



April 1, 2024

US Forest Service
Lolo National Forest
24 Fort Missoula Rd
Missoula, MT 59804

Re: Lolo National Forest Land Management Plan Revision #62960

Lolo National Forest,

The National Wildlife Federation (NWF) applauds the Lolo National Forest Proposed Action (Proposed Action) for including recognition of beaver and beaver restoration as an important part of its watershed and aquatics strategy; however, there are several areas of the planning document that could be improved to more fully comply with the 2012 National Forest Planning Rule's requirements for climate resiliency and ecological integrity, as well as to reflect current scientific research, practical experience, and best management practices. Accordingly, NWF recommends modification of the Proposed Action to strengthen the attention given to the ecological and economic value¹ that beavers have on the Lolo National Forest ecosystem, as well as downstream users.

The North American beaver (*Castor canadensis*) has immense influence over its environment—beavers' extensive instream structures create and enhance habitats for native fish, birds, amphibians, and mammals by contributing to ecological integrity, including connectivity, structure, and function of riparian zones and watersheds—while at the same time mediating the impacts of climate change on mountain snowpack and runoff. As a result of these influences, beavers are referred to as “ecosystems engineers” and considered to be a “keystone species.”² After European settlement of North America, beavers were nearly extirpated from their relatively ubiquitous distribution across the continent by the fur trade. While populations have recovered throughout North America, they remain absent in much of their historically occupied territory.³

1. For an example of economic value, see ECONorthwest. 2011. The Economic Value of Beaver Ecosystem Services: Escalante River Basin, Utah. Eugene, OR: ECONorthwest. p 49–51, tables 22–24. <https://www.beaverinstitute.org/wp-content/uploads/2017/08/BeaverEconomicValue2011.pdf>
2. Baker, B.W., and E.P. Hill. 2003. Beaver (*Castor canadensis*). In: Wild Mammals of North America: Biology, Management, and Conservation, 2nd ed. Baltimore: Johns Hopkins University Press. p 297. A keystone species is one that greatly influences the species composition and physical appearance of ecosystems and whose effects on ecosystem structure and function are both large overall and disproportionately large relative to its abundance. An ecosystem engineer is a species that directly or indirectly controls resource availability by causing “physical state changes in biotic or abiotic materials.” The beaver is a definitive example of both a keystone species and an ecosystem engineer.
3. Baker, B.W., and E.P. Hill. 2003. Beaver (*Castor canadensis*). In: Wild Mammals of North America: Biology, Management, and Conservation, 2nd ed. Baltimore: Johns Hopkins University Press. p 288–289. <https://www.beaverinstitute.org/wp-content/uploads/2021/03/Beaver-Wild-Mammals-of-North-America-Biology-Management-and-Conservation-Second-Edition.pdf>

In the absence of this keystone species, overall ecological integrity changes dramatically and ecosystem services are deeply impoverished: water runs off faster, streams become narrower and more channelized, and the water table drops—reducing the availability of water for fish, birds, amphibians, and other wildlife.⁴ The impact has been aptly characterized as “an aquatic Dust Bowl.”⁵ NWF’s focus on encouraging beaver restoration is grounded in these profound positive impacts of beavers on ecological integrity on our National Forests.

The Lolo National Forest has been a leader in collaborative research to understand historical beaver habitat and suitability for beaver restoration to benefit aquatic and riparian habitat and to build landscape resilience to climate change. The National Wildlife Federation is in support of the language thus far in Proposed Action related to beaver and riparian restoration and offer the following comments to bolster the Proposed Actions inclusion of best management practices and most recent scientific literature.

1. Forestwide Ecological Roles and Contributions (FWERC)

a. FW-FWERC-02

We appreciate the inclusion of the following identified disturbances: “Disturbance processes such as wildfire, insects, and disease, and aboriginal burning have played the primary role in the development of forest and grassland ecosystems over long time periods.”

We suggest that one additional disturbance be added that has had a large historical impact on forest lands westwide. Beaver have shaped the watersheds in which support the many ecosystem services integral to the health of our national forests⁶ which is consistent with the 2012 Planning Rule requiring best available scientific information to inform the development of the Proposed Action. We recommend adding “beaver created wetlands and riparian corridors” to this list of disturbances.

2. Nonforested Veg (VEGN)

a. FW-VEGN-DC-Table 8

We appreciate the inclusion of riparian/wetland as a potential vegetation type within nonforested ecosystem components listed in paragraph one. We recommend adding a row in Table 8 for “Riparian/Wetland” vegetation plant communities desired condition description.

4. See generally, U.S. Fish and Wildlife Service. 2018. The Beaver Restoration Guidebook 2.01: Working with Beaver to Restore Streams, Wetlands, and Floodplains. Portland, OR: U.S. Fish and Wildlife Service. <https://www.fws.gov/oregonfwo/Documents/2018BRGv.2.01.pdf>
5. Goldfarb, B. 2018. Eager: The Surprising, Secret Life of Beavers and Why They Matter. White River Junction, VT: Chelsea Green Publishing.
6. Rosell, F., Bozser, O., Collen, P., & Parker, H. (2005). Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. *Mammal review*, 35(3-4), 248-276. https://openarchive.usn.no/usnxmlui/bitstream/handle/11250/2438080/Ecological_impact.pdf?sequence=2

3. Fire, Fuel, and the Wildland-Urban Interface (FFW)

a. FW-FFW-GDL-01

We acknowledge the diversity of scientific research related to wildfire across Forest lands in the West and suggest the inclusion of beaver modified watersheds as a component of these ecosystems processes as well as a tool for high severity wildfire resilience^{7,8} which is consistent with the 2012 Planning Rule requiring best available scientific information to inform the development of the Proposed Action. Recent studies indicate that watersheds with a high degree of manipulation by beavers have significant resistance to burning during megafires. This resistance may also provide valuable secondary benefits in postfire ecosystem health, water quality, and biodiversity.^{7,8}

4. Watershed (WTR)

a. FW-WTR-GDL-02

We commend the language in this section highlighting beaver as a keystone species and support the component: “To protect the ecosystem services provided by beaver ecosystem engineering, management activities should not remove or otherwise alter beaver dams, except to protect critical infrastructure and public safety, or where necessary to support the management of at-risk species.”

We request the following additional language be added to this component: “Where conflicts with beaver habitat and roads and other human development arise in a watershed, resolution will be addressed through management strategies such as pond levelers, fencing, and other non-lethal methods. Lethal removal will only be considered after non-lethal strategy options have been exhausted.” This additional language is aligned with current best management practices used by the state and westwide.⁹

5. Riparian Management Zones and Ecosystems (RMZ)

We appreciate the introductory language emphasizing the key role that beavers play in restoring ecological integrity in riparian areas and valley bottoms, including the note that RMZs are *not* “no management zones.” We support ecologically based restoration in these critically important habitats.

7. Fairfax, E., and A. Whittle. 2020. Smokey the Beaver: beaver-dammed riparian corridors stay green during wildfire throughout the western USA. *Ecological Applications* 30(8):e02225. 10.1002/eap.2225. <https://esajournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/eap.2225>
8. Fairfax, E., Whipple, A., Wheaton, J.M., Osorio, B., Miller, J., Kirksey, K., Perez, N., Gilbert, J.T., and Jordan, C.E., 2024, Impacts of beaver dams on riverscape burn severity during megafires in the Rocky Mountain region, western United States, in Florsheim, J.L., O’Dowd, A.P., and Chin, A., eds., *Biogeomorphic Responses to Wildfire in Fluvial Ecosystems: Geological Society of America Special Paper 562*, p. 131–151, [https://doi.org/10.1130/2024.2562\(07\)](https://doi.org/10.1130/2024.2562(07)).
9. See BMPs:
 - a. Shockey, J. (2023). [Best Management Practices for Pond Levelers and Culvert Protection Systems](#) Version 1.2. Project Beaver, Jacksonville OR.
 - b. Project Beaver. (2023). [Tree Protection: A beaver coexistence tool](#).
 - c. The Beaver Institute. (n.d.). [Blocked Roads and Culverts and Drains](#).

a. FW-RMZ-OBJ-02

We support this component: “Implement beaver habitat restoration actions in at least two watersheds every 5 years.”

However, we request that the Forest could pursue a more ambitious objective by working in collaboration with outside partners such as the Clark Fork Coalition, Trout Unlimited, National Wildlife Federation, Blackfoot Challenge, and local watershed groups, all of whom are securing resources and actively implementing process-based restoration initiatives on and adjacent to Forest lands.

6. Recreation (REC)

a. FW-REC-GDL-05

We support this component: “To reduce potential adverse effects to water quality and aquatic resources, construction of new facilities or infrastructure within floodplains should be avoided. Where new activities inherently must occur in riparian management zones (e.g., at road and trail stream crossings, boat ramps, or docks), they should be located and designed to minimize adverse effects to floodplains and other riparian-dependent resource conditions (e.g., within geologically stable areas and avoiding major spawning areas).”

However, we request this additional language be added: “Where conflicts with beaver habitat and roads and other human development arise in a watershed, resolution will be addressed through management strategies such as pond levelers, fencing, and other non-lethal methods. Lethal removal will only be considered after non-lethal strategy options have been exhausted.” This additional language is aligned with current best management practices used by the state and westwide.⁹

7. Infrastructure (INF)

a. FW-INF-STD-02

We appreciate the consideration of 100-year flow events in this component: “New, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other permanent stream crossings, shall accommodate at least the 100-year flow, including associated bedload and woody material.”

We suggest adding “New, replacement, and reconstructed culverts adjacent to known beaver occupied riparian areas (~1 mile) shall consider fencing as a proactive approach to conflict resolution and reduce agency cost of future conflict (i.e. flooding, dam removal, and infrastructure loss during high flow events).⁹

b. FW-INF-STD-04

We support this component: “Newly constructed or reconstructed roads shall not encroach into streams and riparian management zones if this action increases the net long-term negative effect to the aquatic ecosystem, including impacts to the floodplain function and geometry.”

However, we request this additional language be added: “Where conflicts with beaver habitat and roads and other human development arise, resolution will be addressed through management

strategies such as pond levelers, fencing, and other non-lethal strategies. Lethal removal will only be considered after non-lethal strategy options have been exhausted.”

c. FW-INF-GDL

We request an additional Guideline be added to this section with the following language: “Where conflicts with beaver habitat and roads and other human development arise in a watershed, resolution will be addressed through management strategies such as pond levelers, fencing, and other non-lethal methods. Lethal removal will only be considered after non-lethal strategy options have been exhausted.”

d. FW-INF-GDL-08

We support this component: “To reduce the risk of road-related sediment to the aquatic ecosystem, new, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other permanent stream crossings, should be designed to prevent diversion of stream flow out of the channel and down the road in the event the crossing is plugged or has a flow that exceeds 100-year event.”

However, we request the following additional language: “Where conflicts with beaver habitat and roads and other human development arise, resolution will be addressed through management strategies such as pond levelers, fencing, and other non-lethal methods. Lethal removal will only be considered after non-lethal strategy options have been exhausted.”⁹

8. Chapter 3: Geographic Area Direction

We appreciate the proactive approach to tribal consultation within the plan development and recommend that the Blackfeet Nation be consulted more thoroughly before Chapter 3 is complete.

9. Focal Species (5.2.1.)

This appears to be an incomplete section at this stage of planning. Because of its value as an ecosystem driver (and consistent with other sections in the Proposed Action, and analysis in the Assessment), we urge the Forest to select beaver as a focal species¹⁰, as well as an indicator for watershed health, water resources, and aquatic ecosystems in the monitoring strategy. The Rio Grande National Forest in Colorado made such a selection in its forest plan revision and is implementing the plan with headwaters restoration activities to improve beaver habitat and expand beaver distribution for all the ecosystem services listed in the draft assessment.

10. U.S. Fish and Wildlife Service. 2018. The Beaver Restoration Guidebook 2.01: Working with Beaver to Restore Streams, Wetlands, and Floodplains. Portland, OR: U.S. Fish and Wildlife Service. p 22.<https://www.fws.gov/oregonfwo/Documents/2018BRGv.2.01.pdf>; Baker, B.W., and E.P. Hill. 2003. Beaver (*Castor canadensis*). In: Wild Mammals of North America: Biology, Management, and Conservation, 2nd ed. Baltimore: Johns Hopkins University Press. p 297. <https://www.beaverinstitute.org/wpcontent/uploads/2021/03/Beaver-Wild-Mammals-of-North-America-Biology-Management-and-Conservation-Second-Edition.pdf>

Beavers provide an excellent indicator of ecological integrity and watershed health, and therefore are appropriate to identify as focal species in this context.¹¹ Focal species are to be “selected on the basis of their functional role in ecosystems.” As noted in the 2012 Planning Rule and discussed by the 2012 Planning Rule Committee of Scientists, further criteria for selecting focal species include “the species’ functional roles in the ecosystem and sensitivity to changing conditions, management activities, particular threats, or desired ecological conditions.” As an ecosystem engineer, the beaver clearly fits this definition.

For example, in naming beavers as a focal species in its Forest Plan, the Rio Grande National Forest stated that beaver presence is “complementary” to other goals and desired conditions including gathering “information on trends in sedimentation, streamflow, riparian cover, and stream temperature [which] are all particularly relevant for the management and conservation of many aquatic and riparian species of conservation concern.” The Rio Grande National Forest Final Plan proposes monitoring the number of subwatersheds (6th level or 12-digit Hydrologic Unit Code) with beaver activity over time, noting: “This is a cost-effective strategy that allows the Forest to track beaver presence and range expansion, identify potential areas where beaver introduction may be appropriate, and provide opportunities for citizen science and outreach.”

Respectfully,

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11. U.S. Fish and Wildlife Service. 2014. Report of the Climate Change Adaptation and Beaver Management Team to the Joint Implementation Working Group Implementing the National Fish, Wildlife, and Plant Climate Change Adaptation Strategy. Portland, OR: U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office. p 6
<https://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Documents/BeaverClimateReportJIWG.pdf>