing for ~40 cubic feet of fill. The fill would be leftover mineral soil from trail construction. All new camps would have signs installed that clearly show visitors where the cook areas, tent/sleeping areas, toilet, and water sources are. These signs would meet the current standards for the Stephen Mather Wilderness that have appropriate symbols routed and burned into 4"X4" posts installed in the ground. In addition each area would have a rock fire ring installed since campfires are allowed in all of the camps covered in this proposal.

To the greatest extent possible the camp locations and design have been chosen to fit as many of the "preferred design features" (PDFs) listed in Appendix A. These PDFs are chosen to minimize resource impacts and conflicts as much as possible for camp developments, including choosing locations that minimize or eliminate impacts to listed species. Also, for bear safety, the layout of each camp will have separate cook/campfire areas that are at least 100 feet away from the tent pads in order to separate sleeping humans from the food storage and cooking area. In addition campsites will be sited so that adjacent parties are not within sight of each other or of the main trail in order to provide solitude in the campsites. The existing McAllister Stock camp would be reconfigured so that the cook area is at least 100 feet away from the tent pads. In order to facilitate proper food storage for visitors using the public camps bear wires would be installed at each of the new cook areas mentioned above.

Finally, there would be limited restoration of abandoned campsites. Any structures, such as fire grates/rigs, tent pad cribbing logs, and trail structures would be removed. Old tent pads would be scarified. Further restoration would rely on natural processes such as forest decay and regrowth. Abandoned trails would be scarified, "naturalized" by spreading logs, brush, and duff across the surface, and then planted with seeds or seedlings of native plants. The bridge abutments which include a mix of native rock, concrete, and wood would be demolished and removed. The washed out bridge would be disassembled and the stringers removed from the wilderness by helicopter. This would require up to 3 flights to remove the bridge.

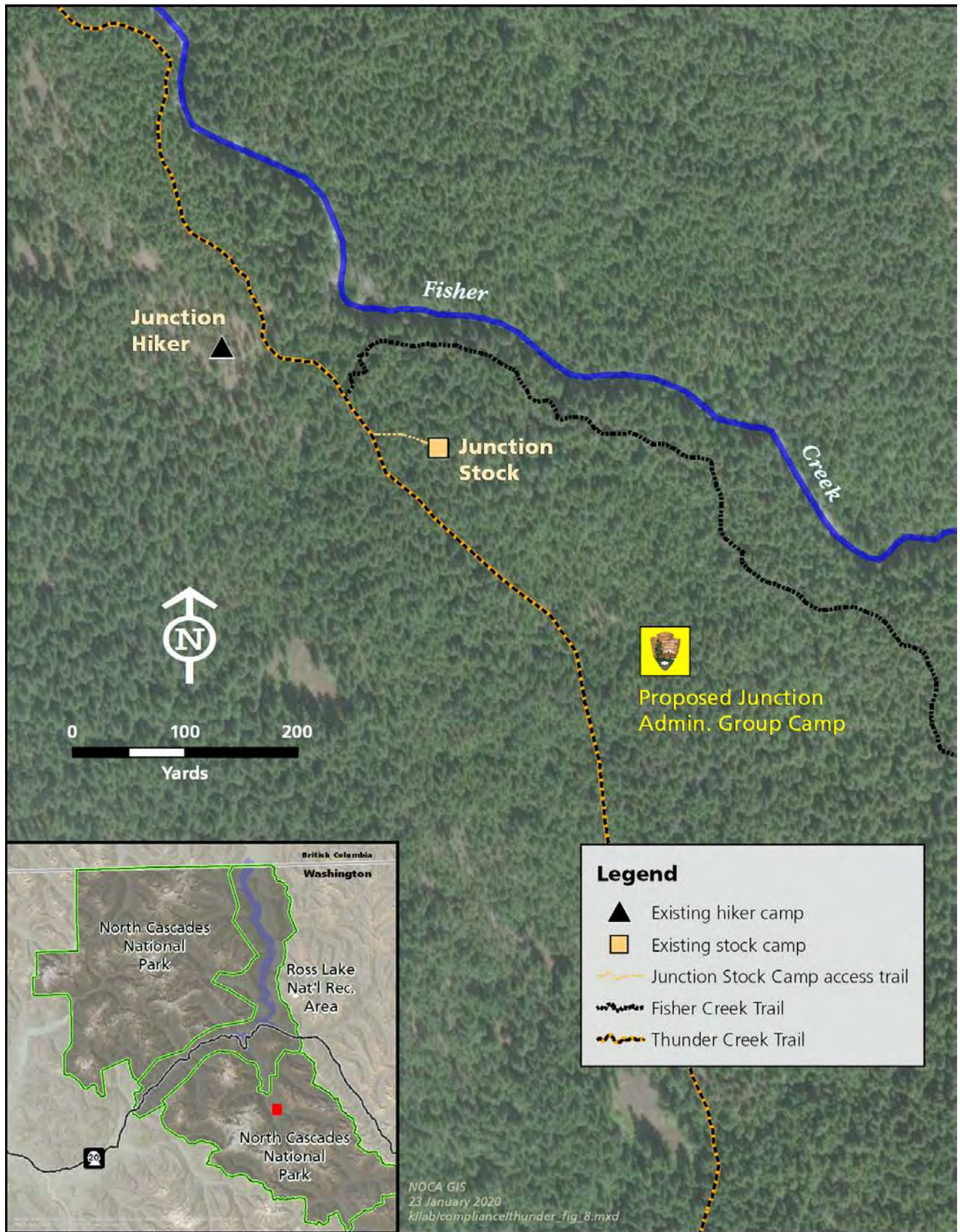


Figure 8. Vicinity of Junction Camps showing proposed new location for an administrative camp.

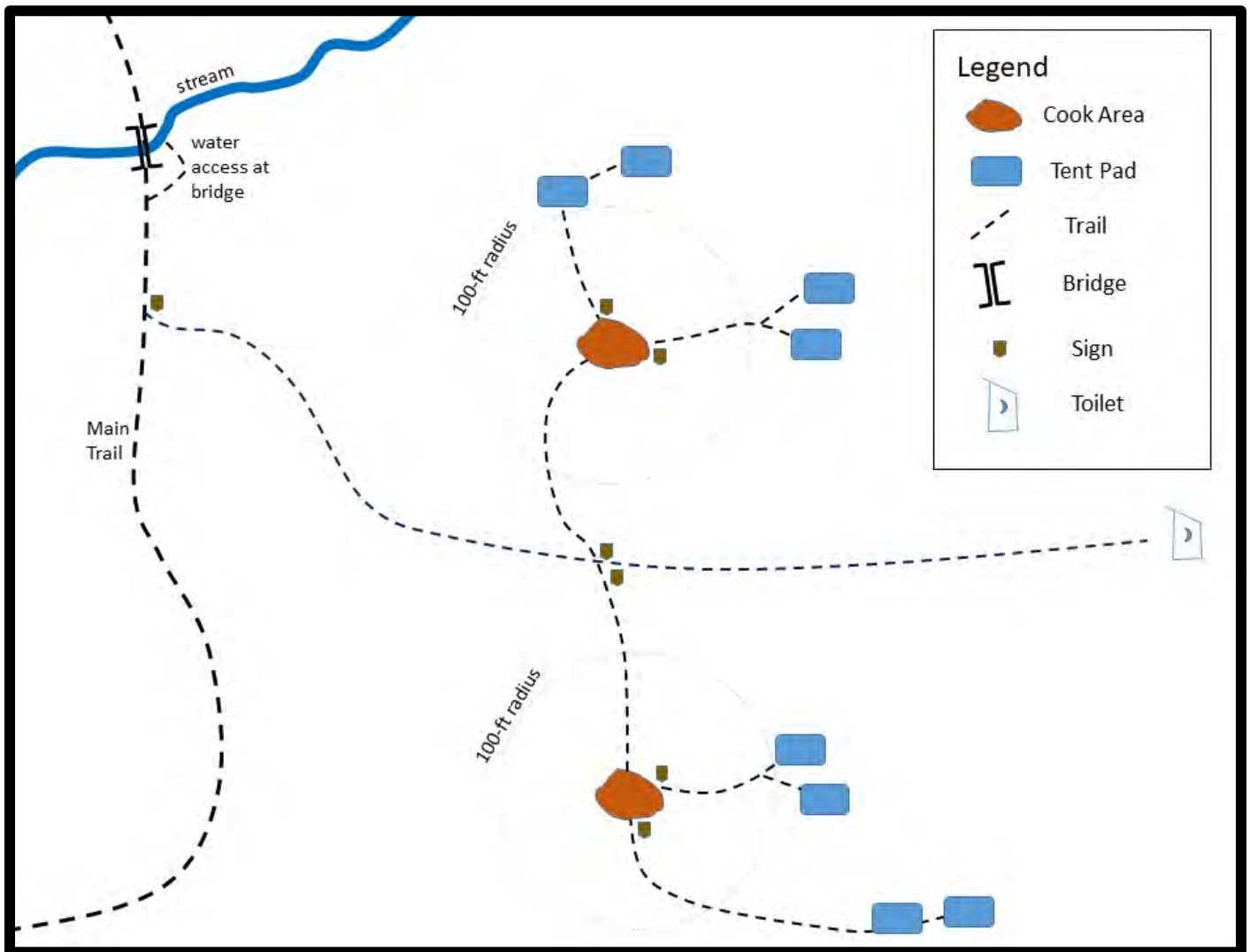


Figure 9. Diagram showing a conceptual layout of a four-site hiker camp. Shows a camp organized to meet PDFs from Appendix A including camp areas at least 100 feet away from water, sleeping areas at least 100 feet away from cook areas, separation between sites and trails to provide privacy and solitude, and the toilet at least 200 feet away from water. Trail junctions are signed to clearly indicate what a trail leads to.

OTHER ALTERNATIVES CONSIDERED

No Action Alternative

Under the No Action Alternative the Thunder Creek Trail would undergo incremental rerouting to respond to erosion of the river bluff, likely by a combination of user-created social trail formation and perhaps some minor trail construction by the NPS in the future. McAllister Hiker camps would remain closed.

Administrative use would continue as is with NPS staff sharing Junction Stock camp capacity with the public.

There would be limited restoration of abandoned campsites. Any structures, such as fire grates/rigs, tent pad cribbing logs, and trail structures would be removed. Old tent pads would be scarified. Further restoration would rely on natural processes such as forest decay and regrowth. Abandoned trails would be scarified, “naturalized” by spreading logs, brush, and duff across the surface, and then planting seeds or seedlings of native plants. The washed out bridge would be disassembled and the stringers removed from the wilderness by helicopter. This would require up to 3 flights to remove the bridge. The bridge abutments which include a mix of native rock, concrete, and wood would be demolished and removed.

Re-Open McAllister Hiker Camp

The alternative of re-opening the existing McAllister Hiker Camp and reinstalling the washed out bridge that spanned Thunder Creek was considered but dismissed from detailed analysis. The primary reason for dismissal is that re-opening as a designated campsite would necessitate felling more than 30 hazard trees, many large diameter old trees, which was deemed too great of an environmental impact. In addition this camp is located in suitable northern spotted owl habitat and would have felled suitable nest trees creating further unacceptable impacts. Dismissing this option has the added benefit that there is no longer a need for a bridge across Thunder Creek thereby removing an installation in designated wilderness and reducing maintenance needs and potential for damage from future floods.

Other Locations Considered

Several other locations to replace and redistribute the camp capacity of McAllister Hiker Camps were considered but dismissed:

- A potential new location was identified just north of and across Fisher Creek from Tricouni Camp. This location was dismissed because it was located in excellent suitable nesting habitat for northern spotted owl.
- The option was discussed to replace the capacity of McAllister Hiker camps by adding on to already existing camps such as Neve, McAllister Stock, Tricouni, and Junction Camps. Alternatives with various combinations of these were dismissed after the proposed action site was identified. It is challenging to find a site that meets as many PDFs as possible and the proposed action site meets some of the most critical. Expanding the footprint at several different locations introduces a higher level of uncertainty as to what the environmental impacts would be. In addition the location of McAllister camps along the trail provides a desirable distance for many people (~7 miles) for a first day of backpacking up the Thunder Creek trail.

Capacity Changes

While there would be a small increase in capacity in the proposed action with the construction of an administrative camp near Junction Stock, addressing changes in capacity (either increases or decreases) in lower Thunder Creek was dismissed because this is beyond the scope of this particular review. Addressing overnight capacity beyond the site specific level is a larger question that needs to be addressed systematically across the Stephen Mather Wilderness. The NPS plans to take this up in the next few years in a comprehensive wilderness stewardship plan.

Action Area Description

The Action Area is defined as all area within ¼ mile of old McAllister Camp, McAllister Stock Camp, the area proposed for construction of the trail reroute, McAllister Hiker Camps, and Junction Administrative Camp within the North Cascades National Park Service Complex (Figures 1, 6, and 8).

Lower Thunder Creek trail and associated camps range in elevation from 1200 ft at the trailhead at Colonial Creek Campground to 3000 ft at Junction Camps (Figure 1). Thunder Creek sits in a north-south oriented U-shaped glacier carved valley, with a variety of landforms including bedrock knobs, debris cones, debris aprons, floodplains, old river terraces, and glacial drift.

A mosaic of old-growth forest of varying ages and compositions blankets the lower Thunder Creek Valley and provides outstanding habitat for many species of wildlife. Thunder Creek is a permanent stream that originates in the glaciated headwaters of the southern unit of North Cascades National Park. The creek flows northward throughout its length, terminating in the tail waters of Diablo Lake reservoir. Gauging station data indicate that stream flows are generally highest in spring when snowmelt peaks and in late fall after heavy rain and “rain on snow” events. Glacial meltwater maintains high flows through summer (Note: Glaciers cover 13% of the Thunder Creek watershed—the highest percent glacial coverage of any major valley in Washington State).

Effects to Listed Species in the Action Area

There are several ESA listed species that may utilize terrestrial or aquatic habitat in the Thunder Creek Valley. However, the only species which may be affected by the proposed action is northern spotted owl (*Strix occidentalis caurina*). The proposed action should have no effect on other listed species that may occur or have habitat in or near the action area. These include: wolverine (*Gulo gulo luscus*), gray wolf (*Canis lupus*), Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos*), bull trout (*Salvelinus confluentus*) and bull trout critical habitat. Each of these species is listed as federally threatened except the gray wolf, which is federally endangered and wolverine which is proposed threatened. There is no critical habitat for the gray wolf, grizzly bear, marbled murrelet, northern spotted owl within the action area. Therefore, the NPS anticipates no impacts to critical habitat for these species from the proposed action.

Northern Spotted Owl (*Strix occidentalis caurina*) (Federal Threatened)

Background

The northern spotted owl (NSO) is a medium-sized owl with dark eyes, dark-to-chestnut brown coloring, and whitish spots on the head and neck, with white mottling on the abdomen and breast (USFWS 2014d). In Washington, the NSO specializes on nocturnal arboreal prey; 88.3 percent of observed prey items in the western Cascades were nocturnally-active prey (Forsman et al. 2001). Spotted owl diets are dominated by flying squirrels (*Glaucomus sabrinus*), however they also consume juvenile snowshoe hares (*Lepus americanus*), pocket gophers (*Thomomys sp.*), and pika (*Ochotona princeps*) (Forsman et al. 2001).

Suitable habitat for NSOs consists of multilayered, multispecies canopy (with 60–80 percent canopy closure) with large overstory trees (> 30” DBH); a high incidence of large trees with various deformities, cavities,

broken tops, or mistletoe infestation; large snags; large accumulations of downed trees and other woody debris on the ground; and sufficient open space below the canopy for flying (Thomas et al. 1990; LaHaye and Gutiérrez 1999; USFWS 2014d).

In 1990, the USFWS listed the NSO as a threatened species because of widespread loss of suitable habitat across the species' range and the inadequacy of existing regulatory mechanisms to conserve the species (USFWS 1990). Although habitat loss due to timber harvest has been greatly reduced on federal lands for the past two decades as a result of the Northwest Forest Plan (USFWS 2008b), many populations of NSOs continue to decline, especially in the northern parts of the species' range. Over the past decade it has become apparent that competition from the barred owl (*Strix varia*) poses a significant threat to the NSO (Gutiérrez et al. 2007). In April 2015, the USFWS published a finding that the petition to relist the NSO from threatened to endangered presented substantial information that the relisting may be warranted. The USFWS has requested more information before it publishes a final rule with regard to the petition (USFWS 2015b).

Published research has documented NSOs nesting in trees as small as 11" DBH with a mean size of 26.2" DBH in eastern Washington (Buchanan et al. 1993). In western Washington, where tree diameter is generally much larger, the mean nest tree size was 74" DBH (WDNR 1997). From these data, researchers have broadly defined NSO suitable nest trees to include all conifer trees and snags that are greater than or equal to 18" DBH (includes 99% of nest trees) that contain suitable structures (platforms, cavities, broken tops) used by NSOs for nesting. These characteristics are common features in suitable NSO habitat.

Disruptive activities that do not occur during the early nesting season or do not occur within the harassment distance threshold are expected to have insignificant effects to NSO (USFWS 2013b). Therefore the USFWS has set a seasonal restriction during the sensitive early nesting season for disruptive actions such as motorized use that must occur in areas with known NSO activity from March 1 to July 15.

Environmental Baseline

The Thunder Creek drainage lies in a late-successional coniferous forest dominated by Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) with the occasional co-subdominance of western white pine (*Pinus monticola*) and lodgepole pine (*Pinus contorta*) in drier sites. Forest stands exhibit a complex structure, with multi-storied layers of live, dead and dying trees, as well as many fallen trees. Some standing dead and fallen trees are quite large, and all classes of decay are present. Many snags display bird, insect and mammal activity, including pileated woodpecker holes, beetle galleries and snags whose bases are shredded by bears and other mammals. Live standing trees in some parts of the drainage exceed 120 feet in height and 75 inches in diameter at breast height, with isolated trees estimated to be in excess of 500 years old. These stand characteristics provide high-quality habitat for several mammal and bird species including NSO.

Contrary, habitat within the action areas display low-quality features for NSO nesting, due to a low percentage of canopy closure, scattered trees with larger openings on the forest floor, limited vertical structure, minimal large-sized fallen trees, and trees that are shorter in height and smaller in diameter that show few signs of deformities needed for NSO nesting. Overall, habitat within the action areas is inconsistent with the majority of low elevation habitat within the drainage, at least in part due to a notably drier micro-environment possibly resulting in less productive and complex forest stands. Consequently, habitat within the action areas may be more suitable, at best, for temporary dispersal of recently fledged

NSOs as they seek to establish new territories of their own. Connectivity to more suitable spotted owl nesting habitat is patchily distributed in the drainage, largely due to natural topographical variation. At best, both of these project areas are characterized as marginal for spotted owl dispersal habitat. The habitat in the action area was surveyed/assessed during a site visit in August 2019 by USFWS and NPS staff at both the McAllister and Junction proposed camp areas.

In 1993-1996, NPS resource management staff conducted the first comprehensive baseline inventory of NSOs in suitable habitat within North Cascades National Park Service Complex, and resultantly identified 11 active NSO territories (Kuntz & Christophersen 1996). All suitable habitat along the trail system was surveyed, in addition to accessible off-trail suitable habitat. During the ten years following completion of the inventory in 1996, the National Council for Air and Stream Improvement monitored three sites as part of a NSO monitoring program along the east slope of Washington's Cascades, and NPS staff conducted sporadic compliance-related owl surveys as needed. However, more comprehensive, up-to-date information on the status of the park's NSO population was needed to aid managers in a number of major planning activities. In response to these needs, NPS partnered with the Institute for Bird Populations (IBP) to initiate a four-year study to determine a more current population status of NSOs in the Complex. During the first year of the project, the model of suitable NSO habitat was revised (Figure 6; Wilkerson and Siegel 2007).

In 2009 and 2010, IBP staff surveyed throughout the northeastern portion of the Complex, including the Thunder Creek drainage (Siegel et al 2012). These were the same transects surveyed during 1994-1996 baseline surveys conducted by NPS staff. The surveys yielded only one NSO detection, outside of Thunder Creek, in a historical NSO territory. In addition, in 2010 an NPS ranger incidentally observed one NSO ~6 miles from the project area.

More recent periodic compliance-related NSO surveys have been conducted in the Thunder Creek drainage including the action area, resulting in several barred owl detections dispersed within the drainage. In all probability the entire drainage below 4,000 feet elevation has well-defined barred owl territories and any NSOs that were ever present may have been displaced and likely will be precluded from establishing future activity centers.

Effects of the Proposed Action

Locations for the proposed camps were chosen to minimize overlap with good NSO habitat. Construction of the camps and trail reroute would cause short-term increases in noise and disturbance in the immediate project area. However, since the habitat is considered limited for NSO nesting and marginal for dispersal habitat, and to date there are no known NSO activity centers or nests located in the vicinity, coupled with the infiltration of barred owl activity in the drainage, the project is unlikely to affect NSOs. Subsequent human use of the area would not cause significant changes in current amounts of use or disturbance, as the action areas already experience moderate human and stock use.

Use of power tools and helicopter flights may impact individuals if in the vicinity of the activity. This is unlikely but the trail crew doing the work will be cognizant it is possible NSOs may be around. If any active NSO nests were detected in or near the project area From March 1 to July 15 chainsaw and helicopter use has the potential for disturbance-caused injuries include flushing from the nest, aborted feeding attempts, and postponed feedings. The following conservation measures ensure any impacts would be insignificant or discountable:

Conservation Measures

1. The disruptive activities listed below should be limited or suspended within the threshold distances in the event that a NSO or its nest is discovered. This is based on current guidance on auditory and visual harassment threshold distances for NSO nests (USFWS 2013b):

Activity	Harassment Threshold Distance
Blasting	0.25 mile (440 yards)
Portable rock drill (USFWS 2006a)	180 feet (60 yards)
Small helicopter	330 feet (110 yards)
Chainsaw use	195 feet (65 yards)

4. Before felling a hazard tree in NSO suitable habitat during the early nesting season (March 1 to July 15), it will be inspected for SNT characteristics. If the tree does not have SNT characteristics it would be felled, if it does it would be felled after July 15. Likewise, even if a hazard tree doesn't have SNT characteristics any trees that would be contacted when it was felled would be inspected for SNT characteristics and the appropriate decision made. Data on SNT characteristics will be collected for each hazard tree. The most up to date definition of a SNT provided by USFWS will be used by NPS staff.
5. Helicopter Use:
 - a. Helicopters should fly a minimum of 400 feet above tree tops to avoid potential disturbance to NSOs. This 400-foot minimum particularly applies during the sensitive early nesting season, which is between March 1 and July 15.
 - b. Hovering of a small helicopter shall not occur within 330 feet of a known NSO activity center at any time during the nesting season between March 1 and September 30.

Effect Determination

There are no known NSO activity centers and very limited, if any, quality nesting habitat within the action area. While there is suitable dispersal habitat in the action area, it is considered marginal. In the event that proposed activities would occur near NSOs, conservation measures provide sufficient mitigation from allowing harm or take of the species. Therefore, this project *may affect but is unlikely to adversely affect* NSOs

Need for Re-Assessment Based on Changed Conditions

This BA and findings above are based on the best current data and scientific information available. A new analysis and revised BA must be prepared if one or more of the following occurs: (1) new species information (including but not limited to a newly discovered activity area or other species information) reveals effects to threatened, endangered, proposed species, or designated/proposed critical habitat in a manner or to an extent not considered in this assessment; (2) the action is subsequently modified or it is not

fully implemented as described herein which causes an effect that was not considered in this assessment; or
(3) a new species is listed or critical habitat is designated which may be affected by the action that was not previously analyzed herein.

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APPENDIX A

Stephen Mather Wilderness Camp Preferred Design Features

- Sited away from dynamic geologic processes and landforms that may disrupt the camp or endanger visitors (floodplains, debris cones, and rockfall areas)
- Does not occupy suitable or sensitive wildlife habitat (northern spotted owl and/or marbled murrelet suitable nesting habitat, grizzly or black bear, other species as applicable).
- Does not occupy rare plant habitat.
- Does not occupy sensitive archeological sites.
- If in forest, sited so that hazard tree risks are minimized and will be for the foreseeable future
- Camp at least 100 feet away from a water body
 - Personal experiences and social science show that visitors want to camp as close as possible to waterbodies. Depending on the local conditions (soils, vegetation, wildlife, and visitor use patterns), campsites could be located closer to water but would require a site specific evaluation and containment strategy (see Marion, Wimpey, and Lawhorn 2018).
- Camp is not so far away from a water source as to be inconvenient to the user (15 min walk max?)
- Toilet is at least 200 feet away from a water body
- The cooking and food storage area are combined and is at least 100 feet away from tent pads/sleeping area to reduce risks of human bear conflict.
 - Cooking and food storage areas may be communal for multiple campsites or each individual site may have its own area. A rule of thumb could be 1 cook site for a large group camp and 1 cook site for every 2 small group campsites within the same camp area.
 - A concerted effort is needed to provide guidance to public to show where the proper cook/food storage area is.
 - A cooking area should not be so screened by topography or vegetation so that when approaching on a trail you can see it if a bear was hanging around or if in the cook area one can see an approaching bear.
- Meets privacy standards: out of sight of both the main trail and other campsites.
- Camp areas are contained on terrain or in a vegetation type that resists growth of barren ground (e.g. side hill campsites)
- As appropriate and applicable may have the following installations for visitor use mitigation:
 - Fire rings – Rock fire rings where fires are allowed.
 - Food storage – Depending on the site the NPS will provide either a wire suspended between trees in forested areas or a metal wildlife resistant storage box or will require use of a bear resistant food container.
 - Toilet (Wallowa or Composter):
 - Large group camps should have separate toilets from small group camps in the same area.
- Stock Users have some different needs and Stock Camps need to have some different PDFs:
 - Need <20% slopes as stock don't navigate steep slopes as well as people.
 - Needs generally larger area to accommodate animals
 - Not too far from water so watering is not overly time consuming (for example if animals need to be led singly to water).
 - Needs well-constructed trail to water access

- Need a tent pad next to the hitch rails for the packer(s).
- Administrative camps have a few different standards:
 - Admin camps can have Knaack boxes
 - Some ranger camps have wood platforms (Pelton Basin and Boston Basin)
 - New camps ideally extension of existing camps to concentrate all human camping impacts in a locale.

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Appendix E: Tabular Overnight Camp Use Data

The backcountry permit database is actively used by NPS ranger staff to issue, track, and report out reservations and permits for available slots in the backcountry of North Cascades National Park Service Complex. The tables below show two types of data on camps use in the locale of the proposed action. Each camp has a different number of campsites available and campsites have various capacities (Table E-1). Visitor use nights (VUN) are the total nights camped by each individual person over the course of a year. This is the measure of total visitor use of designated campsites (Table E-2). However, VUN does not clearly reflect the demand for available individual campsites because groups of different sizes will occupy any given campsite for a night (generally up to the size limit for the campsite.). The measure of permitted nights is more useful for gauging demand as this is the sum of the number of nights a given camp was occupied by a group(s) (Tables E3 to E8).

Table E-1. Table showing the capacity of camps in the lower Thunder Creek locale. The capacity of each campsite is represented by the number. If a camp has multiple campsites the capacity of each is separated by commas. For example, “4,4,8” means that a camp has three campsites, two of which have a capacity of four hikers and one of which has a capacity of eight hikers.

Year	Thunder Camp	Neve Camp	Fourth of July Camp	Panther Camp	McAllister Stock Camp	McAllister Hiker Camp	Tricouni Camp	Junction Hiker Camp	Junction Stock Camp
Capacity	4,4,12	4,4,4	4,4,4	6,6	12	4,4,4,4,12	4,4	4,4,4	12

Table E-2. Summary of visitor use nights for camps in lower Thunder Creek and Panther Creek 2001 to 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Thunder Camp	Neve Camp	Fourth of July Camp	Panther Camp	McAllister Stock Camp	McAllister Hiker Camp	Tricouni Camp	Junction Hiker Camp	Junction Stock Camp
Capacity	4,4,12	4,4,4	4,4,4	6,6	12	4,4,4,4,12	4,4	4,4,4	12
2001	241	306	344	97	19	418	98	181	210
2002	259	303	352	116	21	609	125	278	148
2003	161	193	269	88	170	412	102	203	100
2004	21	18	19	122	242	41	101	95	12
2005	106	108	119	77	274	214	49	91	32
2006	183	224	282	130	64	506	85	223	24
2007	237	181	255	73	12	430	141	283	85
2008	234	226	259	120	18	401	96	245	47
2009	221	239	146	24	28	508	120	338	97
2010	216	224	218	84	19	587	115	305	99
2011	347	342	342	273	72	813	162	282	54
2012	422	361	437	302	110	868	160	314	85
2013	397	311	355	223	188	633	177	306	108
2014	370	325	336	196	44	753	177	320	129
2015	349	257	381	225	16	482	108	279	105
2016	607	438	500	305	121	1063	207	313	115
2017	582	445	415	208	105	1097	177	342	121
2018	538	512	469	310	298		286	391	151
2019	649	463	488	369	495		308	362	241
Average	323	288	315	176	122	579	147	271	103

Table E-3. Summary of permitted nights in McAllister Hiker camp from 2001 to 2019. The camp was closed and had no notable use in 2018 and 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Admin	Public	Total	% Admin
2001	10	122	132	8%
2002	3	196	199	2%
2003	5	125	130	4%
2004	3	14	17	18%
2005	11	48	59	19%
2006	6	129	135	4%
2007	14	161	175	8%
2008	5	132	137	4%
2009	2	166	168	1%
2010	15	207	222	7%
2011	7	246	253	3%
2012	22	254	276	8%
2013	3	220	223	1%
2014	1	263	264	0%
2015	1	164	165	1%
2016	3	356	359	1%
2017	2	399	401	0%
2018				
2019				
Average	7	188	195	5%

Table E-4. Summary of permitted nights in McAllister Stock camp from 2001 to 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Admin	Public	Stock	Total	% Admin
2001	3	3	3	6	50%
2002	2	7	2	9	22%
2003	21	1		22	95%
2004	47	3		50	94%
2005	92			92	100%
2006	11	11	14	22	50%
2007	1	5	2	6	17%
2008	2	4		6	33%
2009	9	2	4	11	82%
2010	2	6		8	25%
2011	8	14	3	22	36%
2012	20	7	7	27	74%
2013	42	9	1	51	82%
2014	3	8	1	11	27%
2015	4	3	2	7	57%
2016	15	16	6	31	48%
2017	5	29	3	34	15%
2018	23	76	6	99	23%
2019	18	84		102	18%
Average	17	16	4	32	50%

Table E-5. Summary of permitted nights in Junction Hiker camp from 2001 to 2019. The camp was closed and had no notable use in 2018 and 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Admin	Public	Total	% Admin
2001	6	85	91	7%
2002	17	91	108	16%
2003	6	92	98	6%
2004	6	30	36	17%
2005	5	37	42	12%
2006	3	83	86	3%
2007	9	102	111	8%
2008	7	92	99	7%
2009	2	146	148	1%
2010	17	134	151	11%
2011	5	112	117	4%
2012	3	137	140	2%
2013	6	129	135	4%
2014	2	147	149	1%
2015	35	61	96	36%
2016	8	126	134	6%
2017	4	160	164	2%
2018	4	178	182	2%
2019	7	136	143	5%
Average	8	109	117	8%

Table E-6. Summary of permitted nights in Junction Stock camp from 2001 to 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Admin	Public	Stock	Total	% Admin
2001	6	4	6	10	60%
2002	13	11	17	24	54%
2003	9	11	6	20	45%
2004	3		6	3	100%
2005		3	5	3	0%
2006	2	7	3	9	22%
2007	8	10	9	18	44%
2008	7	6	7	13	54%
2009	13	9	2	22	59%
2010	22	4	17	26	85%
2011	5	8	5	13	38%
2012	11	7	3	18	61%
2013	4	14	6	18	22%
2014	18	10	2	28	64%
2015	16	3	35	19	84%
2016	15	12	8	27	56%
2017	9	20	4	29	31%
2018	19	19	4	38	50%
2019	8	31	7	39	21%
Average	10	11	8	20	50%

Table E-7. Summary of permitted nights in **Tricouni Hiker** camp from 2001 to 2019. A blank table cell means there was zero use rather than missing data. Zeros are omitted to enhance readability of the tables.

Year	Admin	Public	Total	% Admin
2001	2	43	45	4%
2002	7	52	59	12%
2003		44	44	0%
2004	10	12	22	45%
2005	1	19	20	5%
2006		30	30	0%
2007	6	51	57	11%
2008	2	44	46	4%
2009	1	52	53	2%
2010	4	49	53	8%
2011	6	69	75	8%
2012	7	64	71	10%
2013	3	75	78	4%
2014	2	71	73	3%
2015	3	60	63	5%
2016	1	85	86	1%
2017	2	78	80	3%
2018	4	131	135	3%
2019	11	109	120	9%
Average	4	60	64	7%

Table E-7. Summary of all stock use with a percentage of administrative (NPS trail crew) use for **McAllister Stock** and **Junction Stock** camps. All data are from 2001 to 2019. A blank table cell means there was zero use rather than missing data.

Year	McAllister		Junction	
	# nights	% Admin	# nights	% Admin
2001	3	67%	6	100%
2002	2	100%	2	100%
2003			6	100%
2004				
2005				
2006	14	71%	3	33%
2007	2	0%	8	100%
2008			7	100%
2009	4	75%	9	89%
2010			7	100%
2011	3	100%	4	100%
2012	7	71%	4	100%
2013	1	0%		
2014	1	100%	14	93%
2015	2	100%	3	100%
2016	6	100%	2	100%
2017	3	67%	1	100%
2018	6	100%	2	100%
2019			7	100%
Average	4	71%	5	94%