APPENDIX G:
WILDERNESS MINIMUM REQUIREMENTS ANALYSIS

PROBLEM STATEMENT

The Ackerson Meadow area is seriously degraded as a result of 180 years of human manipulation and other landscape modifications. Much of this degradation is directly related to human-caused incision of streams through the meadow complex, with a resultant lowering of the water table and subsequent changes to vegetation. The condition of the meadow continues to evolve, with the potential for conditions to continue to further degrade as active headcuts migrate and lower the water table.

While the wilderness portions of the area are generally in better condition than the non-wilderness portions, they are affected with most of the same unnatural conditions: incised channels with lowered water tables with the resulting ecological effects. The degradation of the *natural* quality of wilderness character also means that *opportunities for primitive recreation* are also reduced, as the visitor is deprived of the chance to see a natural landscape.

BACKGROUND

The human history of land use in the area is complex, including cattle grazing, a large water conveyance ditch, fire suppression, ditching to drain the meadows, roads, fencing, hunting, etc. Refer to the Ackerson Meadow Restoration Environmental Assessment (EA) for a more complete history. The land ownership of the area is also complex. Lands in the restoration area include designated wilderness, non-wilderness lands donated to Yosemite National Park in 2016, and non-wilderness United States (U.S.) Forest Service (USFS) lands. The USFS and National Park Service (NPS) agreed to a land swap which will result in a more logical boundary. A wilderness eligibility assessment has not been completed.

The complex land status makes analysis under the minimum requirements clause of the Wilderness Act complicated. In wilderness, actions involving non-conforming uses are only allowed when such uses are necessary, and the minimum, for the preservation of wilderness character. Policy is clear that areas near the boundary are not to be treated differently than any other part of the wilderness: "Transition zones adjacent to wilderness may be identified to help protect wilderness values, but no transitional or "buffer" zones are appropriate within wilderness boundaries."[1]

Most of main Ackerson Meadow is non-wilderness. Roughly 1.5 acres within main Ackerson Meadow is within designated wilderness. An additional 15.4 acres of flat meadow-like topography in wilderness was likely part of the meadow ecosystem but now it is heavily encroached by mixed conifer trees. The creeks in wilderness above the meadow are also affected by the incised streams in the meadow, with unnaturally lowered streambeds. Approximately three-quarters of the 70-acre South Meadow is wilderness; with much of it in fairly good condition. Approximately half of the incised portion of the meadow is in wilderness.

Some of the proposed actions in this analysis would cause substantial impacts within wilderness, with many of the benefits occurring in the meadow, which is in non-wilderness. The Wilderness Act requires that such actions must still preserve wilderness character *within wilderness*. The meadow (non-wilderness) and the surrounding uplands (wilderness) are ecologically connected. Increasing the naturalness of the non-wilderness meadow would also improve the naturalness of the adjacent wilderness. Effects to wilderness character will be considered in this context. Cross boundary effects will be considered in other ways as well, such as the effect to *outstanding opportunities for solitude or a primitive and unconfined type of recreation* from both restoration activities and structures and, over time, the view of a more natural landscape from within the wilderness.

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[1]NPS Management Policies 6.3.4.1

Typically, new lands added to a national park would go through a wilderness eligibility assessment and study before any major actions take place. The outcome of that eligibility assessment would either be a finding that the land was ineligible because of non-conforming or incompatible uses, or that it was eligible for recommended or potential wilderness status, pending congressional action to designate. The proposed meadow restoration actions would not preclude future consideration for wilderness eligibility. Policy for these different land classifications is sufficiently broad to provide some guidance for this analysis:

> The National Park Service will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. **Until that time, management decisions will be made in expectation of eventual wilderness designation.**[2]

Management Policies goes on to say that:

> The only exception to the minimum requirement policy is for eligible areas that the Service has not proposed for wilderness designation. However, those lands will still be managed to preserve their eligibility.[3]

DESCRIPTION OF THE AREA

There are three areas in designated wilderness within the larger project area:

1. Main Inlet Creeks: The far eastern end of the main meadow extends a short distance into wilderness. On Ackerson Creek, the channel incision extends well past the wilderness boundary. On a northern tributary, the incision also extends upstream into wilderness.

2. South Inlet Creeks: At the east end of South Meadow, there is a small reach of incised creek. The incision is generally shallow, and substantially vegetated. The origin of this incision is unclear, although it may have been created by intentional ditching.

3. South Ackerson: The lower, western end of the creek is in non-wilderness. Approximately half the project area, about 1,000 linear feet, is in designated wilderness. Above the project area, the meadow is essentially intact; characterized by sheet flow. The incision in this area is from three to six feet deep and includes five headcuts. The origin of this incision appears to be a mix of intentional ditching, and an adjustment to incision in Main Ackerson Creek at its confluence.

Approximately 75 percent (52 of 70 acres) of South Ackerson Meadow became part of the Yosemite Wilderness in 1984. The wilderness character of South Meadow is unavoidably affected by land uses and management practices in adjacent non-wilderness, including fire suppression and commercial grazing.

OPTIONS OUTSIDE OF WILDERNESS

Conducting restoration activities only in the non-wilderness areas would probably improve conditions slightly within wilderness, at least in the short-term. At the Main Inlet Creeks, lack of any action within the wilderness could lead to problems with the restoration efforts in the main, non-wilderness meadow. The upper section of meadow would still have a lowered water table, and the velocity of the water coming down through the wilderness section of the creek could be hard to dissipate without any structures or fill in wilderness. The creek bed within wilderness would remain at an unnaturally low level, disconnected from its former floodplain. The ecotone that is currently near the wilderness boundary might move west, down meadow, reducing species diversity within wilderness.

At the South Meadow, limiting restoration activities to non-wilderness would result in little change within the degraded wilderness section of the meadow. More importantly, it would not reduce or eliminate the

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[2] NPS Management Policies 6.3.1 (bold added)

[3] NPS Management Policies 6.3.1

threat of migrating headcuts in this section, many of which are already causing substantial erosion within wilderness and eventually would lead to changed plant communities and altered habitats.

South Inlet Creeks are entirely within wilderness; no actions outside of wilderness would affect conditions.

NECESSITY FOR ACTION

South Meadow contains a stream channel that is incised three–six feet and contains five headcuts. This condition is likely to further degrade over time, with potential for headcut migration and further lowering of the water table in areas of the meadow that are now healthy. At Main Inlet Creeks in the upper part of Ackerson Meadow, in non- wilderness, conditions would likely degrade further without some action in wilderness; this in turn would affect the adjacent wilderness as the overall ecological diversity of the area continues to be diminished. Both of these are substantial threats to wilderness character that prompt consideration of action.

ALTERNATIVES

Alternative 1: Full Gully Fill

Overview. At South Meadow, the erosion gully would be completely filled in, restoring the level of the existing meadow terrace. At Main Inlet Creeks of Ackerson Meadow, fill would extend upstream from main Ackerson Meadow into wilderness along the two creeks. At South Inlet Creeks, there would be no action under this alternative.

Components.

Water diversion — A low earthen dam or cofferdam would be constructed at the upstream end of the project area. An excavator would be used to construct earthen dams, if needed. Water would be diverted in a pipe that drains below the active work area. If needed, a motorized pump would be used for this process.

Plant and sod salvage — Following dewatering, all large woody debris, live woody plants (e.g., willows) and up to 12 inches of topsoil sod would be removed from the gully and stored on the meadow surface. Large, salvaged willows would be topped using hand tools and both the tops and root wad would be stored. An excavator would be used for this operation.

Gully filling — The gully would be filled with soil and organic material excavated from hillsides near the Ackerson Meadow complex, outside of the wilderness. Heavy equipment (e.g., bulldozers, scraper loaders, excavators, and dump trucks) would excavate, transport, place, mix, compact and shape the fill within the gully. Equipment would travel within the gully following the removal of the native vegetation and sod.

At South Meadow, approximately 1,000 feet of gully would be filled with approximately 2,700 cubic yards of material, requiring approximately 270 10-yard dump truck trips.

At Main Inlet Creeks, the upper end of the fill would be graded at a level elevation to form a flat, vegetated meadow surface within the gully that the stream would flow across. For the northern tributary, fill would extend 200 feet into wilderness and require approximately 150 cubic yards of material, or 15 dump truck loads. For the Main Creek, fill would extend approximately 440 feet into wilderness, requiring approximately 1,600 cubic yards of material, or 160 dump truck loads.

Work on all wilderness sections would be completed over one season. The exact duration would depend on weather, operational logistics, and stochastic events like wildfire and floods, equipment, and staff availability. Operations would be limited during nesting season for sensitive wildlife (great gray owls, little willow flycatchers, songbirds, and fisher).

Sod replacement and stabilization — Salvaged wetland sedge sod, topsoil, and woody plants would be replaced at the top surface. Willow tops would be placed into the topsoil. On remaining areas of bare fill, further erosion control measures would be considered in the following order: 1) Scatter branches and other

native materials gathered from the area, 2) Place erosion control blankets and/or coir wattles on bare areas, 3) Scatter native seed, and 4) Plant nursery-grown plants. Planting would only be considered for the most vulnerable, high risk areas.

Erosion control structures — A small number (5–13)of hand-built creek Beaver Dam Analog (BDA) structures would be installed on the two Main Inlet Creeks. These would remain in place and annually maintained with hand tools until the new fill was sufficiently vegetated to prevent erosion from the incoming streams.

Public access — All wilderness areas in the project area would be closed to public access during the restoration effort.

Alternative 2: Hand-Built Structures

Overview — Hand-built structures, consisting of post-assisted log structures (PALS) and BDAs would be installed in all wilderness areas of the project within the gully system and tributaries. BDAs mimic natural beaver dams. They are made of woody material and could use untreated wooden posts to secure the structures and form upstream ponds. PALS are hand-built structures composed of similar woody material. Unlike BDAs, PALS are not intended to create an immediate upstream pond; however, over time may create some temporarily ponded areas. PALS can be used to force specific geomorphic processes, such as channel widening and aggradation, enhance channel roughness, and increase lateral floodplain connectivity during high-flow events.

Neither BDAs nor PALS are intended to be permanent structures. They are specifically intended to first mimic, then promote, and eventually sustain the natural processes of sediment and wood accumulation, and most importantly, the production of riparian plant species such as willow and native sedge root masses that subsequently drive other important hydrologic and geomorphic processes that characterize healthy riverine ecosystems. It is intended that these structures are essentially catalysts that would be subsumed by the geomorphic processes (sedimentation, riparian, and wetland plant growth, etc.) that they promote.

Material for these hand-built structures would primarily be sourced from the Ackerson Meadow complex itself and adjacent surrounding forests, and additional nearby material sources may be used. The park would maintain them annually with hand tools until the goal for each phase is achieved; maintenance material is sourced similar as the installation (i.e., generally on-site).

Alternative 2 is anticipated to occur in three or more phases. It is intended to be implemented within an adaptive management framework that can be adjusted based on outcomes of previous phases. Phase 1 would install the most hand-built structures (up to 42) throughout the wilderness areas of the project. Phase 2 and 3 would add hand-built structures within the gully with the specific number and locations to be determined as needed to increase floodplain surfaces. The timing of Phases 2 and 3 are dependent on flood magnitude and success of sediment capture of hand-built structures installed under previous phases. Speculatively, it is anticipated that this could be on the order of five years to multi-decadal (10+ years) time spans.

Main Inlet Creeks — In Phase 1, two BDAs would be installed on the northern tributary and nine BDAs on the Main Creek. The gullies on the northern tributary are generally shallow, and because they would be the first places to accumulate sediment, some areas may infill their ponds within three–five years. The primary gully of this reach varies between 7–11 feet deep and would require annual maintenance of structures within a single phase, and also likely require multiple phases to accrue enough sediment. Phase 1 in the primary gully may require 5–10 years, given the difficulty of entrapping sediment in streamflow with high energy. Each subsequent phase may require another 5–10 years (Phase 2 and 3), in which new BDAs would be built atop accumulated infill to continue vertical aggradation. Once infill reaches the meadow surface, continued phases of BDAs installations are no longer necessary as the accumulated sediment would force water out of the former gully and spread onto the meadow floodplain.

South Inlet Creeks — In Phase 1, 21 BDAs and PALs would be installed on the South Inlet Creeks. These would both erode (above the meadow) and accumulate (on the meadow) sediment. The gullies here are very shallow and may infill the meadow portions within three–five years, although the upstream sections of the creek may require structures for a longer duration in order to capture enough naturally derived sediment to attain sufficient aggradation to restore a more natural level.

South Meadow — In Phase 1, 10 BDAs would be installed in South Meadow. The gully here is generally three–six feet deep, and therefore would require about two phases to be able to have sediment reach the meadow surface. Because the runoff feeding this gully is coming off a vegetated meadow dominated by sheetflow, it is thought that sediment accumulation would be very slow, possibly many decades, during which the park would annually maintain and adjust the BDAs as necessary.

Non-conforming uses — Other than the structures themselves, no non-conforming uses would be employed for this alternative: no motor vehicles, no motorized tools, no landing of aircraft. Transport of material for the structures would be by hand or stock.

Public access — The area would remain open for the duration of the project.

Alternative 4: No Action

Under this alternative, no action would occur in designated wilderness.

CONSIDERED BUT DISMISSED

"Bank Blasters" at North Inlet Creeks

PALs and similar structures ("bank blasters") were considered as a method to provide sediment in main Ackerson Meadow. These structures are designed to erode the stream banks and greatly increase erosion and sediment transport over natural rates; in effect they create an inset floodplain below the meadow floodplain. This would cause substantial impacts in designated wilderness, but the benefits would all occur in non-wilderness. Actions in wilderness must, by law, contribute to the preservation of wilderness character. In addition, policy prohibits "borrow pits" in wilderness. While this would not be a borrow pit in the traditional sense, it simply uses natural forces to excavate material instead of machines.

Stabilize Headcut Features in Place

At South Meadow, the headcuts could be armored and stabilized, preventing upstream migration. While this would reduce the threat of more meadow becoming incised, natural healing of the gully is very unlikely without action. In the long run, armoring the headcuts would eventually fail without perpetual maintenance.

EFFECTS ON WILDERNESS CHARACTER

Alternative 1, Full Gully Fill

Untrammeled — Alternative 1 would have a large impact to the *untrammeled* quality, primarily due to the *intensity* and *magnitude* of the action.

- *Intensity*: This would be a complex action that requires numerous choices about future conditions: the fill type, topography, thalweg location, future vegetation, etc.
- *Risk*: While there is certainly a risk of unintended consequences with such a complex action, similar past projects using this method have shown that those consequences have mostly been minor. Conversely, if there are serious unintended consequences, undoing full fill would be difficult.
- *Probability of Success*: Meadow restoration using the full gully fill technique has proven successful in other areas of the Sierra Nevada. The large scope of the project may make long-term success more

difficult, but the shorter time span for full fill, compared to hand-built structures, gives it a higher chance of succeeding.

- *Sustainability*: The full-fill method should be mostly self-sustaining without further intervention once vegetation fully covers the fill areas, in 5–10 years.
- *Magnitude*: A large area of South Meadow would be affected, as well as hundreds of feet of the Main Inlet Creeks.

Natural — Alternative 1 would have a high probability of returning lower South Meadow to within the natural range of variation and improve conditions on the Main Inlet Creeks. It also has a high probability of reducing or eliminating future threats from an unnaturally lowered water table.

- *Human Causation*: There is a high certainty of human causation of the incision in the Ackerson Meadow complex. While stream channels may exist in healthy meadows, substantial incision and headcuts are very rare under natural conditions and indicate a destabilization of normal meadow processes. We have no documentation of the pre-cattle grazing ecological or hydrological conditions, but it is quite likely that the post-restoration condition would be within the natural range of variation.
- *Magnitude*: Large areas of South Meadow would be allowed to recover under this alternative, and the creeks above main Ackerson Meadow would become less incised.
- *Ecological Importance*: Meadows play an important role in mediating water flows and in providing habitat for numerous species. The rarity of large, low elevation meadows like South Meadow increases their importance in maintaining biodiversity.
- *Risk of Increasing Impacts*: Under this alternative, the healthy portion of South Meadow would be better protected from the threat of migrating headcuts and further dewatering. At South Inlet Creeks, there is little risk given the topographic position of this incision.
- *Recovery Time*: The estimated recovery time of 5–10 years would be much faster than under Alternative 2 and the No Action Alternative.
- *Irreversibility*: Restoration could be successful after further headcut migration, incision, and drying, although it would require more manipulation. Fire frequency and other factors have the capability to convert meadows to forests, making restoration difficult to impossible. A greater concern is the extirpation or extinction of wildlife species that inhabit the meadow.

*Undeveloped — V*ehicle use and motorized tools would be needed under this alternative as well as erosion control and water diversion installations.

- *Duration and numbers* of structures and installations for Alternative 1 include:
  - Three cofferdams and pipes – 1 season for South Ackerson; 1–2 seasons for Main Inlet Creeks.
  - A few BDAs would be in place above the fill for 5–10 years to reduce the erosive power of flowing water until vegetation is established on the fill. These structures are fairly primitive.
- Erosion blankets – used as needed; probably extensive. These structures would decompose on site within 5–10 years.
- Vehicle and motorized tool use.
- A full season of daily motor vehicle use, including excavators, dump trucks, water trucks, and bulldozers at both Main Inlet Creeks and South Ackerson.
- Motorized pumps may be used while the cofferdams and pipes are in place.
- *Power to transform the landscape and technological sophistication:* Erosion blankets and BDAs are primitive structures. Cofferdams, pipes, and motorized pumps have the power to dewater a large area.

The earthmoving vehicles proposed for this alternative are sophisticated, powerful machines with a large capacity for transforming the landscape.

Outstanding Opportunities for Solitude or a Primitive and Unconfined Type of Recreation — Opportunities for wilderness recreation would be eliminated in the immediate areas as the area would be closed during restoration. Anyone recreating near the area would hear and see the heavy machinery and other activities, including those originating in the main meadow. Once the restoration is complete, the signs of it would remain for at least a decade, including disturbed areas and erosion control structures.

Context — Currently, few people visit this area. Like all areas at the wilderness boundary, expectations for solitude and primitive experience are low, as roads, vehicles, fencing, and other non-conforming uses are obvious. This somewhat reduces the impact to this quality from restoration activities.

In the longer term (more than 10 years), visitors would be able to experience a more natural landscape.

Other Features of Value — There are no identified features of value in the wilderness portions of the project. Mitigation measures to protect cultural resources have been included in the alternative.

Alternative 2, Hand-Built Structures

Untrammeled — Same as Alternative 1.

- *Intensity*: While this is a complex action that requires numerous choices about future conditions, it would involve fewer choices than Alternative 1 and natural processes would assume a greater role in the outcome.
- *Risk*: Risk would be less than Alternative 1 due to the longer time span and frequent adjustments that can be made to the system.
- *Probability of Success*: Success, in the short-term, would be farther from natural conditions than under Alternative 1. In the long-term, the probability of success is substantially lower than Alternative 1 due to inherent uncertainties in funding, administrative prioritization, and logistical support over the long timeframe required.
- *Sustainability*: This alternative requires a multi-decade effort to be sustainable.
- *Magnitude*: A somewhat larger area is involved than with Alternative 1 because of the action at South Inlet Creeks.

Overall, the impact to this quality would be somewhat less than under Alternative 1, due to a reduced intensity. Under this alternative, there would be less human manipulation and natural processes would have a greater role in determining future conditions.

Natural — In all areas, there would be minimal effects from harvesting natural materials for the structures. The other effects for this quality vary by area.

- *Main Inlet Creeks:* A portion of the creeks would return to a more natural level, and the effect of a higher water table would benefit the main meadow, which would improve the ecological connectivity and habitat continuity with the wilderness upstream. It would also somewhat improve riparian conditions for those reaches treated.
- *South Inlet Creeks:* Virtually all of the 21 structures would be designed to mine sediment for the meadow below, impacting at least 0.33 mile of riparian area. The existing incision here would fill with sediment more quickly than under Alternative 1. Once the incision fills, the trees that are currently growing in the upper end of the meadow would die and the area would return to meadow.
- *South Meadow:* The BDAs would probably raise the water table enough to reduce the risk of migrating headcuts, but a return to natural conditions for the incised part of the meadow would be very slow, probably many decades, because of the very limited supply of sediment.

- *Human causation*: Same as Alternative 1.
- *Magnitude*: The use of PALs and bank blasters would impact the riparian area at the South Inlet Creeks. Conversely, there would be sediment deposition at Main Inlet Creeks and within all wilderness meadow segments.
- *Ecological Importance*: Same as Alternative 1 for the meadows. Riparian areas are also ecologically important, although less rare than meadows.
- *Risk of Increasing Impacts*: Under this alternative, the healthy portion of South Meadow would be protected from the threat of migrating headcuts and further dewatering as long as the BDAs were maintained. Increased sediment deposition in the South Inlet area may prevent or reverse unnatural tree growth in the eastern end of the meadow.
- *Recovery Time*: The estimated recovery is very long compared to Alternative 1. For South Ackerson Meadow in particular, there may not be enough sediment available to fully fill the incised gully for many decades.
- *Irreversibility*: Restoration could be successful after further headcut migration, incision, and drying, although it would require more manipulation. Fire frequency and other factors have the capability to convert meadows to forests, making restoration difficult to impossible. A greater concern is the extirpation or extinction of wildlife species that inhabit the meadow.

Undeveloped — The only non-conforming uses in this alternative are the hand-built structures themselves. No vehicle use, mechanical transport, or motorized tools would be needed. While these structures are primitive, they have considerable power to transform the landscape. There would be 5–13 BDAs at Main Inlet Creeks, 21 structures at South Inlet Creeks, mostly PALs and bank blasters, and three–five BDAs at South Meadow.

Outstanding Opportunities for Solitude or a Primitive and Unconfined Type of Recreation — Unlike the other action alternative, there would be no need to close the area to recreation during construction. Crews building the structures would be fairly quiet, and no motorized noises from within wilderness would be heard. The structures would be obviously human made, although primitive, and would be maintained on the landscape for many decades.

Other Features of Value — There are no identified features of value in the wilderness portions of the project.

Alternative 4, No Action

Under the No Action Alternative, the *untrammeled* and *undeveloped* qualities would be unaffected. The natural quality may improve slightly over time in the Main Inlet Creek area as natural sedimentation is likely to happen at the upstream end of the meadow first. The same is true for the South Inlet Creek area. For South Ackerson Meadow, however, there is a risk of headcuts migrating upstream and dewatering more of the meadow. As the main meadow area becomes less natural, and converts to forest, ecological diversity would decline, affecting the naturalness of the adjacent wilderness. The *outstanding opportunities* quality is tied directly to the *natural* quality; as visitors have opportunities to visit a more or less natural, primitive landscape, the opportunities increase or decrease commensurately.

DECISION

As noted in the background discussion, this decision is complicated by the trans-wilderness boundary nature of both the ecological communities and the proposed restoration area, with approximately 75 percent of the project area in non-wilderness. The minimum requirement decisions made in this document should not be considered precedential for future restoration efforts, particularly for those completely in wilderness.

- A key factor for the decision is whether modern human actions caused the current conditions. As noted above, there is a high certainty of human causation of the incision in the Ackerson Meadow complex. Given that certainty, and the substantially degraded conditions, some action should be considered.

All three areas of designated wilderness in question have different contexts and will be considered separately.

South Meadow

The primary factors driving the decision for this area are impacts to the *untrammeled* and *undeveloped* qualities, and the *probability of success, risk of increasing impacts, and recovery time.* Because the relatively healthy meadow above the incised area is unlikely to generate much sediment, hand-built structures are unlikely to produce a self-sustaining condition.

The impacts under Alternative 1 to the *untrammeled* and *undeveloped* qualities cannot be overstated. An entire work season with heavy machinery operating within designated wilderness is antithetical to the wilderness idea — indeed, the Wilderness Act was in large part motivated by the desire to prevent such powerful tools from modifying the landscape. A thousand feet of creekbed filled with 2,600 cubic yards of material cannot be easily undone.

Alternative 2, conversely, has less impact to the *untrammeled* quality and far less impact to the *undeveloped* quality. Aside from the structures themselves, there would be no vehicles, motorized tools, or mechanical transport. The small crews would build the primitive structures by hand. The area could remain open during restoration activities.

The BDAs in Alternative 2 would raise the water table, supporting more natural vegetation and eliminating the risk of migrating headcuts as long as they were maintained. Because there is so little sediment from the healthy meadow above, however, maintenance would have to continue for many decades — possibly 50–100 years before enough sediment accumulated to ensure a self-perpetuating, sustainable wetland. Given the vicissitudes of funding, administrative commitment, and shifting priorities over such a long time span, it is unlikely that the meadow would ever reach a natural condition under Alternative 2.

The *risk of increasing impacts* — migrating headcuts that lower the water table and dry more of the currently healthy meadow would continue without some action. While other actions may delay that outcome, such as the BDAs in Alternative 2, only Alternative 1 would result in a permanent, sustainable correction to the current condition. Despite the large impacts noted above, Alternative 1 is the minimum requirement for the preservation of wilderness character at South Meadow.

South Inlet Creeks

In this small area (approximately four acres), there is little risk of increasing impacts. The ditches are small and vegetated. As they fill with sediment and the water table rises, the trees now starting to grow there would die and the area would revert to meadow. That process would happen much faster under Alternative 2, but the upstream riparian area would be degraded as a result and would take much longer to recover. As there is little risk of any irreversible ecological changes by waiting for natural aggradation to occur, no action is the minimum requirement for the preservation of wilderness character.

Main Inlet Creeks

Ecological health and connectivity with main Ackerson Meadow is central to this decision. Restoration actions proposed in wilderness would provide the foundation for restoration of natural processes in the non-wilderness meadow. Heads of meadows are transition zones from concentrated stream flow to sheet flow distributed across the meadow surface, through slope transition and alluvial processes. The head of Ackerson Meadow, in wilderness, is the natural place for this flow to be distributed across the breadth of the entire meadow. Without action in wilderness to fill the erosion gully and distribute the flow, not only is the success and extent of downstream restoration at risk, but the head of the meadow becomes separated

from the rest of the system. This land boundary division does not conform to hydroecological context. Preserving wilderness character within wilderness depends on repairing the damage outside of wilderness, and vice-versa.

With action within wilderness, riparian floodplain conditions would develop on and within the immediate vicinity of the erosion gullies within wilderness, and re-wet approximately 1.5 acres of wetland/meadow within wilderness. Improving the overall wetland and hydrologic processes in these meadows benefits native wildlife, and highly mobile species like the great gray owl and songbirds, the fisher, and macroinvertebrates that subsequently extend to a greater zone of influence including adjacent wilderness areas. Restoring a natural condition in Ackerson Meadow also increases *opportunities for primitive recreation* across the invisible wilderness boundary. Finally, Ackerson Meadow may someday become designated wilderness, and considering it as one integrated, holistic landscape is the sensible long-term action.

Under Alternative 1, the Main Inlet Creeks would undergo the same modification with heavy machinery as South Meadow, with a full season of work with bulldozers, dump trucks, and excavators. This same connection would be made in Alternative 2 by installing a series of channel-spanning BDAs, but over a much longer time, with a greater *risk* as a result. If action were to occur only outside of wilderness, those actions would stabilize conditions (i.e., changing downstream topography, slowing runoff, improving vegetation and wildlife habitats), and that stability would slowly translate upstream as riparian conditions improve and sediment is deposited upstream of the project area over time. Recovery is still likely but over an even longer time scale, with a concurrent increase in risk.

Given the risk of potentially damaging stochastic events with the long timeframe for Alternative 2 (such as high severity fire followed by flooding) that could undo downstream restoration efforts, and the risks associated with administrative uncertainty (discussed above for South Meadow) for Alternative 2, Alternative 1 is considered the minimum requirement for the preservation of wilderness character.

Ackerson Meadow Restoration

Check one:

❑ The proposed action is a temporary, one time activity, from _____ to _____.
✓ The proposed action will be an on-going, long term activity.

Submitted By:

Mark Fincher June 21, 2021

Date

Reviewed By:

7/14/2021

X Nicole Athearn

Division Chief, RMS
Signed by: National Park Service

(Attach any comments and conditions)

8/2/2021

X Jeff Webb

Wilderness Manager
Signed by: JEFFREY WEBB

(Attach any comments and conditions)

8/9/2021

X Kevin J. Killian

Chief Ranger
Signed by: KEVIN KILLIAN

(Attach any comments and conditions)

Approved By:

X

Superintendent AUG 1 9 2021

(Attach any comments and conditions)