Wildlife Habitat Zones of Agreement

Blue Mountains Forest Partners

May 2023

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Technical Assistance: Trent Seager, Director of Science, Sustainable Northwest (SNW), provided technical assistance for the writing of these Wildlife Habitat Zones of Agreement, including the review of existing framework, proposed ZOA, and specific approaches to wildlife habitat on the Malheur NF. The coarse-meso-fine filter approach was provided by Dr. Brenda McComb. She also provided the list of diverse terrestrial wildlife species found on the Malheur NF. Graphic design and layout provided by Trent Seager (SNW).

About this document: this document represents a memorialization of the social values and scientific framework of the BMFP on terrestrial vertebrate wildlife habitat to be shared with their Forest Service partners. BMFP contracted with Dr. Trent Seager and Dr. Brenda McComb for scientific input in the creation of this document. Additional information was provided by Malheur National Forest Resource Specialists and Wildlife Biologists.

Pictured here: Tree swallow (by Hayley Crews). This is one of many terrestrial vertebrate wildlife species found on the Malheur National Forest that has a habitat requirement of a structural condition (here, a cavity for nesting) in order to be present on the landscape.

Scientific names: genus and species for all vertebrate taxa are given in Table 12 (p. 92) and not included in the text throughout the document.

Pictures: Photographs used with permission, including purchases by Sustainable Northwest. Photographers and artists are noted either in captions throughout or on the last page (p. 127). **All images should be assumed © copyrighted** and therefore cannot be used without purchase or written permission from the artist.

Front cover photographs: ponderosa pine forest in winter (by HDDA Photography), male white-headed woodpecker (by Tim Zurowski), Pacific marten (by Erni), American red squirrel (by Jukka Jantunen), little brown bat (by Salparadis), white-breasted nuthatch (by vagabond54), ponderosa pine after wildfire on the Malheur National Forest (by Trent Seager), golden-crowned kinglet (by Tim Zurowski), western larch in the fall (by DortmundFan), eastern long-toed salamander (by John P. Claire). **Additional photographs** found throughout the document with no citation are listed on the last page (p. 127). **Back cover photograph**: white-headed woodpecker (by Tim Zurowski).

Pictured here: Male rufous hummingbird feeding on a flowering currant (Ribes spp.; photo by Tim Zurowski). This wildlife species selects habitat based on plant communities and seral stages but no structural condition. Pollinators are usually thought of as invertebrates (e.g., bees, butterflies) but hummingbirds and other vertebrates can also play an important role in pollination.

BMFP Membership Approval of this Document

This document was voted on and adopted unanimously by BMFP members in their May 18, 2023 full group meeting. Please refer to our website (https://bluemountainsforestpartners.org/) and the Meeting Minutes (https://bluemountainsforestpartners.org/work/meeting-minutes/) posted there for more details.

Pictured here: Ermine (short-tailed weasel) in an aspen log (photo by Bildagentur Zoonar GmbH). This wildlife species selects habitat based on plant communities and seral stages but no structural condition. Ermine are small mustelid carnivores that prey on a variety of small mammals and are associated with different plant communities that support their prey, especially voles.

Executive Summary

The Malheur National Forest (NF) has adopted a management strategy that would begin to move forest stands to more closely align with the structure and composition that would fall within the historical range of variability (HRV). That approach should allow terrestrial vertebrate wildlife species (i.e., amphibians, birds, mammals, reptiles) that had persisted in the fire-dominated landscapes of the past (up until the late 1800s) to persist into the future, though uncertainty remains with regards to climate change. Decades of fire exclusion and climate change have shifted tree species composition, stem density, tree spatial pattern, snag density and spatial pattern, dead wood amounts, understory plant communities, water capture and movement, and ecoregion boundaries causing them to fall outside of the HRV. As a consequence of these shifts, there are some terrestrial vertebrate wildlife species (hereafter, wildlife species) whose habitat availability has declined and other wildlife species whose habitat availability has increased.

Of particular interest to BMFP is to be aware and intentional about shifts in wildlife habitat as restoration and management activities work to return the landscape to fall within HRV and desired future conditions. With any natural or anthropogenic disturbance or stressor, there are wildlife species that gain habitat and others that lose habitat (i.e., winners and losers). Within the context of climate change and subsequent effects on forest resistance, we want to be sure that loss of habitats for some wildlife species is understood when conducting landscape and project restoration. Project- and forest-level analysis should include whether management activities cause habitat availability for a species to fall outside of the HRV. We propose a **filter approach** to understanding the likelihood of conservation of all terrestrial vertebrates across the Malheur NF as forest management continues to restore forest types to HRV. The filter approach is consistent with use of HRV and the future range of variability (FRV) under climate change scenarios, and this approach provides a framework for assessing which wildlife species may need special attention when implementing vegetation restoration projects.

The conceptual framework for the filter approach to conserving biodiversity is based on the one outlined in *Wildlife Habitat Management: Concepts and Applications in Forestry* (Hunter 2005, McComb 2015). When addressing the issue of conserving biodiversity, and the thousands of species of plants and animals that occur within a given management area, a tiered approach to decision-making is used that considers the needs of some species explicitly, and it assumes that the needs of others will be met through a more generalized strategy of habitat protection and/or management that considers plant community and seral stage representation across the planning area.

The filter approach is often used as a basis for reducing the risk of losing a species from an ecosystem (Hunter 1999, Zenner et al. 2010) by using three management strategies, or “filters”: **(1) coarse**; **(2) meso**; and **(3) fine**. These strategies are designed to “catch” species in each filter within a hierarchy of management approaches while minimizing the risk of losing species.

We note that the 2012 National Forest System Land Management Planning (USDA FS 2012) includes Coarse and Fine filter approach for wildlife management on National Forest Service lands. BMFP is glad to be in alignment with the 2012 Planning Rule and associated monitoring requirements. However, we were purposeful in adding a third category of Meso to the Coarse and Fine filter approach. These Meso filter species are readily captured when analysis includes the plant community and seral stage with structural conditions. This is separate from the Fine filter species needing more detailed analysis. Of importance, our Meso filter species approach captures most wildlife that are currently listed as Management Indicator Species (MIS) in the Malheur National Forest Land and Resource Management Plan (USDA Forest Service 1990).

Importantly, each wildlife species is categorized by its biological needs through the Coarse, Meso, and Fine filters. This does not preclude an emphasis on some species or habitats over another, but rather creates a framework for accounting for those habitat requirements at different spatial and temporal scales.

Pictured here: Least chipmunk in a dry pine forest (photo by Tim Zurowski). This chipmunk is a Coarse filter species, and thus selects habitat based on plant communities and seral stages. However, small mammal diversity and density increases in special habitat types and biodiversity hotspots, helping drive food webs that include raptors and carnivores.

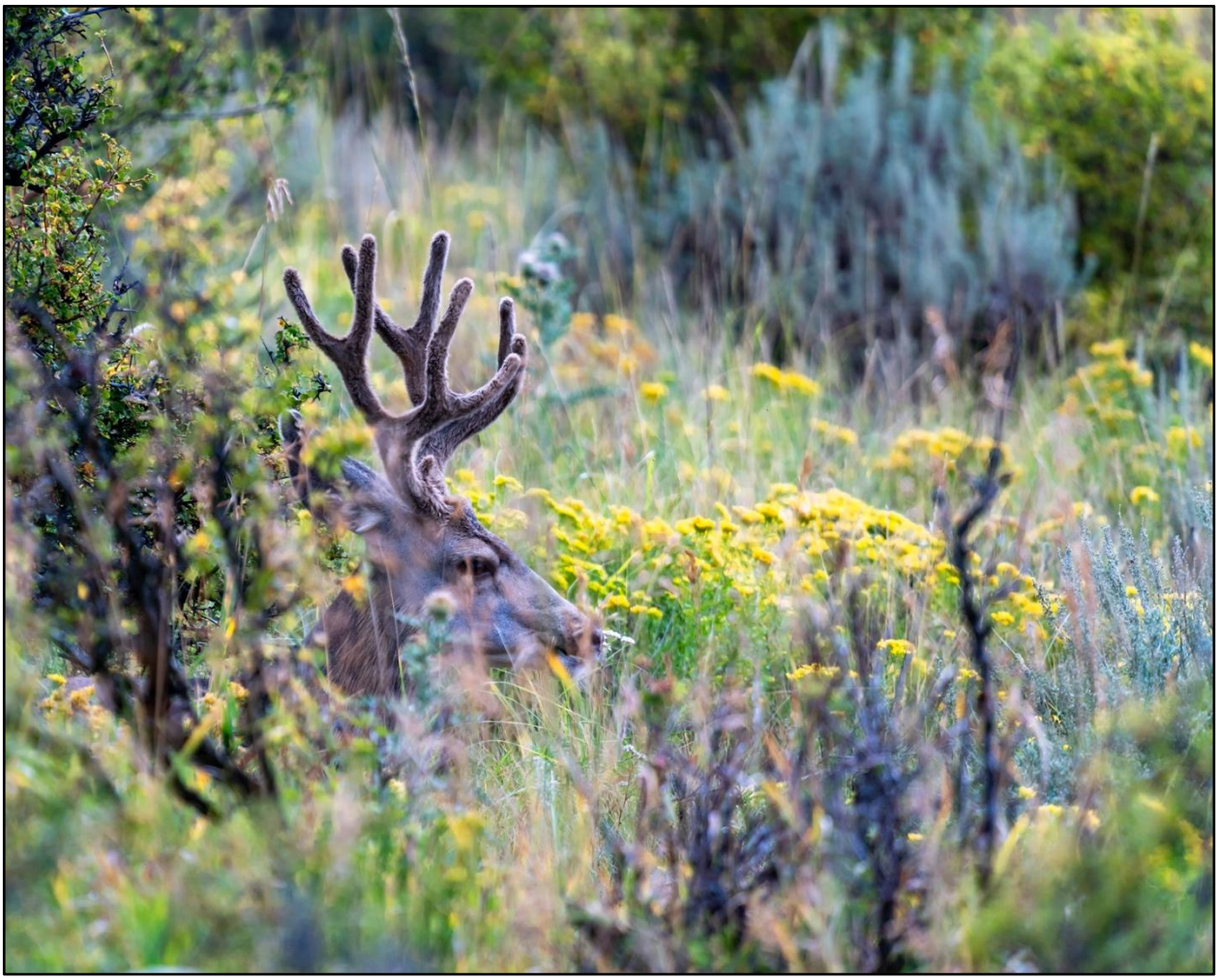
Honoring Tribes and their Tribal Rights

BMFP recognizes that many wildlife species have important cultural and natural resource significance to the multiple Tribes that have ceded lands currently managed by the Malheur NF, including the Burns Paiute Tribe, Confederated Tribes of the Umatilla Indian Reservation, and Confederated Tribes of Warm Springs, among others.

We understand the Forest Service has a responsibility to those Tribes, and that includes reasons for project initiation and subsequent government-to-government consultation before and during any project analysis and planning. Our hope is that the approach outlined in this document to wildlife habitat on the Malheur NF will increase the best available scientific information used in decision making by our Forest Service partners, including the emphasis on animals and habitats important to the many Tribes. We understand and support that Indigenous Knowledge (including Traditional Ecological Knowledge) is an important part of what our Forest Service partners must consider as part of the best available scientific information.

This Zones of Agreement document and the suggestions found throughout represent a framework for the social, economic, and ecological values of BMFP. These suggestions should not be seen as in conflict with any request from Tribes and their Natural Resource Departments. Rather, BMFP supports the Tribes requests and hope to work with them for a better understanding and shared learning on the landscape as we work collectively to restore the forest ecosystems to be closer to HRV and FRV.

BMFP supports the rights of all Tribes on the lands being managed by the Malheur NF. We recognize that their Tribal Rights, and the resources upon which those rights depend, are legally protected and important to honor as the Tribes have lived here since time immemorial.

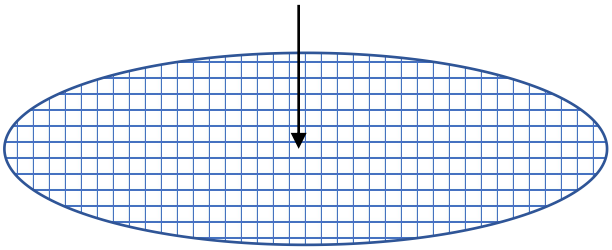


Conceptual Framework for the Filter Approach:

Coarse filter:

- Plant communities + Seral stages
- *Example*: bobcat, pine siskin
- *Estimate*: 146 of the ~200 species

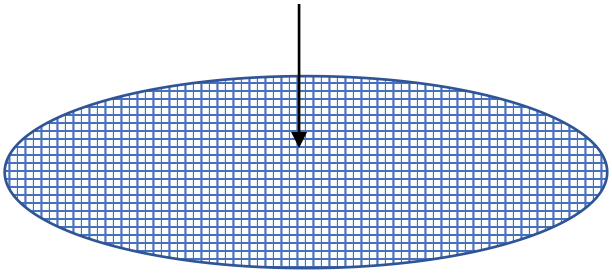
All wildlife species



Meso filter:

- Above filter + Structural Conditions + Placement (spatial)
- *Example*: woodpeckers, deer, elk
- *Estimate*: 49 of the ~200 species

Wildlife species needing structural conditions



Fine filter:

- Above two filters + Habitat Elements *(analyze specific habitat requirements for each species – no proxy)*
- *Example*: Pacific marten
- *Estimate*: 2 of the ~200 species

Rare wildlife species and habitat specialists

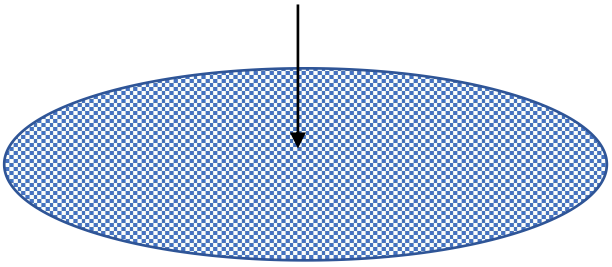


Figure 1. Conceptual Framework for the Filter Approach. As shown above, a Coarse filter fits most terrestrial vertebrate wildlife species, meaning their habitat needs can be met by "plant community + seral stage". In the Meso filter, the wildlife species need an additional structural conditions, meaning their habitat needs can be met by "plant community + seral stage + structural conditions + placement". In the Fine filter, rare or highly specialized species need "plant community + seral stage + structural conditions + placement + habitat elements (analyze specific habitat requirements for each specific species, e.g., no proxy".

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Pictured here: long-tailed weasel with prey (Peromyscus spp.; photo by John E. Heintz, Jr.). Downed wood provides cover for many wildlife species. As shown here, downed wood is an important habitat structure that supports more diverse food webs even for species such as this weasel and mouse that only require plant community + seral stage (coarse filter).

Table of Tables

Pictured here: Male western bluebird on a western juniper tree with berries (photo by Jen DeVos). This wildlife species requires a cavity for nesting, either one by made by other species (e.g., woodpeckers) or a natural cavity from decay and rot in a tree.

I. Introduction

Introduction

The Blue Mountains Forest Partners (BMFP) was established in 2006 and is a diverse group of stakeholders who work together to create and implement a shared vision to improve the resilience and wellbeing of forests and communities in the Blue Mountains. The work of the BMFP takes place on the northern two Ranger Districts (Prairie City and Blue Mountain) of the 1.7 million-acre Malheur National Forest (NF) located in Grant, Harney, and Baker counties in eastern Oregon. The Malheur NF is one of 23 priority landscapes that receive funding under the Collaborative Forest Landscape Restoration Program (CFLRP) to accomplish accelerated restoration to restore forest resiliency (Schultz et al. 2012). The CFLRP explicitly encourages collaborative, science-based restoration, and the Malheur NF currently has the most ambitious forest restoration targets of any national forest in the Pacific Northwest Region (USDA Forest Service Region 6).

This document includes the BMFP's Zones of Agreement (ZOA) for terrestrial vertebrate (i.e., amphibians, birds, mammals, reptiles) wildlife habitat. These ZOA do not address invertebrates (phylum: Arthropoda), though we recognize that the Forest Service manages for federally listed insects (e.g., western bumble bee). The work on terrestrial vertebrate wildlife habitat (hereafter, wildlife habitat) on the Malheur NF began as a compilation of notes from field trips, subcommittee meetings, and presentations given at Collaborative Full Group meetings in John Day, Oregon throughout 2015, 2016, and 2017 (on the northern goshawk, white-headed woodpecker, cavity nesters, post-fire woodpecker species, and elk, among others). In 2018, BMFP hired Dr. Trent Seager and Dr. Brenda McComb to create a framework for conserving wildlife biodiversity. They proposed an approach to conserving biodiversity on the Malheur NF through a coarse-meso-fine filter approach. They presented this at the July 2018 field trips and meetings (BMFP 2018, and Appendix A).

The core tenet of these ZOA is a Filter Approach where all terrestrial vertebrates found on the Malheur NF (and within the vegetation types addressed by BMFP) are categorized into Coarse, Meso, and Fine filter species (see Figure 1 above). The ~200 wildlife species are then addressed as part of planning for forest management and restoration. Specifically,

1. **Coarse Filter** | **147 species** (see List #1 below)
2. **Meso Filter** | **49 species** (see List #2 below)
3. **Fine Filter** | **2 species** (see List #3 below)

These Zones of Agreement serve two purposes:

1. ZOA allow BMFP members and others to clearly understand what BMFP has discussed and agreed to with respect to a particular topic; here, terrestrial wildlife habitat. By documenting our own decisions, and the scientific and social rationale behind them, BMFP will be better able to track our agreements and progress towards addressing disagreements about forest management. This purpose can be thought of as "internal accounting and tracking" of our agreements.

2. The ZOA can be used by our Forest Service partners to assess and track the level of social agreement around management of a particular forest resource (here, wildlife habitat) for use in Accelerated Restoration, implementation of the Southern Blues Restoration Coalition's Collaborative Forest Landscape Restoration Program, and other management planning efforts.

"We view ecosystem management as a strategic, collaborative process

integrating economic realities and social values

with the application of scientifically derived knowledge

of ecological relationships and constraints

to provide desired ecosystem services for future generations

while maintaining the biodiversity, processes, and functions necessary

for ecosystem integrity at multiple scales."

Zenner et al.

Pictured here: an adult male American three-toed woodpecker delivering prey to young in the nest cavity (photo by Erni). This is a Meso Filter species because it requires a structural condition in addition to plant community and seral stage. In this case, the structure is a dead, decaying, or defective tree to allow for the excavation of a cavity for nesting. Primary excavators like woodpeckers provide cavities that can be used by secondary cavity nesters for years to come.

II. New Approach to Wildlife Management

New Approach to Wildlife and Habitat

BMFP is proposing a new approach to wildlife habitat management that is different from the approach found in the Malheur Forest Plan (USDA FS 1990), which uses Management Indicator Species (MIS), Featured Species, and Fish and Wildlife Goals (see Malheur Forest Plan: Wildlife Framework below). The indicator species approach is no longer a scientifically valid approach unless there is empirical evidence linking the selected species and its response to the ecological processes (or features within restoration) and the species can be effectively monitored (Chase and Guepel 2005; Murphy et al. 2011; also see Goodell and Seager 2015 for further discussion and review).

We are proposing a filter approach that would allow for the inclusion of all terrestrial vertebrate wildlife species found within the vegetation and habitat types that BMFP addresses in restoration and management on the Malheur NF. The filter approach is in line with the 2012 National Forest System Land Management Planning (aka 2012 Planning Rule; USDA FS 2012), which proposes a coarse-filter/fine-filter framework. Here, we expand on 2012 Planning Rule to include a third filter, the Meso filter, as an intermediary between the Coarse and Fine filter approach (Hunter 2005).

The Filter Approach is a core tenet of these ZOA. This approach allows all terrestrial vertebrates to be categorized into Coarse, Meso, and Fine filter species (see Figure 1 above). The ~200 wildlife species can then be viewed through these three filters to address their habitat needs in landscape level restoration:

1. **Coarse Filter**: plant community + seral stage
2. **Meso Filter**: plant community + seral stage + structural conditions
3. **Fine Filter**: plant community + seral stage + structural conditions + habitat elements

Creating a Comprehensive List of Terrestrial Vertebrate Wildlife

To create a comprehensive list of terrestrial vertebrate species found on the Malheur NF, we reviewed the following datasets:

- Oregon Explorer's *Wildlife Explorer* by county for Grant and Harney Counties
- eBird for all sightings on the Malheur NF and adjoining lands
- Malheur NF data: Forest Plan, past NEPA documents, wildlife biologist, and resource specialists
- Forest Service Regional Office: federal and state listed and sensitive species list
- ODFW Conservation Strategy and Listed Species

From that search, we found 288 terrestrial vertebrate wildlife species. We then selected wildlife species that have habitat within the vegetation and forest types addressed by BMFP: Xeric Pine, Dry Pine, Dry Mixed Conifer, Moist Mixed Conifer, Riparian, Aspen, Post-fire, and Special Habitat types (for more information, see *Wildlife Habitat by Forest Type* in the Interaction with other Documents and Tools section below). The wildlife species found in these habitat types totaled to 198. The remaining 90 species were removed from consideration for this document. However, they are listed at the end of this document for transparency and potential future considerations (see below, *List #4: Wildlife species not included*). The final count and consideration for this document and filter approach includes the following:

- **Coarse Filter**: plant community + seral stage
    - 147 species (see List #1 below)

- **Meso Filter**: plant community + seral stage + structural conditions
    - 49 species (see List #2 below)

- **Fine Filter**: plant community + seral stage + structural and habitat elements
    - 2 (see List #3 below)

Biological Need vs. Conservation vs. Representation

The filter approach is based on the biological needs of a wildlife species. This means that research dictates whether a species' habitat needs require plant community, seral stage, structural conditions, and/or habitat elements. This biological filter does not inherently line up with what state and federal agencies and other organizations use for their priority species.

> Conservation: Both the US Fish and Wildlife Service (USFWS) and Oregon Department of Fish and Wildlife (ODFW) list species as threatened, endangered, candidate, or sensitive based on criteria that focus on decrease in population,

habitat, and range. Similarly, the USFWS created Birds of Conservation Concern to identify migratory nongame birds that are likely to become candidates for listing under the Endangered Species Act (ESA) unless there are additional conservation actions.

Representation: Partners in Flight created an approach that would both help avian species at risk and keep common birds common. They refined this by focusing on a suite of focal species to ensure that conservation is directed at the range of habitat conditions for birds within separate ecosystems.

Indicator Species: As stated above, the Malheur Forest Plan is based on a 1980s approach using MIS, Featured Species, and Fish and Wildlife Goals. This was standard at the time, and it was required under the 1982 Planning Rule (USDA FS 1982), which has subsequently been modified many times. To be valid, this approach must show: (1) empirical evidence linking the selected indicator species and its habitat requirements to the multiple species they are selected to represent, and (2) that the indicator species can be effectively monitored (Chase and Guepel 2005; Murphy et al. 2011). Most species do not meet these criteria.

Umbrella Species: A variation on the indicator species is the umbrella species approach. To be valid, this approach must show (1) empirical evidence linking the selected umbrella species and its habitat requirements to the multiple species they are selected to represent, and (2) that the umbrella species can be effectively monitored (Chase and Guepel 2005; Murphy et al. 2011). Most species do not meet these criteria.

Focal Species Monitoring: The 2012 FS Planning Rule (USDA FS 2012) uses the Coarse and Fine filter approach for planning, but a separate focal species approach for monitoring (see Interaction with Other Documents and Tools below). This focal species approach is monitoring species for each habitat type as a proxy for multiple species (e.g., indicator, umbrella) and habitat characteristics.

While none of the above approaches are what BMFP chose to use in restoring and managing wildlife habitat on the Malheur NF, we do address them here in this ZOA document since they are required by our Forest Service partners in their NEPA analysis (see Malheur Forest Plan: Wildlife Framework and Interaction with other Documents and Tools below).

It is important to appreciate that what BMFP is proposing here is to account for all wildlife species within forest restoration. Therefore, species listed as conservation

concern, MIS, or even as threatened or endangered under the ESA might be considered a Coarse filter species here. Why is that? In this case, all species are evaluated on their habitat requirements, and not on their conservation status. If a species is biologically assigned to a Coarse filter status, and that would not allow for management to meet social values (only biological values), then members of BMFP or our Forest Service partners can suggest that the species be addressed separately in management recommendations. The filter approach remains about habitat requirements. If a species is declining or vulnerable in population, then that would warrant the restoration of their habitat, but not necessarily moving the species from Coarse into Meso filter, or Meso into Fine filter.

In this document, BMFP moved both mule deer and Rocky Mountain elk into Meso filter even though their biological habitat needs were met under Coarse filter. This is due to a habitat characteristic having a negative impact. Here, that characteristic is open roads (i.e., actively used by motorized vehicles) which can alter or stop deer and elk from accessing habitat on the Malheur NF.

Pictured here: bull elk in open area with aspen and pine trees in the background (photo by Kerry Hardgrove). Deer and elk avoid the use of some forage and habitat areas based on open road systems that are used by automobiles.

Key Questions for these ZOA:

Given the context outlined above, and what BMFP has already agreed upon in previous ZOAs, these zones aim to address the following key questions:

- What wildlife species habitats should be considered when restoring the Malheur NF to HRV and future range of forest conditions?
- What structures (e.g., age classes, snags) should be included in prescriptions to assure they are present in stands treated to HRV and FRV within project areas?
- What are the spatial patterns of trees at the stand-scale needed to meet the habitat needs of wildlife?
- How are understory vegetation and plant communities being addressed in restoration as they relate to habitat structural conditions, foraging, and food webs?
- What are the spatial patterns at the landscape scale of treated, untreated, unmanaged, burned, and seral stages of each forest type across the Malheur NF, and how can those be used to inform management decisions for wildlife needs including permeability and dispersal?

III. Forest Service Management Direction and Wildlife Framework

Malheur Forest Plan: Wildlife Framework

The wildlife management framework for the Malheur NF starts with the National Forest's Land and Resource Management Plan (aka Forest Plan; USDA FS 1990). From this, other requirements may be added through policy, amendments, and Regional Forester's direction.

While the Malheur Forest Plan is more than 30 years old (USDA FS 1990), the Forest Service is still required to abide by it. Scientific research and understanding have advanced greatly in the past 30 years, and how to integrate that knowledge and understanding into management and restoration has also advanced. This is reflected in the Forest Service's own direction (e.g., 2012 Planning Rule). Still, for BMFP to capture our social values and suggestions to our Forest Service partners, we want to remain clear on their management direction and legal requirements, starting with the Forest Plan.

Malheur NF Land and Resource Management Plan (hereafter, Malheur Forest Plan) has 4 major components that apply to wildlife. Note that these are listed below in the order that BMFP discusses and considers them, not in the order they appear in the Malheur Forest Plan (USDA FS 1990).

I. Management Indicator Species (MIS)

The National Forest Management Act of 1976 directs the Forest Service to identify and actively monitor MIS to assess impacts of forest management activities on native biota within national forest lands (Code of Federal Regulations 1985). For the Malheur Forest Plan, 12 terrestrial vertebrate species were chosen[1] (see Table 1 below that includes updates and modifications).

II. Featured Species

Under featured-species management, the Forest Service's goal is to "produce selected species in desired numbers in specific locations. This can be achieved by manipulating vegetation so the limiting factors of food, cover, and water are made less limiting for the species featured. These may be game species, threatened or endangered species, or species that have particular esthetic value." (Parker and

[1] Malheur Forest Plan, Chapter IV. Forest Management Direction, E. Forest-Wide Standards, Fish and Wildlife, Management Indicator Species #61 (IV-32).

Thomas 1979). For the Malheur Forest Plan, there are 6 featured species[2] (see Table 2 below).

III. Forest-wide Standards: Fish and Wildlife[3]

Standards are legally required, and within the forest-wide standards of the Malheur Forest Plan, there are multiple sections that address terrestrial wildlife and their habitat. These include:

- Big Game Summer Range: #28-37
- Primary Excavators: #38-49
- Featured Species: #50-55 (covered in Table 2 below)
- Unique and Sensitive Habitats (Microhabitats): #56-57
- Elk Calving Habitat: #58
- Old Growth Lodgepole/American three-toed woodpeckers: #59
- Raptors: #60
- Management Indicator Species: #61(see Table 1 below)
- Threatened, Endangered, and Sensitive Species: #62-68

See Appendix B for the list of forest-wide standards #28-68 that are not already included in tables. See the Malheur Forest Plan (USDA FS 1990) for the entire text.

Pictured here: great gray owl in aspen tree (photo by Collins93). This owl species nests in aspen and conifer stands near large meadows. Both aspen and meadows are listed as Unique and Sensitive Habitats in the Malheur Forest Plan. The great gray owl requires broken topped snag/tree or an abandoned stick nest for nesting. This makes it a Meso filter species for these ZOA.

[2] Malheur Forest Plan, Chapter IV. Forest Management Direction, E. Forest-Wide Standards, Fish and Wildlife, Featured Species #50-55 (IV-30).

[3] Malheur Forest Plan, Chapter IV. Forest Management Direction, E. Forest-wide Standards, Fish and Wildlife, #28-68 (IV-27:33).

American three-toed woodpecker:

While lodgepole pine encroaches into stands and habitats that it would not have in the past due to the historical fire regime, the Malheur Forest Plan identifies old growth lodgepole as important wildlife habitat for this woodpecker species. Because this species requires trees with defects and snags for excavating cavities and foraging, it is a Meso filter species in these ZOA.

Rocky Mountain Elk:

This large mammal select habitat based on plant communities and seral stages, though open road systems and domestic cattle can shift the temporal and spatial use of habitat by elk. This, along with the social importance of elk, make it a Meso filter species in these ZOA.

Pictured here: American three-toed woodpecker and young in a lodgepole pine tree cavity (above; photo by Allixuout). Two cow elk drinking from a stream with a willow and grass meadow system in the background (below; photo by Devon Kotke). These species are both MIS and have habitat needs identified in the Malheur Forest Plan.

IV. Forest Goals & Objectives: Fish and Wildlife Management Direction

The following provide guidance in the Malheur Forest Plan: goals, desired future conditions, and management objectives. The ones listed below are specific to wildlife and habitat (e.g., riparian).

Forest Goals: Fish and Wildlife[4]

The Malheur Forest Plan has 49 separate goals, including five listed under Fish and Wildlife. Here we show how the last wildlife goal (#19) aligns well with these ZOA:

19. Provide a diversity of habitat sufficient to maintain viable populations of all species.

> *BMFP's proposal to address all wildlife species using the filter approach is in alignment with both the FS 2012 Planning Rule and with the Malheur NF's current Forest Plan, specifically Fish and Wildlife Goal #19*

Desired Future Condition of the Forest: Fish and Wildlife[5]

The Malheur Forest Plan includes forest management direction for the desired future conditions of the forest specific to fish and wildlife. These are broken in two sections, *The Forest in 1999* and *The Forest in 2039*. See Appendix B for summary of each section as it relates to terrestrial vertebrate wildlife species and the Malheur Forest Plan (USDA FS 1990) for all text and descriptive paragraphs.

Forest Management Objectives, Resource Summaries: Fish and Wildlife[6]

This section addresses multiple objectives, and summarized here are the ones that relate to terrestrial vertebrate wildlife with fish-only and specific species that have since been delisted species removed for ease of cross-referencing:

- Big Game cover and forage distribution and roads.
- Threatened, Endangered, and Candidate Wildlife Species with USFWS.

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[4] Malheur Forest Plan, Chapter IV. Forest Management Direction, B. Forest Goals, Fish and Wildlife, #15-19 (IV-2).

[5] Malheur Forest Plan, Chapter IV. Forest Management Direction, C. Desired Future Condition of the Forest, Objectives: Fish and Wildlife, 1. The Forest in 1999 (IV-6), and 2. The Forest in 2039 (IV-9).

[6] Malheur Forest Plan, Chapter IV. Forest Management Direction, D. Objectives, Resource Summaries, Fish and Wildlife (IV-16:18).

- Cooperate with other MNF resource departments to achieve fish and wildlife standards.
- Improve wildlife habitat, including: prescribe burning, seeding, browse planting, mechanical disturbance, and fertilizing to enhance forage.
- Aspen stands and riparian vegetation.
- Manage fish and riparian habitat.
- Habitat for cavity excavators through dead and downed trees.
- Old growth units to sustain populations of dependent species

See Appendix C for the paragraphs and text related to terrestrial vertebrate species. See the Malheur Forest Plan (USDA FS 1990) for the entire text.

Forest Management Objectives, Resource Summaries: Riparian Areas[7]
This section addresses multiple objectives, and summarized here are the ones that relate to terrestrial vertebrate wildlife:

- Riparian areas will be managed to protect or enhance water quality, fish habitat, and wildlife.
- Uneven-age timber management; harvest may occur outside 66' corridor; timber harvest may occur if needed to accomplish riparian objectives.
- Allotment management plans will include managing riparian areas with objectives and monitoring.
- Riparian inventory will evaluate present conditions and habitat management objectives.
- Riparian area forage will be 45% grasses, 40% shrubs.
- Cavity excavator habitat levels will be managed for 60% of potential populations in riparian areas.

See Appendix D for the paragraphs and text related to terrestrial vertebrate species. See the Malheur Forest Plan (USDA FS 1990) for the entire text.

[7] Malheur Forest Plan, Chapter IV. Forest Management Direction, D. Objectives, Resource Summaries, Riparian Areas (IV-19:20).

Forest Service Management Direction

Wildlife within the Forest Service Management Direction:
Within the Malheur Forest Plan and regional amendments are specific requirements for wildlife species, their habitats, and structural components. In addition, the FS Region 6 Office gives guidance to the Malheur NF for managing wildlife species. Here we capture these specifics to better understand the current requirements of our Forest Service partners in planning for wildlife habitat.

1. Malheur NF Land and Resource Management Plan (USDA FS 1990):
    - Terrestrial Management Indicator Species (MIS; see Table 1)
    - Featured Species (see Table 2)

2. Regional Forester's Forest Plan Amendment (USDA FS 1994, 1995)
    - Wildlife Standards as part of Interim Management Direction by the PNW Regional Forester added:
        - Goshawk: protection of occupied nest sites (see the Northern Goshawk section below)
        - Late and Old Structure (LOS): LOS within biophysical environment (e.g., temperature and moisture regime with late seral tree species) must fall within HRV or have no net loss of LOS if below HRV
        - 21" rule: maintain all remnant late and old seral structural live trees ≥ 21" dbh
        - Connectivity: maintain connectivity between LOS stands and between all Forest Plan old growth stands
        - Snags, Green Tree Replacements, and Downed Logs: maintain snags and green tree replacement trees of ≥ 21" dbh or representative dbh of overstory. Downed logs can only be removed when they exceed quantities listed (for ponderosa pine, mixed conifer, and lodgepole pine)

3. Regional Forester's Forest Plan Amendment (USDA FS 2021a) amends the following Wildlife Standards of 1995 Eastside Screens:
    - Old Trees and Large Trees:
        - outside of LOS: retain and emphasize recruitment of old trees and large trees, favoring fire tolerant species where appropriate.
        - old trees: age of ≥ 150 years
        - large trees: grand fir or white fir ≥ 30" dbh with all other tree species ≥ 21" dbh

- Snags:
    - standard: maintain all snags > 20” dbh (or representative dbh of the overstory layer) or complete a snag analysis with specifics
    - guideline: if snags must be felled, then meet guidelines
- Green Tree Retention for Future Snag Recruitment:
    - standard: retain green trees to meet future snag and downed wood recruitment for diverse composition of wildlife species
    - guideline: use, strive, prioritize, and consider key options

4. Regional Forester Sensitive Species List for the Malheur NF (USDA FS 2021b; see Table 3)

    “For Region 6 of the Forest Service, Sensitive Species are defined as those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species’ existing distribution (FSM 2670.5[8]). Management of sensitive species “must not result in a loss of species viability or create significant trends toward federal listing” (FSM 2670.32[8]). The Regional Forester is responsible for identifying sensitive species and shall coordinate with federal and state agencies and other sources, as appropriate, in order to focus conservation management strategies and to avert the need for Federal or State listing as a result of National Forest management activities.” (USDA FS 2021b).

5. US Forest Service Land Management Planning Rule (USDA FS 2012)
    - species of conservation concern: requires plan components to provide ecological conditions to maintain viable population of each species of conservation concern at the plan area or species range
    - filter approach: provide through coarse filter and fine filter
    - monitoring focal species: focal species are carefully selected and monitored when the key ecological indicators of composition, structure, function, and connectivity are either unavailable or difficult to monitor

[8] Forest Service Manual, 2600: Wildlife, Fish, and Sensitive Plant Habitat Management. Chapter 2670 - Threatened, Endangered and Sensitive Plants and Animals.

Importantly, the FS 2012 Planning Rule clearly states, "*Focal species are not selected to make inferences about other species. Focal species are selected because they are believed to be indicative of key characteristics of ecological integrity and are responsive to ecological conditions in a way that can inform plan decisions*." BMFP's ZOA embrace the spirit and science of this

6. State and Federal Listed Species
   For species requiring analysis by Malheur NF staff during NEPA and project planning, all state and federally listed species (threatened, endangered, proposed, and candidate) are captured in the Regional Forester Sensitive Species (USDA FS 2021b). Here, BMFP wants to specifically review and list what species are proposed by state and federal agencies and their specific status.
   - US Fish and Wildlife Service (USFWS) threated, endangered, or proposed species (see Table 4)
   - Oregon Department of Fish and Wildlife (ODFW) threatened and endangered species (see Table 4)

7. Migratory Bird Treaty Act (MBTA)
   MBTA analyses are required as part of the Forest Service's NEPA process to show how management actions are consistent with the act. Due to the large number of migratory bird species, project level analysis for the Forest Service focuses on species identified in the (1) USFWS Birds of Conservation Concern list (USDI FWS, 2021), and (2) the geographically specific Partners in Flight Conservation Strategies (Altman and Bresson, 2017) which identify focal species and species to represent specific habitat types.
   - USFWS Birds of Conservation Concern (see Table 5)
   - Partners in Flight Avian Focal Species (see Table 6)
   - Partners in Flight Unique Habitat Focal Species (see Table 7)

IV. Linking to other Documents and Tools

Social Values and Linking to Other ZOA

This document is created to be a representation of the social values and supporting science for the stakeholders of the Blue Mountains Forest Partners (BMFP) on terrestrial vertebrate wildlife habitat. To undertake this effort, the Collaborative reviewed the current management direction given to our Forest Service partners on the Malheur NF (see Malheur Forest Plan: Wildlife Framework and Forest Service Management Direction sections above). Here, BMFP is providing a larger framework and approach to wildlife habitat is doing so through shared social values and other considerations, including connecting these ZOA to other BMFP Zones of Agreement.

Social Values within Management Direction

These Zones of Agreement work to frame the social values of BMFP with the understanding that there are also legal requirements that the Malheur NF has for managing terrestrial wildlife. These FS legal requirements include direction from the Malheur Forest Plan and from the US Forest Service Pacific Northwest Regional Office in addition to state and federal agencies and other partnerships:

Other Considerations

In addition to the FS Regional Office list of species to be addressed, BMFP wanted to review lists that help inform the Regional Forester and track species that may have habitat or population concerns. These lists include:

- Oregon State Sensitive Species (2021) and Conservation Strategy Species (2016) listed for the Blue Mountain ecoregion (see Appendix G, Table G1)
- Oregon Biodiversity Information Center (ORIBC)

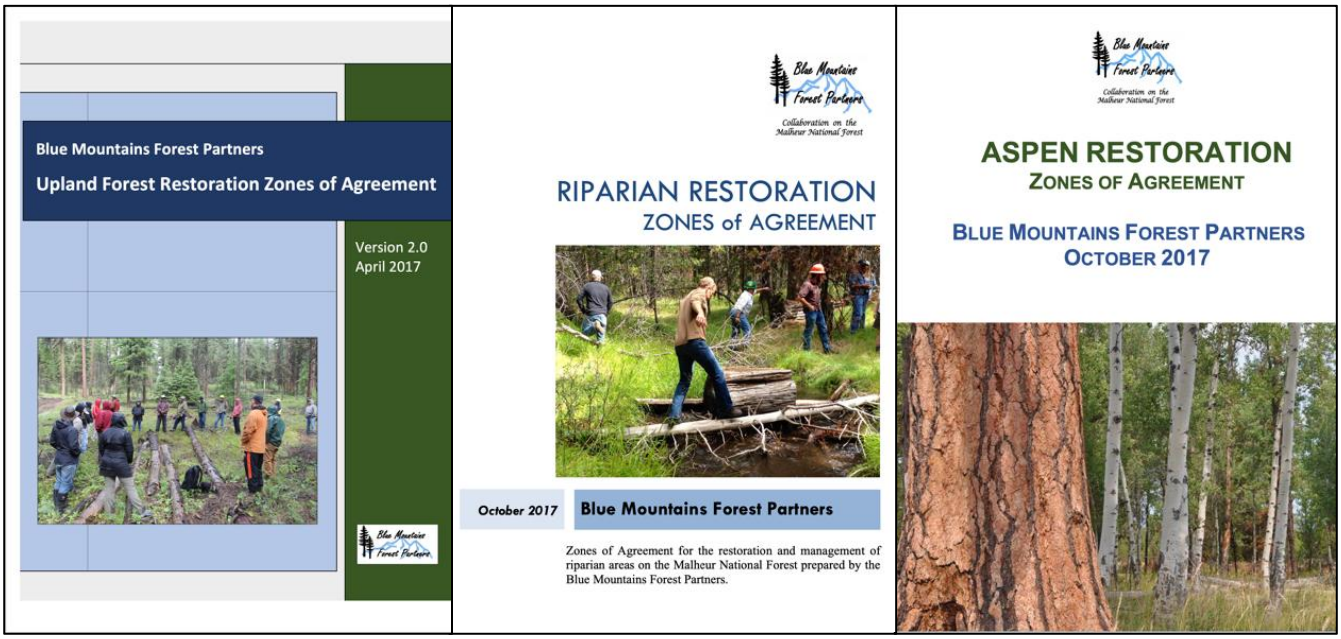
Wildlife Habitat by Forest and Vegetation Type

For this document, we address terrestrial vertebrate wildlife within the different vegetation types as listed in the following BMFP Zones of Agreement on: Upland Forest Restoration (BMFP 2017a), Riparian Restoration (BMFP 2017b), and Aspen Restoration (BMFP 2017c) with additional habitat types included that are being studied or discussed by the Collaborative (e.g., post-fire, special habitat types).

We recognize that our FS partners on the Malheur NF use different forest vegetation classification. To cross-walk or reference the vegetation types of BMFP with those used by the FS (e.g., ponderosa pine/Douglas-fir), see BMFP ZOAs referenced above.

For the purposes of consistency within BMFP's work, wildlife habitat in this document will be addressed in the following vegetation types:

1. Xeric ponderosa pine
2. Dry ponderosa pine
3. Dry mixed conifer
4. Moist mixed conifer
5. Riparian
6. Aspen
7. Post-fire
8. Special habitat types (e.g., meadows, deciduous tree stands)



Pictured here: BMFP has many Zones of Agreement, including previous compilations of project-level ZOA. To make sure all the ZOA are in alignment with one another, this document draws on the vegetation types and habitat types addressed in previous ZOA (Upland Forest Restoration; Riparian; Aspen) and on habitat types being discussed and considered by the Collaborative (post-fire environments, meadows, deciduous stands, etc.). To see all the ZOA documents and read the details, visit BMFP's ZOA section on their website.

Interaction with other Documents and Tools

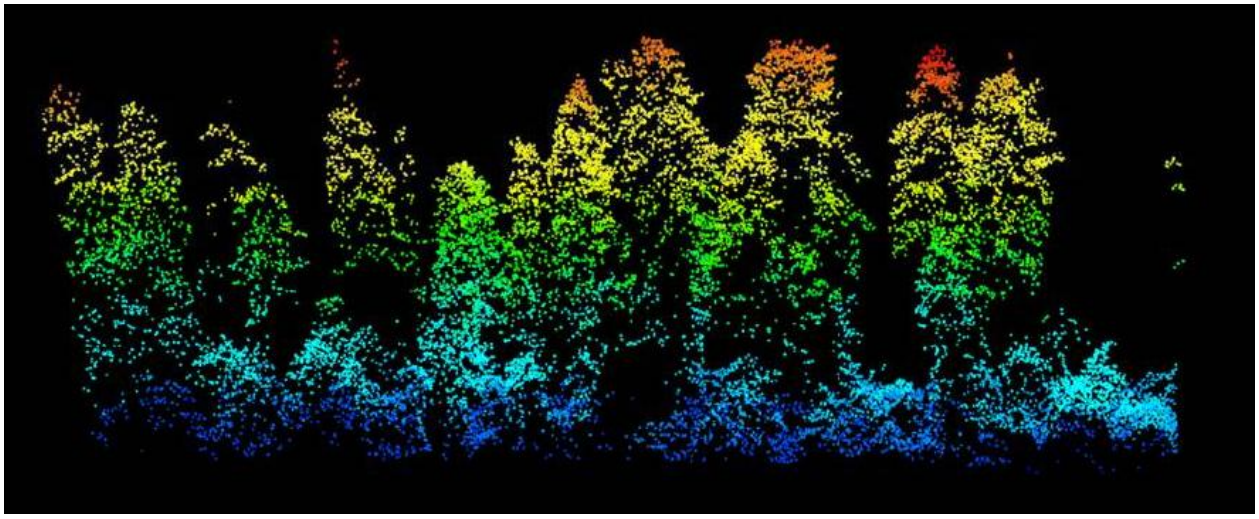
Decision Support Tool

Earlier draft versions of the Wildlife Habitat ZOA included a template for a decision support tool (DST) to help implement the filter approach. This DST is now a separate document, *Wildlife Habitat Decision Support Tool: for managing terrestrial vertebrate habitat on the Malheur National Forest*. Please look to this document for specific lists of what each wildlife species needs for habitat and the associated citations where this information was found. The DST specifically includes the:

Coarse Filter species | plant community + seral stage needed
Meso Filter species | plant community + seral stage + structural conditions needed
Fine Filter species | plant community + seral stage + structural conditions + habitat elements needed

GIS and LiDAR Tool for Habitat Mapping

The Malheur NF has near complete LiDAR coverage that was flown in 2007 and 2017. This information is available for analysis, including overstory canopy closure and other habitat characteristics important when assessing wildlife habitat at the landscape scale. LiDAR allows the creation of a point cloud and analysis of tree height and canopy cover, among others (see figure below). While it is feasible to take the decision support tool and use the habitat requirements of any species to compare against existing data for vegetation structure (plant community + seral stage + structural condition), this has not been done on the Malheur NF. BMFP hopes to work to find a way to use the diverse data sets from the Forest Service, BMFP, Oregon State University, and other research and agencies partners to build such a tool.

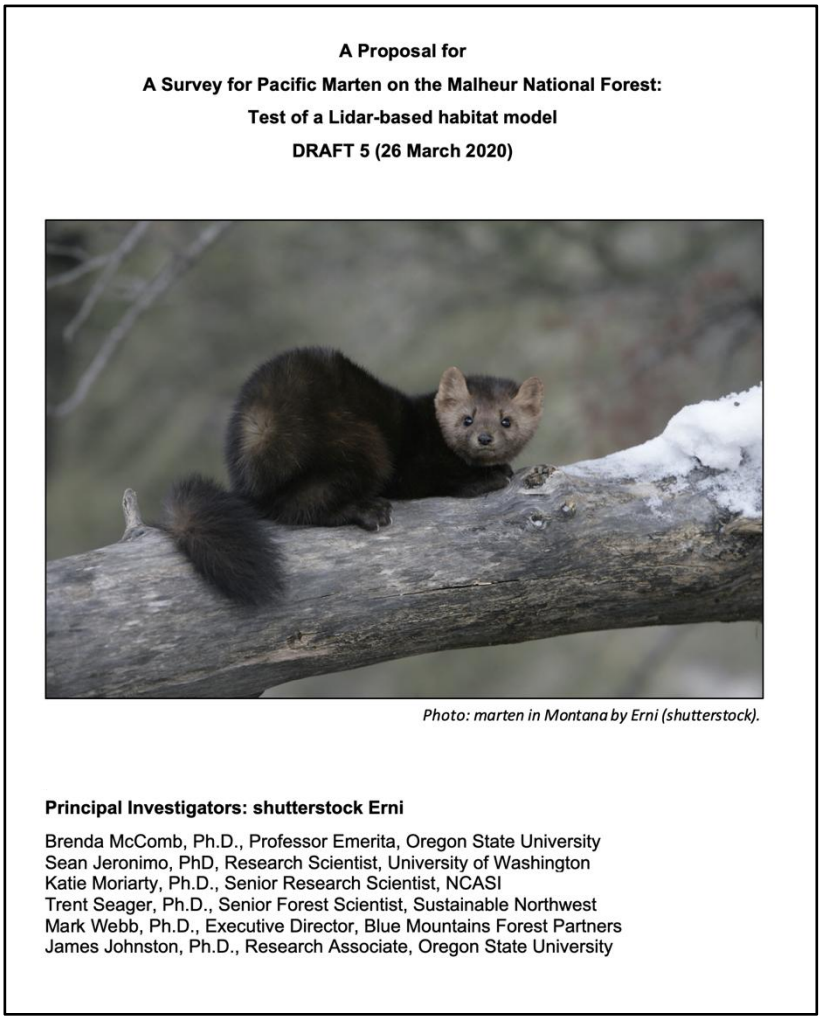


Pictured here: point cloud created using LiDAR, showing canopy height in different colors, individual trees, and midstory cover (photo by Andrew Ngeow, courtesy of Oregon State University).

Pacific Marten Modeling and Detection

As a way of testing the option for GIS and LiDAR habitat mapping, BMFP is working with a group of researchers to consider a pilot study on Pacific marten on the Malheur NF (see figure below). The idea is that if it is possible to use overstory data (LiDAR), understory data (fire, fuels, and vegetation plot data), and add snag data (to be determined) to accurately predict and detect marten habitat, then it should be possible to do that for meso and coarse filter species that do not have such complex habitat requirements. The research proposal was looking at potential options for 2020 field work, but the onset of COVID and associated restrictions delayed the project.

The project's stated goals include:



A Proposal for

A Survey for Pacific Marten on the Malheur National Forest:

Test of a Lidar-based habitat model

DRAFT 5 (26 March 2020)

Photo: marten in Montana by Erni (shutterstock).

Principal Investigators: shutterstock Erni

Brenda McComb, Ph.D., Professor Emerita, Oregon State University
Sean Jeronimo, PhD, Research Scientist, University of Washington
Katie Moriarty, Ph.D., Senior Research Scientist, NCASI
Trent Seager, Ph.D., Senior Forest Scientist, Sustainable Northwest
Mark Webb, Ph.D., Executive Director, Blue Mountains Forest Partners
James Johnston, Ph.D., Research Associate, Oregon State University

Our goal is to assess the occurrence and distribution of Pacific marten on the Malheur National Forest. Specifically, we aim to obtain distribution data on martens and other forest associated species (e.g., piliated woodpeckers) in areas designated for fuel reduction treatments to assist forest planners balance needs for reducing fire risk while maintaining biodiversity as directed under the 2012 Planning Rule.

To obtain distribution data on martens, we will use multi-species camera survey protocols and initially focus in areas >1300 m in elevation as martens in similar dry forests are often found >1600 m in the southern portion of their range. Because there have been no prior cohesive surveys, we will initially stratify camera placement using a Lidar-based model of structural complexity. We hypothesize structural complexity will be correlated with predicted marten habitat. We will accomplish our goals by both assessing the

vegetation and accuracy of the Lidar model while surveying for martens along a predicted gradient.

Please see the full draft document for further information, citations, and maps of potential habitat and pilot work.

Pacific Marten: *note on taxonomy and appropriate research*

A few years after the 1990 Malheur Forest Plan, there was a common name change from Pine Marten to American Marten while retaining the scientific name *Martes americana*. More recently, the taxonomy of the marten (*Martes* spp.) has changed in North America (USDI FWS 2015). The *Martes* species found across Oregon is the Pacific Marten (*Martes caurina*), with the subspecies *Martes caurina vulpina* found in the Blue Mountains. As such, only research occurring on the Pacific Marten or previous research on *Martes* species within the current range of the Pacific Marten is used in this and associated documents.

Pictured here: Marten climbing a lodgepole pine tree in Canada (photo by Ghost Bear). The Pacific marten is a rare and highly specialized species on the Malheur NF. This means the species needs plant community + seral stage + structural conditions + habitat elements and thus makes this one of two Fine filter species for BMFP.

V. Current Malheur NF Planning for Terrestrial Vertebrate Wildlife Species

Wildlife Species considered in Forest Restoration and Project Planning:

The Malheur NF is required to consider multiple wildlife species when doing project planning and NEPA analysis. Included in this document are the species that overlap with BMFP's Upland Forest Vegetation Types. There are other species that our FS partners consider and analyze for that are not included here (e.g., fish species, invertebrates).

The followings lists are required based on the Malheur Forest Plan (USDA FS 1990) and subsequent modifications (USDA FS 1994, 1995, 2021) and Regional Forester requirements (USDA FS 2021b). The current lists include:

12 - Management Indicator Species
6 - Featured Species
1 - Northern Goshawk
12 - Regional Forester's Sensitive Species
1 - Federally Threatened, Endangered, or Candidate Species
10 - USFWS Birds of Conservation Concern
12 - Partners in Flight – Avian Focal Species
13 - Partners in Flight – Unique Habitat Focal Species

67 total species

see Tables 1-8 below for a detailed list and associated photo composites

These add up to 67 species total with 52 of them being unique. This is because 12 species were in multiple lists, sometimes up to four different lists. It is important to note that the above species were chosen for different reasons under different lists (e.g., indicator, conservation) and thus might be analyzed for different reasons. This could require all 67 species with duplicates to be analyzed to meet the Forest Service direction or suggested analysis from the listing agency. Even the Malheur Forest Plan repeats two species in the MIS list (see Table 1). This requires that those species be analyzed for two reasons or habitat types. BMFP recommends moving away from this and instead focusing on the coarse-meso-fine filter approach. See *Biological Need vs. Conservation vs. Representation* section above (pp. 6-8) for more information and further discussion.

Table 1. List of terrestrial vertebrate Management Indicator Species (MIS) found in the Malheur National Forest Land and Resource Management Plan (USDA FS, 1990) along with the given reason the species was selected by the Malheur NF.

	Species	Species Type	Forest Service Reason for Selection and/or Habitat[9]
1.	American three-toed woodpecker	avian	(1) old growth; (2) primary cavity excavator; dead & defective habitat
2.	black-backed woodpecker	avian	primary cavity excavator; dead & defective habitat
3.	downy woodpecker	avian	primary cavity excavator; dead & defective habitat
4.	hairy woodpecker	avian	primary cavity excavator; dead & defective habitat
5.	Lewis' woodpecker	avian	primary cavity excavator; dead & defective habitat
6.	northern flicker	avian	primary cavity excavator; dead & defective habitat
7.	Pacific marten[10]	mammal	old growth
8.	pileated woodpecker	avian	(1) old growth; (2) primary cavity excavator; dead & defective habitat
9.	red-naped sapsucker[11]	avian	primary cavity excavator; dead & defective habitat
10.	Rocky Mountain elk	mammal	species commonly hunted
11.	white-headed woodpecker	avian	primary cavity excavator; dead & defective habitat
12.	Williamson's sapsucker	avian	primary cavity excavator; dead & defective habitat

[9] Note: this text is directly from the 1990 Forest Plan. It is assumed “dead & defective habitat” means the habitat available in snags and defective live trees.
[10] The 1990 Forest Plan lists this species as Pine Marten. The *Martes* species currently found across Oregon is the Pacific Marten (*Martes caurina*). See *Pacific Marten: note on taxonomy and appropriate research* section above (p. 25) for details.
[11] The 1990 Forest Plan originally listed both the yellow-bellied and red-breasted sapsucker. Since then, there has been a taxonomy change with three North American sapsuckers now considered a meta species, and only the red-naped is considered to occur in the Blue Mountains (see Walters et al. 2002).

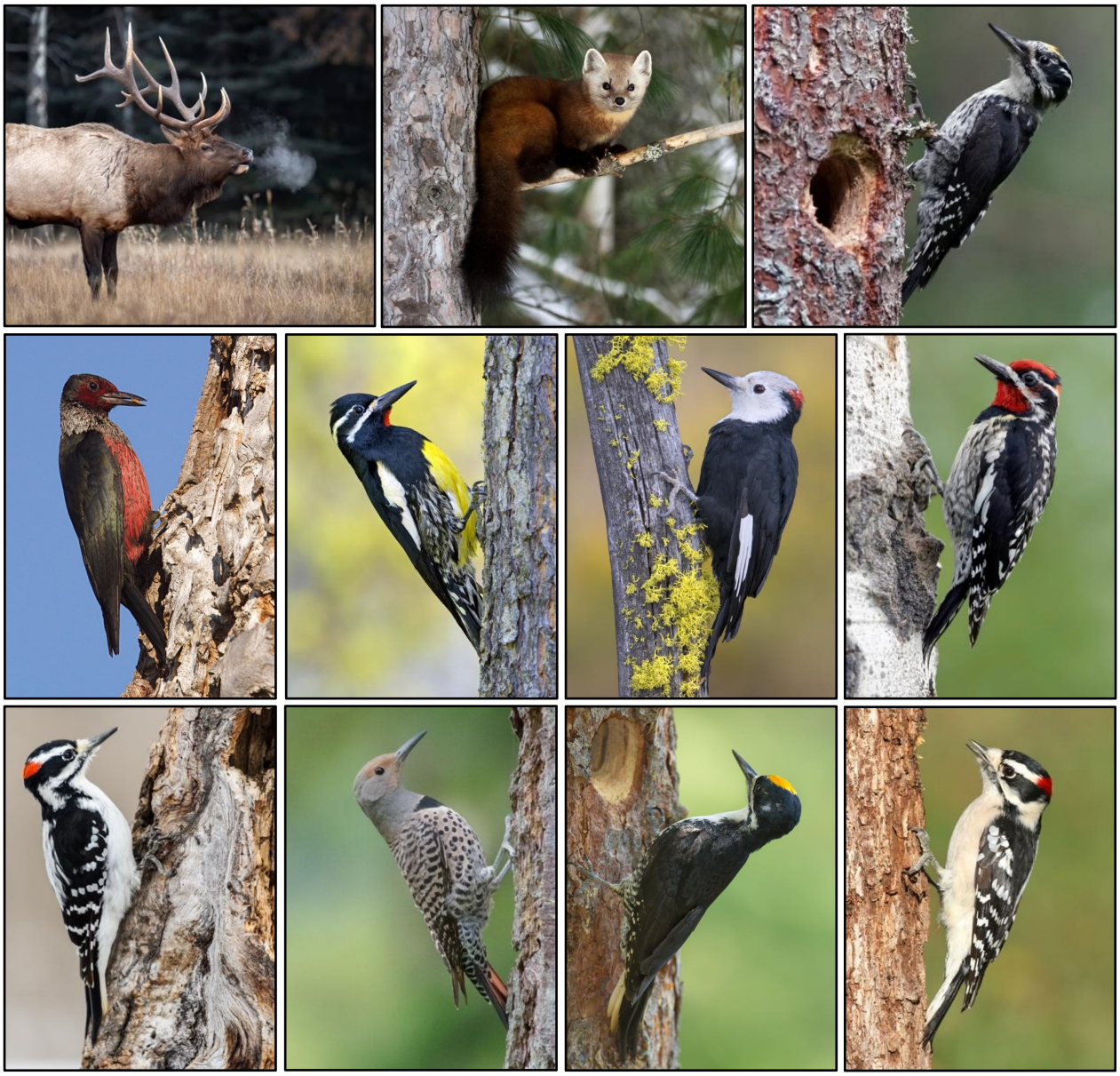


Figure 2. Composite of Management Indicator Species (MIS) for the Malheur NF. Top row L to R: Rocky Mountain elk (by Harry Collins Photography); Pacific marten (by Christopher MacDonald); and American three-toed woodpecker (by Risto Puranen); Middle row L to R: Lewis' woodpecker (by Tom Reichner); Williamson's sapsucker (by Tim Zurowski); white-headed woodpecker (by Tim Zurowski); and Red-naped sapsucker (by Agami Photo Agency); Lower row L to R: hairy woodpecker (by FotoRequest); northern flicker (by T. Schofield); black-backed woodpecker (by Agnieszka Bacal); and downy woodpecker (Steve Byland) Lower right: pileated woodpecker (by Double Brow Imagery).

Table 2. List of Featured Species found in the Malheur National Forest Land and Resource Management Plan (USDA FS 1990) under forest-wide standards along with the given reason the species was selected by the Forest Service.

	Species Type	Species	Standards listed in the Forest Plan
1.	avian	dusky grouse[12]	maintain grouse winter roost habitat
2.	avian	greater sage-grouse[13]	protect and enhance sagebrush habitats with documented use by sage grouse or high potential for use
3.	avian	osprey	maintain or create large nesting snags and green replacement trees within 1/2 mile of water sources currently being used by osprey
4.	avian	upland sandpiper[13]	protect and enhance occupied habitats of upland sandpipers that are critical to nesting and rearing of young
5.	mammal	Rocky Mountain bighorn sheep[13]	maintain bighorn sheep habitat; no domestic sheep allotment pastures within bighorn sheep range; review all activities within prime habitat, including migration routes, to identify and mitigate human disturbance.
6.	mammal	pronghorn[13]	maintain pronghorn antelope habitat by controlling the invasion of trees through project level environmental analysis.

[12] Listed in the Malheur Forest Plan as “grouse”; assumed to be blue grouse as sage-grouse is listed separately. In 2006, there was a taxonomy change with the blue grouse separated into two separate species: dusky grouse and sooty grouse (Banks et al. 2006). The species found on the Malheur NF and Northern Rockies is the dusky grouse.

[13] These four species have some habitat overlap with the BMFP vegetation types (e.g., xeric pine, upland dry pine, special habitat) but the core habitat distributions for these species are found in other Malheur NF habitat types such as talus slopes, sagesteppe, and open grasslands.

Figure 3. Composite of some of the featured wildlife species in the Malheur Forest Plan. Top row L to R: dusky grouse (by Double Brow Imagery), Rocky Mountain bighorn sheep (by Larry Lamsa). Middle row L to R: pronghorn (by Richard Mittleman), upland sandpiper (by Ashley Wahlberg Tubbs). Bottom: osprey (by Andy Morffew).

The Northern Goshawk

The Malheur NF Land and Resource Management Plan (USDA FS 1990) does not directly address the northern goshawk, but the plan was amended by the Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales (aka “Eastside Screens”) by the PNW Regional Forester (USDA FS 1994, 1995). This requires the Malheur NF to manage for active and historical (≤5 years) northern goshawk nests at three specific scales. These scales are: nest site (tree, clump); suitable nesting habitat (30 acres); and post fledging areas (400 acres), with each scale having restrictions on management activity or disturbance.

BMFP worked with The Nature Conservancy, Oregon Department of Forestry, and the High Desert Museum to fund a technical review of the northern goshawk on the Malheur NF (Goodell and Seager 2015). The scientific literature shows a lack of robust trends in reproduction and survival in forests managed for old growth versus other management, with the northern goshawk reproduction and survival trend data instead pointing to inter-annual variability in weather and prey abundance (Kennedy 1997, 1998; Boyce et al. 2006; Reynolds et al. 2008). Additionally, the long-term northern goshawk dataset from the Malheur NF (Richabaugh and Fremd 2012) and published literature (see review in Goodell and Seager 2015) showed nest site selection, prey base, and canopy closure at the nest and stand level varied greatly within and between vegetation or forest type.

This ZOA draws heavily on the Malheur NF goshawk technical review document (Goodell and Seager 2015). After the BMFP goshawk workshop and field tour (summer 2015), and subsequent discussions, the Malheur NF Supervisor's Office reviewed the Eastside Screens. The Interim Wildlife Standards in the Eastside Screens do not require that the Forest Service survey for the northern goshawk in project areas. Instead, only known active and historical nests sites receive protection and guidance. In 2017, BMFP supported the Malheur NF Wildlife Program Manager's update on the restrictions based on the best available scientific information. Of note, the Eastside Screens give guidance on seasonal restrictions on activities, but it does not give specifics:

> "Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting." (Interim Wildlife Standard, Scenario A, page 10*,* USDA FS 1995)

The Malheur Goshawk Guidance modified the disturbance restriction season to April 1 to August 15 each year (using published literature and local fledging and dispersal dates). Based on research showing no evidence of negative effects of logging truck noise on the nesting northern goshawk (Grubb et al. 1998; Grubb et al. 2013; see also "Road and Pedestrian Disturbance on National Forests" in Goodell and Seager 2015), the new guidance also exempted 2-digit and 4-digit roads from haul restrictions. The decision on haul restrictions for 3-digit roads remains up to the discretion of the District Biologist. In 2019, the Malheur NF adopted a ¼ mile buffer that would be applied to disturbance activities.

The northern goshawk is unique in that it is not listed as an MIS or for special management in the Malheur Forest Plan, and the Eastside Screen amendment doesn't require management of the habitat or survey for the species, only protection of known nests (active within ≤5 years; USDA FS 1995). To address this gap, BMFP proposes that the northern goshawk be listed as a Meso Filter species (see List #2) and the nesting habitat be addressed through that filter (e.g., conifer clumps with nesting structure and canopy closure) while foraging habitat is addressed through the Coarse Filter approach (e.g., diverse prey species and abundance).

Specifically, important prey species for the goshawk include sciurid species (e.g., ground and tree squirrels, chipmunks), birds (e.g., American robin, northern flicker, jays), rabbits, and hares. These are all Coarse Filter species except for the northern flickers, which is a Meso Filter species. For further details on diet and prey resources of the goshawk on the Malheur NF, see prey species composition in the technical review (Goodell and Seager 2015).

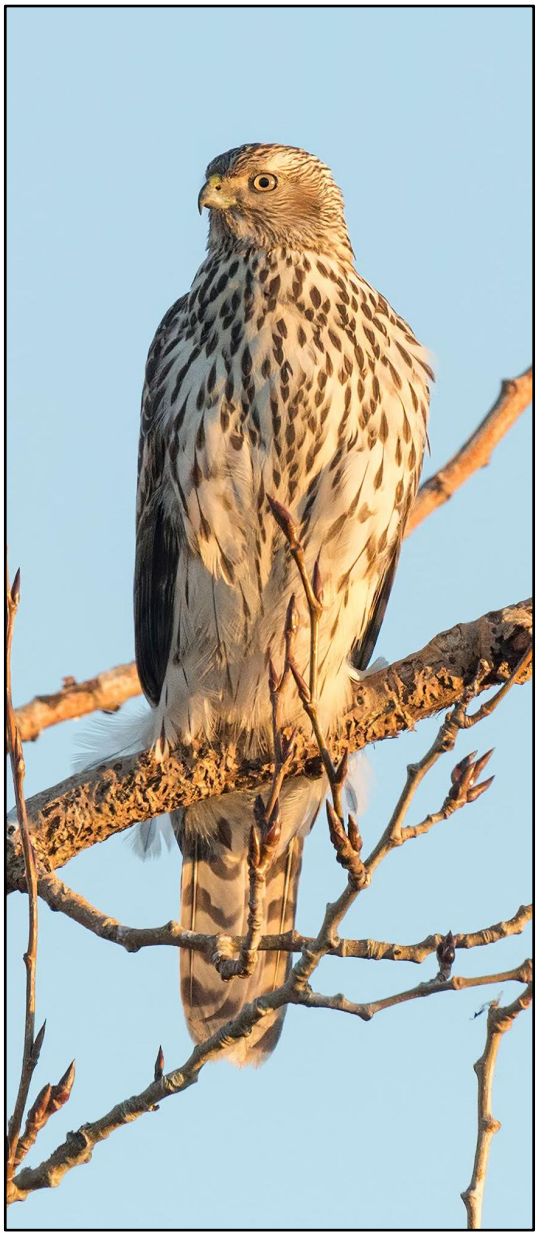


Figure 4. The northern goshawk is an iconic raptor species in eastern Oregon. It has been discussed extensively among BMFP and their Forest Service partners. Pictured here: adult northern goshawk (by Jay Ondreicka), immature northern goshawk (by Feng Yu), northern goshawk nest in ponderosa pine (by Trent Seager), and northern goshawk chicks in nest (by Jonas Sjoblom); note the fresh conifer needles and branches lining the nest as protection against insects and fungal diseases.

Table 3. List of Regional Forester's Sensitive Species that are terrestrial wildlife species and detected or suspected[14] for the Malheur NF (USDA FS 2021b).

	Species	Detected or Suspected	Species Type	Reason for Selection by Region 6 Forester
1.	bald eagle	D	avian	Delisting plan includes monitoring until 2029
2.	bighorn sheep	D	mammal	State Sensitive and Strategy Species
3.	bobolink	D	avian	State Sensitive and Strategy Species
4.	fringed myotis	D	mammal	State Sensitive and Strategy Species
5.	gray wolf	D	mammal	Strategy species
6.	greater sage-grouse	D	avian	State Sensitive-Critical and Strategy Species
7.	Lewis's woodpecker	D	avian	State Sensitive-Critical and Strategy Species
8.	pallid bat	S	mammal	State Sensitive and Strategy Species
9.	Townsend's big-eared bat	D	mammal	State Sensitive-Critical and Strategy Species
10.	upland sandpiper	D	avian	State Sensitive-Critical and Strategy Species
11.	white-headed woodpecker	D	avian	State Sensitive-Critical and Strategy Species
12.	wolverine	S	mammal	State Threatened Species and Strategy Species
13.	bufflehead[15]	D	avian	OBIC 2019 list; removed from ODFW 2021 list[16]
14.	Columbia spotted frog[15]	D	amphibian	State Sensitive-Critical and Strategy Species
15.	grasshopper sparrow[15]	S	avian	OBIC 2019 list; removed from ODFW 2021 list[16]
16.	pygmy rabbit[15]	S	mammal	OBIC 2019 list; removed from ODFW 2021 list[16]
17.	Wallowa rosy finch[15]	S	avian	OBIC 2019 list; removed from ODFW 2021 list[16]

[14] For suspected species (e.g., have not been recently detected on the Malheur NF), the FS staff are required to address them in the NEPA analysis if a project area has available habitat. See Appendix A. for the maps used by BMFP to determine inclusion.
[15] Not found in BMFP vegetation types (e.g., xeric pine, upland dry pine, special habitat).
[16] Oregon Biodiversity Information Center (OBIC; Portland State University's Institute for Natural Resources): 2019 Rare, Threatened, and Endangered Species of Oregon; note that the 2021 ODFW Sensitive Species list removed these species entirely or for the Blue Mountain ecoregion.

Figure 5. Composite of some of the Regional Forester's Sensitive Species for the Malheur NF. Top (L to R): bald eagle (by Alan Lipkin) and gray wolf (by Miroslav Chytil). Middle (L to R): Townsend's big-eared bat (by John Larson, BLM) and wolverine (by Jamen Percy). Bottom: Lewis' woodpecker (by Tom Reichner) and white-headed woodpecker (by Dave Acheson).

Table 4. List of Federal and State Threatened, Endangered, or Proposed terrestrial species of wildlife on the Malheur NF (USDA FS 2021b).

	Species	Detected or Suspected	Species Type	Reason for Selection and/or Habitat
1.	Canada lynx	S	mammal	Federal Threatened; not currently detected on Malheur NF. However, if habitat is present, it must still be addressed in NEPA.

Note: In March 2000, the USFWS listed the contiguous United States distinct population segment of the Canada lynx listed as threatened (USDI FWS 2000) under the endangered species act of 1973. In 2017, the USFWS evaluated the Canada lynx viability with considerations for forest management, wildland fire management, climate change, and other potential sources of habitat loss and fragmentation in the final species status assessment report (USDI FWS 2017). In October 2020, during the creation of these ZOA, the USFWS withdrew their proposed rule for the North American Wolverine (USDI FWS 2020). While earlier drafts of these ZOA include the wolverine in this list, it was removed though remains on Table 10 (Regional Forster's Sensitive Species list).

Pictured here: Canada lynx showing the ear tufts and the highly adapted paws for snowy and cold climates (photo by Keith Williams). This is the only terrestrial wildlife species for the Malheur NF that is listed by the USFWS as either threatened, endangered, or proposed under the Endangered Species Act (ESA). Note that the Canada lynx has not been detected and is only suspected on the Malheur NF.

Table 5. List of USFWS Birds of Conservation Concern for Region 10, Northern Rockies (US portion only) of eastern Oregon and Washington (USDI FWS 2021)[17].

	USFWS BCC Species	General Habitat Requirements
1.	bobolink	wet meadows with low vegetation cover and high litter cover; low grazing.
2.	calliope hummingbird	predominantly a montane species found in open shrub sapling seral stages (8-15 years) at higher elevations and riparian areas.
3.	Cassin's finch	open, mature coniferous forests of lodgepole and ponderosa pine, aspen, alpine fir, grand fir, and juniper steppe woodlands.
4.	evening grosbeak	ponderosa pine, mixed conifer, subalpine fir; open canopy mature forests; avoidance of shrub and brushy habitats, closed canopy forests.
5.	flammulated owl	associated with ponderosa pine forests and mixed conifer stands with <50% canopy closure, open understory with dense patches of saplings, or shrubs.
6.	Lewis's woodpecker	large trees (>20" dbh) in open ponderosa pine, open riparian woodland, and logged or burned pine forests; perches with brushy understory, dead and downed material, and abundant insects.
7.	long-eared owl	nests in dense forest or brushy vegetation near open habitats for foraging.
8.	olive-sided flycatcher	open conifer forests (<40% canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance.
9.	rufous hummingbird	broad range of habitats; secondary succession communities and openings, mature forests with available insects, flowers, and sapsucker wells.
10.	Williamson's sapsucker	mid- to high-elevation, mature open and mixed coniferous/deciduous forests; aspen important component; western larch, Douglas-fir, ponderosa pine.

[17] Species were removed if they were not found on the Malheur NF; the following are found on the NF but not within forest and vegetation types not addressed by BMFP: western grebe, Clark's grebe, and black tern.

Figure 6. Composite of some of the US Fish and Wildlife Service's Birds of Conservation Concern on the Malheur NF. Top (L to R): flammulated owl (by Julio Mulero); olive-sided flycatcher (by vagabond54); and willow flycatcher (by Kelly Colgan Azar). Bottom (L to R): Cassin's finch (by Robin Agarwal) and calliope hummingbird with columbine flower (by Robert Mutch).

Table 6. List of Habitat Types and Attributes with Avian Focal Species for Partners in Flight (PIF) for the Oregon and Washington portions of Northern Rocky Mountains Bird Conservation Region (from Altman and Bresson 2017)[18].

[18] Presented by Habitat Type and information given is from Altman and Bresson (2017). Species removed that applied only to Okanogan highlands.

	PIF Habitat Type	PIF Focal Species	PIF Habitat Attribute
1.	Dry Forest[19]	chipping sparrow	open herbaceous understory with scattered sapling pines
2.	Dry Forest[19]	flammulated owl	interspersion herbaceous openings and patches of dense sapling or pole trees
3.	Dry Forest[19]	Lewis's woodpecker	large snags
4.	Dry Forest[19]	white-headed woodpecker	large patches late-successional forest with heterogeneous canopy cover
5.	Mesic Mixed Conifer Forest[20]	orange-crowned warbler	patches of dense understory shrubs
6.	Mesic Mixed Conifer Forest[20]	olive-sided flycatcher	forest edges and openings with scattered trees
7.	Mesic Mixed Conifer Forest[20]	Townsend's warbler	high canopy cover and foliage volume
8.	Mesic Mixed Conifer Forest[20]	Williamson's sapsucker	large snags
9.	Riparian Woodland	MacGillivray's warbler	patches of dense understory foliage and cover
10.	Riparian Woodland	red-naped sapsucker	large snags
11.	Riparian Woodland	western wood-pewee	broken canopies with extensive habitat contrast edges
12.	Riparian Woodland	yellow warbler	high canopy and subcanopy cover and foliage volume

[19] Dry Forests defined in the document as Ponderosa Pine and Ponderosa Pine/Douglas-fir/Grand fir.
[20] Listed in the document as Late Successional.

Figure 7. Composite of Habitat Type Focal Species for the Partners in Flight. *Top row L to R: MacGillivray's warbler for riparian woodlands (by Frank D. Lospalluto); chipping sparrow for dry forest (by Michael Klotz); western wood pewee for riparian woodlands (by Deborah Freeman); Middle row L to R: orange-crowned warbler for mesic mixed conifer forest (by Peter K. Ziminsk), yellow warbler for riparian woodlands (by Doug Greenberg); Lower row: Townsend's warbler for mesic mixed conifer forest (by Agami Photo Agency).*

Table 7. List of Birds that are Unique Habitat Focal Species for Partners in Flight (PIF) for the Oregon and Washington portions of Northern Rocky Mountains Bird Conservation Region (from Altman and Bresson 2017).

	PIF Focal Species	PIF Habitat Type	PIF Habitat	BMFP Vegetation Type
1.	black-backed woodpecker	Unique Habitats	Post-fire	✓
2.	bobolink	Unique Habitats	Lowland wet meadows	✓
3.	Clark's nutcracker	Unique Habitats	Whitebark pine	✓
4.	gray flycatcher	Unique Habitats	Juniper woodland	✓
5.	savannah sparrow	Unique Habitats	Upland grasslands	✓
6.	warbling vireo	Unique Habitats	Aspen	✓
7.	willow flycatcher	Unique Habitats	Riparian shrub	✓
8.	calliope hummingbird	Unique Habitats	Montane shrubland[21]	–
9.	dusky flycatcher	Unique Habitats	Subalpine forest[21]	–
10.	golden eagle	Unique Habitats	Cliffs and rock outcrops[21]	–
11.	hermit thrush	Unique Habitats	Subalpine forest[21]	–
12.	Lincoln's sparrow	Unique Habitats	Alpine montane meadows[21]	–
13.	vesper sparrow	Unique Habitats	Sagebrush-steppe[21]	–

Note: For species #8-13, PIF chose these Focal Species to represent Unique Habitat Types. While these species remain in the Coarse and Meso filter species list for the ZOA, the Unique Habitat Types they are chosen to represent are not found within the BMFP vegetation types (p. 22). This highlights the challenges of using multiple lists, from multiple agencies and organizations, based on multiple different approaches to manage for wildlife habitat.

[21] Habitat found outside BMFP forest types (see Upland Forest ZOA). However, the Focal Species is found on the Malheur NF in other habitats, so remains here.

Figure 8. Composite of Unique Habitat Focal Species for Partners in Flight. *Top row L to R: dusky flycatcher for subalpine forest (by Frank D. Lospalluto), savannah sparrow for upland grasslands (by Bill VanderMolen); Middle row L to R: bobolink for lowland wet meadows (by Peter Swaine), calliope hummingbird for montane shrubland (by Tom Benson); warbling vireo for aspen (by Becky Matsubara), gray flycatcher for juniper woodland (by Frank D. Lospalluto); Bottom: Clark's nutcracker for whitebark pine (by Dennis W Donohue).*

Table 8. Comparison of Malheur NF MIS and Featured Species (USDA FS 1990) to other state and federal lists.

	Malheur NF Management Indicator Species	Regional Foresters Sensitive Species	USFWS Birds of Conservation Concern	PIF Focal Species[22]	ODFW State Sensitive or Strategy Species
1.	American three-toed woodpecker				
2.	black-backed woodpecker			✓	✓
3.	downy woodpecker				
4.	hairy woodpecker				
5.	Lewis' woodpecker	✓	✓	✓	✓
6.	northern flicker				
7.	Pacific marten				✓
8.	pileated woodpecker				✓
9.	red-naped sapsucker			✓	
10.	Rocky Mountain elk				
11.	white-headed woodpecker	✓		✓	✓
12.	Williamson's sapsucker		✓	✓	
	Malheur NF Featured Species				
13.	dusky grouse				
14.	greater sage-grouse				✓
15.	osprey				
16.	Rocky Mountain bighorn sheep				✓
17.	upland sandpiper	✓			✓

[22] Pine-Oak Woodland habitat not found on the Malheur NF, so those Focal Species not included here.

Table 9. List of Avian Wildlife Species found on state and federal lists used for management on the Malheur NF, including those in the Malheur Forest Plan (USDA FS 1990).[23]

	Avian Species	Malheur NF MIS and Featured Species	Regional Foresters Special Status Species	USFWS Birds of Conservation Concern	PIF Focal Species	ODFW Sensitive or Strategy Species
1.	American three-toed woodpecker	✓				
2.	bald eagle		✓			
3.	black-backed woodpecker	✓			✓	✓
4.	bobolink		✓	✓	✓	✓
5.	Brewer's sparrow					
6.	calliope hummingbird			✓	✓	
7.	Cassin's finch			✓		
8.	chipping sparrow				✓	
9.	Clark's Nutcracker				✓	
10.	downy woodpecker	✓				
11.	dusky flycatcher				✓	
12.	dusky grouse	✓				
13.	flammulated owl			✓	✓	✓
14.	golden eagle				✓	
15.	gray flycatcher				✓	
16.	great gray owl					✓

[23] Those not found in BMFP Upland Forest and Special Habitat Types (see above) removed.

17.	greater sage-grouse	✓	✓			✓
18.	hairy woodpecker	✓				
19.	hermit thrush				✓	
20.	Lincoln's sparrow				✓	
21.	Lewis' woodpecker	✓	✓	✓	✓	✓
22.	MacGillivray's warbler				✓	
23.	northern flicker	✓				
24.	olive-sided flycatcher			✓	✓	✓
25.	orange-crowned warbler				✓	
26.	osprey	✓				
27.	pileated woodpecker	✓				✓
28.	red-naped sapsucker	✓			✓	

Table 9 (cont.). List of Avian Wildlife Species found on state and federal lists used for management on the Malheur NF, including those in the Malheur Forest Plan (USDA FS 1990).

	Avian Species	**Malheur NF MIS and Featured Species**	**Regional Foresters Special Status Species**	**USFWS Birds of Conservation Concern**	**PIF Focal Species**	**ODFW Sensitive or Strategy Species**
29.	savannah sparrow				✓	
30.	Townsend's warbler				✓	
31.	upland sandpiper	✓	✓			✓
32.	vesper sparrow				✓	
33.	warbling vireo				✓	

34.	western wood-pewee				✓	
35.	white-headed woodpecker	✓	✓		✓	
36.	Williamson's sapsucker	✓		✓	✓	
37.	willow flycatcher				✓	
38.	yellow warbler				✓	

Table 10. List of Mammalian Wildlife Species for management on the Malheur NF, including those found in the Forest Plan (USDA FS 1990) and the Regional Forester's Sensitive Species and USFWS Listed Species list (USDA FS 2021b).

	Mammalian Wildlife Species	Malheur NF MIS and Featured Species	Regional Foresters Species
1.	Canada lynx		✓
2.	fringed myotis		✓
3.	gray wolf		✓
4.	mule deer	✓	
5.	Pacific marten	✓	
6.	pallid bat		✓
7.	pronghorn antelope	✓	
8.	Rocky Mountain elk	✓	
9.	Rocky Mountain bighorn sheep	✓	✓
10.	Townsend's big-eared bat		✓
11.	wolverine		✓

Figure 9: a wolverine using high elevation forest and logs. *The North American wolverine is only suspected to be on the Malheur NF, with no recent detections. It was a federal candidate species for potential listing under the ESA. When the proposed USFWS rule was withdrawn in 2020, the wolverine became a Regional Forester's Sensitive Species. Photo by Adamikar.*

VI. ZOA Alignment with the 2012 Planning Rule

2012 Forest Service Planning Rule

BMFP's proposed approach to wildlife habitat management within these Zones of Agreement is closely aligned with the Forest Service's 2012 Planning Rule (USDA FS 2012). We recognize that the Malheur Forest Plan was created in 1990 (USDA FS 1990), and as stated above, working under a dated plan come many ecological, economic, social, and cultural problems (see *Biological Need vs. Conservation vs. Representation* and *Malheur Forest Plan: Wildlife Framework sections* above).

Maintain or restore the ecological integrity of terrestrial and aquatic ecosystems

BMFP's Upland Forest Restoration, Riparian, and other Zones of Agreement[24] are built on the best available science and fit well with the guidance from the 2012 Planning Rule's Ecological Sustainability and Ecosystem Integrity section (§219.8 within USDA FS 2012; see Appendix H for the full text). Specifically, to:

> "…to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including…to maintain or restore structure, function, composition, and connectivity, taking into account:"
>
> > "(iv) System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change."

Persistence of native wildlife communities in the plan area
(§219.9 within USDA FS 2012; see Appendix H for the full text).

The ecosystem requirements within Ecosystem Integrity and Ecosystem Diversity is intended to provide the ecological conditions to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area.

Species specific plan components require additional ecological conditions for federally listed threatened and endangered species, and to "maintain a viable population of each species of conservation concern within the plan area."

[24] see BMFP Zones of Agreement website

> "*Viable population*. A population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors." (§219.19 within USDA FS 2012).

The current Malheur Forest Plan (USDA FS 1990), requires:

> "manage dead tree (snag) habitat to provide for at least 40% of the potential populations of primary excavator species throughout stand rotations" with subsequent numbers incorrectly given to apply equally for all primary excavators for snags ≥12" and ≥20" DBH per acre.

> "Maintain dead tree habitat capable of supporting at least 20% of the potential population level within land areas no greater than 40 acres and an additional 20% or greater within land areas no larger than the respective subwatershed"

BMFP's Proposed Wildlife Approach within 2012 Planning Rule

Given that project planning and priority is usually focused on fire-fuels-vegetation, including additional funding (e.g., CFLR) and economic viability of project areas, BMFP suggests here what the wildlife emphasis would be within each of those projects and how those tier into Forest Level analysis of Meso and Fine Filter Species habitat needs.

The 2012 Planning Rule focuses on species of conservation concern (as defined by the Regional Forester and Deciding Officer) and to maintain a viable population of each one within the Plan Area. As stated above, viable population is challenging to measure and can vary greatly from 1200 to 12,000+ individuals of each species needed.

BMFP instead suggests that the wildlife emphasis at the Project Level would be on the Structural Conditions within seral stages that are underrepresented at the Forest Level in comparison to HRV.

COARSE FILTER: Vegetation Type + Seral Stage

Based on BMFP's Upland ZOA and new Integrated ZOA, the emphasis for Project Level focus to meet Forest Level goals that the Malheur NF vegetation types (Xeric Pine, Dry Pine, DMC, MMC) and associated seral stages. This would address the needs of Coarse Filter wildlife species. To accomplish this, the Vegetation Types + Seral Stages will be restored:

1. HRV: using historical conditions as a reference
2. Current: using those reference conditions to better understand the departure of current conditions
3. FRV: using local research and BASI for climate change to account for the future range of conditions so ecosystems and their associated functions and processes are more likely to persist across time

   (see BMFP Upland ZOA and Integrated ZOA for details)

MESO FILTER: Structural Conditions (within Seral Stages of Vegetation Types)

BMFP proposes that at the Forest Level, there will be thresholds for containing the required Structural Conditions needed by Meso Filter species within each Vegetation Type and Seral Stage.

Forest Level Thresholds for Structural Conditions: 40-60-80%

40% – Minimum Threshold

At the Forest Level, current total acres of each Vegetation Type (Xeric Pine, Dry Ponderosa Pine, Dry Mixed Conifer, and Moist Mixed Conifer) and associated Seral Stages[25] that have the Structural Conditions needed by Meso Filter species is >40% of HRV.

60% – Restoration Threshold

At the Forest Level, as landscape level restoration projects are completed, current total acres of each Vegetation Type and associated Seral Stages that have the Structural Conditions needed by Meso Filter species will be >60% of HRV.

80% – CFLR Threshold

At the Forest Level, CFLR focuses to achieve landscape level restoration at an ecological meaningful level within an accelerated timeline (10+ years). As CFLR funding and projects are brought to completion, the current total acres of each Vegetation Type and associated Seral Stages that have the Structural Conditions needed by Meso Filter species will be >80% of HRV.

Example: White-headed Woodpecker

> **Forest Type + Seral Stage**: the proposed goal and restoration approach for the acres of Dry Ponderosa Pine on the Malheur NF, and the Seral Stages within the forest type, are addressed in BMFP's Upland ZOA and Integrated ZOA. This Wildlife Habitat ZOA does not address the total acres or % of those acres that represent HRV for the Vegetation Type or Seral Stage.
>
> **Structural Conditions**: within the current acres of each Vegetation Type and Seral Stage on the Malheur NF, the % of those acres that have the Structural Conditions needed by the white-headed woodpecker as Meso Filter species should be >40% of what they were historically as a minimum threshold.

[25] Examples: successional/structural stages such as mid-open, late-open (Haugo et al. 2015); Vegetative Structural Stages (VSS 1-6) such as VSS 2: saplings and poles (Tuten et al. 2015).

Seral Stage Example: Minimum Threshold Met for the White-headed Woodpecker?

At the Forest Level, evaluate the percentage of the acres of Dry Ponderosa Pine in the Late-Open Seral Stage (low canopy cover with large diameter trees) that contain the Structural Conditions needed for the white-headed woodpecker:

- Canopy closure: mosaic of open canopy (40% with range <50% for nesting; 50-60% for roosting; 65% for foraging)
- Nesting and Foraging Trees: large snags or defective ponderosa pine trees (>18" DBH with range: 15-39" DBH) for nesting; clumps of mature trees (17-29" DBH) and clumps of saplings (5-9" DBH) for foraging.
- Spatial Placement: mosaic of open spaced nest trees with clumps of foraging trees.

If the % of current Dry Ponderosa Pine, Late-Open Seral Stage that contain those Structural Conditions are below 40% of what they were historically (HRV), then the Minimum Threshold is not met.

If below 60%, then the Restoration Threshold is not met.

If below 80%, then the CFLR Threshold is not met.

Figure 10. Small mammals form different food webs. *Above is a North American red squirrel (photo Jukka Jantunen); below a mountain cottontail in pine needle litter (pine straw) and herbaceous plants next to ponderosa pine tree with fire charred bark (photo byhumblebleufrog). Small mammals are often lumped together, but rabbits feed on herbaceous plants on the ground while arboreal squirrels feed in the trees and on the ground. Each of these small mammal populations help create different food webs for plant interaction and predators.*

Pictured here: American black bear (photo by Jim Cumming). This is a Coarse filter species, large mammal, and fur bearer. While large mammals are usually not considered to play a role in vegetation dispersal, black bears are known for dispersing seeds. Research shows that seeds ingested by wild black bears germinated significantly better than those not ingested, including the seeds of chokecherry (Prunus virginiana), Oregon grape (Mahonia repens) and skunkbush sumac (Rhus trilobata), all found on the Malheur NF (Auger et al. 2002).

VII. Wildlife Habitat within a Forest Restoration Context

Forest Restoration Context

Context for Wildlife Habitat: Forest Restoration, HRV, and Ecosystem Processes

This document provides a wildlife-centric approach to forest and ecosystem restoration. Thus, these Zones look at each wildlife species and its needs instead of a more typical approach to eastside forest restoration through vegetation types (upland forest types), fuel loading, and fire risk. Below is a list that helps provides a framework from the extensive work and agreements that BMFP has come to within their Collaborative and with their Forest Service partners.

1. Historical range of variability (HRV) restores the forest types to a place of resistance and resilience.
    - HRV is often used as a guide for restoring current forest vegetation types and stands to be more resistant and resilient to natural and expected disturbances (e.g., drought, fire, insect, disease).
    - HRV is usually set in a time period that pre-dates the interruption of natural fire processes that began in the late 1800s through passive (grazing) and active (suppression) fire management.
2. Range of future forest conditions (sometimes referred to as future range of variability, FRV).
    - BMFP is working on forest restoration that allows a range of desired future forest conditions and those systems ability to respond to climate change and future disturbances (Upland Forest Restoration ZOA, 2017).
    - While HRV can act as an initial starting point or guide to show how out of range existing conditions are, BMFP is considering a future range of forest conditions to account for climate change.
3. Restoring to HRV, including managed and prescribed fire, allows ecosystem functions and processes that were present across time to continue to occur.
4. Managing the forest and systems to a range of future forest conditions (or FRV) would allow those processes and functions to continue to occur into the future under a warming climate and associated uncharacteristic disturbances (e.g., extreme or extended drought and associated insect and disease outbreaks).

5. BMFP's Upland Forest Restoration ZOA proposes restoration using HRV as a guide and managing for a future range of conditions for upland forest types (xeric pine, dry pine, dry mixed conifer, moist mixed conifer). This is similarly addressed in the Aspen and Riparian Restoration ZOA documents.

    - This approach will meet the needs of 75% of terrestrial wildlife that occurred historically on the Malheur NF (i.e., all coarse filter species) as the plant communities + seral stages used by those wildlife species across time will continue to be present.

    - This is especially true if the disturbance processes (e.g., historical fire return interval) and functions (e.g., snow capture, water yield) are restored to allow the associated forest structure to be present.

6. Understand that not all the Malheur NF and CFLRP lands will have active restoration (e.g., mechanical thinning, prescribed fire) on them, let alone be restored to HRV or FRV.

    - The Malheur NF has additional areas with unique or hands-off management (e.g., inventoried roadless areas, wilderness).

7. Within restoration project and management boundaries, some acres are left untreated as large skips, refugia, or leave areas.

    - Specifically, these would be stands or large portions of stands within restoration projects that have no mechanical treatment, have prescribed or managed fire only, and/or have no mechanical treatment or fire.

8. Past management has changed forest structure, composition, and function (see Upland Forest ZOA) decreasing options for restoration, especially to HRV. This means that some restored areas can change stand trajectory but not necessarily restore it to HRV in the present time.

9. Spatially and temporally, stands and vegetation types will not remain static, and instead, are expected to shift from disturbances (fire, drought, insects, disease; see Upland Forest ZOA).

    - These disturbances could alter existing structure (e.g., insect kill of old growth pine, stand-replacing fire).

    - The disturbances could also reinforce the pattern and processes BMFP aimed to achieve in restoration based on HRV and FRV (e.g., low intensity

fire recycles nutrients and encourages fire-adapted understory and overstory vegetation).

The latter is the goal of restoration, and this would help assure a diverse array of wildlife habitat remaining on the landscape as it has for hundreds of years.

Pictured here: BMFP and Forest Service partners on a 2018 field tour of prescribed fire on the Malheur NF (photo by Trent Seager). While wildlife habitat needs to be analyzed based on species needs through the Filter Approach, the habitat still needs to be in the ecological context of the stand's carry capacity based on site characteristics. This is important if the habitat is expected to persist over time under current and future climate change and associated disturbances.

VIII. BMFP's Wildlife Habitat Zones of Agreement

Zones of Agreement

BMFP recognizes that the Malheur NF is required to analyze for specific wildlife species and their habitat in restoration projects and proposed management within CEs/EAs/EISs, as outlined in the sections I. – VI. of this document. Some of the lists of terrestrial vertebrate species have been considered static for the past 20 years (e.g., MIS). However, other lists of wildlife species the Forest Service is required to analyze or manage for have changed and continue to change, sometimes on a frequent basis. In fact, during the writing of this document, multiple lists changed, including at a structural level such as the USDA FS Regional Forester's list changing from a *Special Status Species* list to *Sensitive Species* list (USDA FS 2021b) as outlined in section *VI. Shifting Mandates and 2012 Planning Rule* (above). Further, even wildlife species listed in the Forest Plan can move from static, as highlighted by the renewed efforts of Forest Plan revision for the Blues Forests under the 2012 Planning Rule (USDA FS 2012). Any new Forest Plan would no longer include MIS and instead move to a coarse-fine filter approach and focal species monitoring.

Given the above, BMFP proposes the following tenets for wildlife habitat restoration and management on the Malheur NF:

1. Wildlife habitat should be analyzed as Coarse-Meso-Fine Filter so that each restoration or management project can restore habitat as needed.
2. Since National Forests are not set by ecological boundaries[26], the focus for wildlife should be to "restore ecological conditions…to contribute to maintaining **a viable population of the species within its range**."[27]
3. Individual species emphasis should be reserved only for those of biological importance (i.e., ESA listed species) or cultural importance (i.e., important to Tribes, such as First Food species).

[26] Most National Forests were established in the late 1800s and early 1900s after an era of forcible removal of Indigenous Nations and Tribes, and lower elevation lands claimed by European settlers. The Malheur NF was established in 1908.

[27] Emphasis added; 2012 Forest Service Planning Rule (USDA FS 2012).

Goals, objectives, and strategies for Wildlife Habitat

Given the requirements the Malheur NF staff have for wildlife habitat management and analysis, BMFP has these additional goals:

I. Wildlife habitat should be analyzed and addressed through the Filter Approach:

Within the context of climate change and subsequent effects on forest resistance, we want to be sure that habitat for wildlife species is understood when conducting landscape and project restoration. Project- and forest-level analysis should include whether management activities cause habitat availability for a species to fall outside of the HRV. We propose a **filter approach** to understanding the likelihood of conservation of all terrestrial vertebrates across the Malheur NF as forest management continues to restore forest types to HRV and FRV.

BMFP defines the filter approach as:

1. **Coarse Filter Level** – Plant Community + Seral Stage
2. **Meso Filter Level** – Plant Community + Seral Stage + Structural conditions
3. **Fine Filter Level** – Plant Community + Seral Stage + Structural conditions + Habitat Elements

II. Restoration of wildlife habitat should "contribute to maintaining a viable population of the species within its range"[28]

BMFP recognizes that the 2012 Planning Rule focuses on species of conservation concern (as defined by the Regional Forester and Deciding Officer) and to maintain a viable population of each one within the Plan Area. Given the uncertainty of viable population numbers and estimates, and the limitations of plan areas not aligning with ecological boundaries or species ranges, BMFP proposes that restoration of wildlife habitat should "contribute to maintaining a viable population of the species within its range" (§219.9 within USDA FS 2012; see Appendix H for the full text). Within the plan area, all wildlife species, and especially Meso filter species, should have their habitat managed to be within HRV.

The Filter Approach (#I above) addresses BMFP's social and ecological values of wildlife biodiversity on the Malheur NF. Additionally, it addresses the specific-species component outlined in the 2012 Planning Rule.

[28] 2012 Forest Service Planning Rule (USDA FS 2012)

Of particular interest to BMFP is to be aware and intentional about shifts in wildlife habitat as restoration and management activities work to return the landscape to fall within HRV and desired future conditions. With any natural or anthropogenic disturbance or stressor, there are wildlife species that gain habitat and others that lose habitat (i.e., winners and losers) in post-restoration and then across time based on the change in trajectory and future activities (e.g., prescribed and managed fire).

BMFP recognizes that some wildlife species may occur now in different densities and populations numbers that were not necessarily present in the past. Outside of species federally listed under the ESA and species important to Tribes, wildlife habitat should be managed within HRV and desired future conditions that are resistant and resilience to climate change, drought, and fire. This is different than managing wildlife habitat to current population numbers or existing habitat. We realize that our Forest Service partners are still required to analyze and plan for wildlife species as mandated by management direction or regulatory agencies (see *Section III. Forest Service Management Direction and Wildlife Framework* above).

Outside of those requirements, and given that viable population is challenging to measure and has scientific uncertainty (see *Section IV. ZOA Alignment with the 2012 Planning* Rule above), BMFP recommends that when managing for wildlife habitat and species on the Malheur NF:

1. Follow the guidance of the Forest Service 2012 Planning Rule (USDA FS 2012):
    - "…maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range."
    - As such, a wildlife species found on the Malheur NF need to have their potential habitat on the National Forest compared to their geographical range to determine their conservation status (see *2012 Forest Service Planning Rule* section above).
2. Recognize that the departure from stand and landscape HRV is a good proxy for departure from Coarse Filter wildlife habitat; and structural conditions within those habitats are a good proxy for Meso Filter wildlife habitat.
    - As is addressed in vegetation, fire, and fuels, some ecosystems and forest stands are simplified from past management activity, fire suppression, climate change, or some interaction of these among other forces.

- Restoration needs to address structural conditions in addition to tree species composition, spatial arrangement, and seral stage, to account for Meso Filter species.

3. MIS should be seen as only a discrete list of wildlife species, not a proxy for multiple other species. Indicator or umbrella species must be scientifically analyzed and meet specific rigorous requirements to truly represent other species, and as such, are very rare. Thus, analyzing and planning for MIS means only accounting for MIS, and no other species (see *Biological Need vs. Conservation vs. Representation* above).

4. Habitat that meets a species needs within the Filter approach is an effective proxy for managing for that one species. It is not scientifically valid or acceptable to use habitat as a proxy for one species, if that habitat is then used as a proxy for a suite of other species.

Pictured here: red fox (photo by Ondrej Prosicky).

III. Active management (restoration projects, prescribed and managed fire) should:

1. Facilitate a range of terrestrial vertebrate wildlife habitat to meet the needs of the full suite of species historically found on the landscape (e.g., those who's habitat needs were found within HRV) with particular emphasis on those of biological importance (e.g., listed species) and cultural importance (i.e., important to Tribes, such as First Food species).
2. Create and maintain wildlife habitat, and the associated ecosystem structures and ecological processes, at multiple spatial and temporal scales.
3. Emphasize historical disturbance regimes, including reintroduction of low severity frequent fire, an important driver of food webs and biodiversity in the fire-prone forest types found on the Malheur NF.
4. Ensure the plant community, seral stage, structural conditions, and habitat elements needs of wildlife across their historical and expected range on the Malheur NF.

Pictured here: prescribed fire on the Malheur NF post-treatment (phot by Trent Seager). This was taken on a 2018 BMFP field tour of Dry Pine and Dry Mixed Conifer stands that had been thinned + prescribed burn. Note the meandering fire footprint with saplings of different conifer species still surviving in the background.

IV. Specific objectives that will help measure achievement of these goals include that Restoration Projects (planning areas) include:

1. Goals #1-5 in BMFP Upland Forest Restoration ZOA (BMFP 2017a):
    - "*Complete planning for an average of two planning areas per year over a ten-year period*.
    - *Mechanically treat an average of at least 25,000-50,000 acres per year over a ten-year period to reduce forest density and shift species composition.*
    - *Reintroduce fire, including prescribed fire and wildland fire that significantly reduces surface fuel on an average of 25,000-50,000 acres per year.*
    - *Achieve an overall increase in the number of old trees on the landscape.*
    - *Maintain or expand the geographic extent of rare [tree] species, e.g., whitebark pine and western white pine."*
2. Restore and increase diverse understory plant communities with an emphasis on flowering plants as drivers of food webs.
3. Increasing the footprint and total overstory of aspen ecosystems.
4. Restore meadows to their original soil boundaries.
5. Restore hydrological connectivity of meadows.
6. Restore natural disturbance regimes in meadow systems (e.g., frequent fire, seasonal flooding) to facilitate appropriate meadow plant communities with an emphasis on plants of cultural importance to Tribes.
7. Prescribe and treat Savannas (e.g., transition zones) as shrub and forb dominated communities (with only open, scattered conifer trees) found between meadows and associated conifer forests.

V. Specific silviculture prescriptions that will help meet objectives include:

1. **Tree Spatial Pattern**:

    Mechanical thinning should restore meadows, swales, openings, and within stand tree spatial patterns and their elements (overstory tree clumps, regen patches, openings, widely spaced individual trees; see Churchill et al. 2018). While this list may be done for modification of fire behavior or other restoration needs, specifically here it should be done to address the many wildlife habitat

plant communities, seral stages, and structure needs outlined in the Wildlife Habitat Decision Support Tool (SNW 2023). Additionally, restoration of tree spatial pattern will help wildlife and their habitat by addressing:

- Water: increase snow capture, delay snow melt, decrease water use, increase water filtration and retention, and increase water yield.

- Understory Plants: shift soil and light resources from the overstory to the understory.

2. **Wildlife Trees (snags, defective, decaying, others)**:

   As is feasible during mechanical treatment and prescribed fire, the Forest Service should evaluate, retain, and recruit wildlife trees: snags, defective, decaying, and other trees that provide structure (e.g., branching, mistletoe, natural cavities) important to wildlife habitat needs at appropriate spatial placement.

   To assure wildlife habitat structural condition needs are being met, wildlife trees should be evaluated through post-treatment surveys. We appreciate that planning efforts address this through modeling efforts. However, post-treatment surveys have not aligned well with modeling efforts from planning, and which those were only done for specific species (e.g., MIS) and not structural conditions for all Meso Filter species.

3. **Downed Wood**:

   As is feasible during mechanical treatment and prescribed fire, the Forest Service should evaluate, retain, and recruit downed wood of different conifer species, sizes, and decay as important structural conditions of wildlife habitat needs and drivers of food webs (e.g., fungi, insects).

   Similar to above, to assure wildlife habitat structural condition needs are being met, downed wood should be evaluated through post-treatment surveys. These surveys should not be considered static data. If prescribed or managed fire burns through the area, it can consume some downed logs and wood.

4. **NEPA Planning for Wildlife Structural conditions**

   Meso filter species require structural conditions within the plant community and seral stage. These elements should be accounted for in NEPA planning, and

more importantly, in silvicultural prescriptions, treatment, and restoration activities. As outlined in this document, wildlife trees, downed wood, and other structural conditions can be either retained or created during restoration and management activities (silvicultural treatments, prescribed and managed fire).

As BMFP has observed across many project areas on the Malheur NF, accounting for snag recruitment across time does not work without a specific plan for those snags to be created (e.g., girdling, damage, burning) or recruited (e.g., post-treatment shock, post-fire mortality across time).

In Forest Types and areas with low snag presence and few options for snag recruitment, it is paramount that our Forest Service partners retain defective trees as living snags to provide for cavities and other structural conditions typically provided by snags.

Pictured here: an old road on the Malheur NF that has grown over with vegetation (phot by Trent Seager). This was taken on a 2016 BMFP field tour to discuss travel management, wildlife movement, future management options, and recreation.

5. **Adaptive Management**

   We envision an approach where adaptive management is used with wildlife resource specialist working with Rx fire, fuels, silviculture so that wildlife habitat structural needs are considering under existing conditions, post-treatment conditions, and desired future conditions based on change in trajectory.

   An example of this could be wildlife resource specialists encouraging prescribed fire practitioners to burn hotter around trees or clumps of trees that were purposely retained to recruit as snag or wildlife trees (based on DBH, species, spatial placement, etc.).

Pictured here: BMFP taking a 2015 field tour of a Designated Old Growth (DOG) stand that was originally chosen for the pileated woodpecker (photo Trent Seager). Using adaptive management, BMFP requested that the DOG be redesigned for the white-headed woodpecker based on stand surveys that found it contained old growth ponderosa pine and young fir trees (see the mature and old pine in the background of the photo). Continuing with adaptive management, BMFP requested the addition of a Replacement Old Growth (ROG) stand nearby that was on a north facing slope with old growth fir, a better fit for the pileated woodpecker. DOGs and ROGs are Forest Plan components and much discussed by BMFP through the years.

Pictured here: mature and old ponderosa pine trees in Oregon showing encroachment by lodgepole and juniper with additional infilling of young ponderosa pine (photo by Jess Kraft). Note the spacing and pattern of the mature pine trees. Fire and other disturbances created this pattern over hundreds of years, and in their absence for the past 120 years, conifer encroachment and infilling are shifting the habitat type and modifying the food webs. This removes habitat for some wildlife species while creating it for others. Note the hardwood trees and flowering shrubs present. These may have encroached in the absence of fire, or they may be holding on before being outcompeted (light and water) by a high stem density of young conifers. The restoration trade-offs of this stand for fire and drought can also include consideration of wildlife habitat needs across Coarse, Meso, and Fine filter species.

Specific Approaches to Wildlife Habitat on the Malheur NF

To help our Forest Service partners during planning and analysis, we offer the following specifics:

1. **Wildlife Habitat at the Coarse Level (Plant Community + Seral Stage) should be analyzed at the Forest-Level**

   Coarse filter species habitat needs should be reviewed at the forest-level. Specifically:

   - Address habitat needs by reviewing plant communities and seral stages (see Decision Support Tool for details) spatially at the forest-level, accounting for new projects and management activities over set periods of time (~ every 5 years).
   - Habitat needs by plant community + seral stage should be lumped and considered in categories (rather than listed for all 146 species).
   - Account for temporal variation (disturbance, succession) in seral stages of overstory and understory plant communities in both treated and untreated areas.

2. **Wildlife Habitat at the Meso Level (Plant Community + Seral Stage + Structural Conditions) within Upland Forest Types should be analyzed at the Project Level**

   During restoration of these 4 separate Upland Forest Types (BMFP 2017a), use the Meso filter approach to support analysis and account for wildlife habitat needs:

   1. Xeric ponderosa pine
   2. Dry ponderosa pine
   3. Dry mixed conifer
   4. Moist mixed conifer

   Meso filter species structural habitat needs:

   - Address structural requirements (including spatial placement) of habitat needs within plant community and seral stage (see Decision Support Tool for details).

- Structural requirements within plant community and seral stage should be addressed within the Upland Forest Type in the project area, even if available habitat for species viability is done at the forest-level.
- Habitat needs by plant community + seral stage + structural conditions should be lumped and considered in categories (rather than listed for all 49 species).
- Account for temporal variation in:
    - seral stages of overstory and understory plant communities via disturbance or succession (in both treated and untreated areas).
    - structural conditions: especially snag retention, cavity retention, and substrates that are short lived (e.g., stick nest).

3. Wildlife Habitat within Aspen Ecosystems

Aspen ecosystems are addressed in BMFP's Aspen Restoration Zones of Agreement (2017c) for retention, expansion, and longevity of aspen stands. Here we account for habitat needs for wildlife that use aspen ecosystems. Restoration of aspen stands and ecosystems should specifically address structural conditions and food webs.

Structural conditions:

- Aspen stem size (dbh): live aspen are highly susceptible to heart-rot and decay, allowing strong and weak excavators to create cavities in larger aspen (8-16" dbh).
- Cavity retention: aspen stems with disease or decay do not always quickly progress to mortality, allowing for the retention of cavities across time (~12 years) for secondary cavity users.
- Aspen stem height: midstory aspen stems provide spatially appropriate structure for nest placement (e.g., open-cup) for certain species.
- Aspen stem size and height: aspen stands that contain areas of mature trees with no mid-story have higher density of cavity nesting birds and secondary cavity nesting wildlife.
- Conifers: retention of old growth conifers and replacement old growth conifers within and around aspen stands provide structural conditions otherwise missing from the ecosystem (e.g., branching for raptor stick nests, bark plates for foraging, >18" dbh snags/decaying stems).

Aspen food webs:

Understory vegetation: the diverse plant communities found in aspen understories drive different food webs. Restoration of the site-specific understory plant community should be emphasized, including increased soil moisture and appropriate canopy cover and type. Open grasses should be managed for in the area around the aspen stand and not within it, as grasses within aspen exclosures have shown to outcompete aspen sprouts.

- Intermediate disturbance: aspen understories with some disturbance (e.g., ungulate foraging) increases herbs and forbs by decreasing the community-level competition with shrubs and grasses. Overgrazing and chronic browsing depletes the understory and truncates the food webs.
- Aspen sprouts: are important forage for ungulates and provide greater insect diversity for food webs.

Pictured here: meadow transitioning to aspen stand then transitioning to scattered old growth ponderosa pine all while showing elevational rise and gradient (photo by: USFS PNW Region). Note the aspen suckering and understory plants under the aspen trees, including conifer encroachment in the aspen and old growth pine understory.

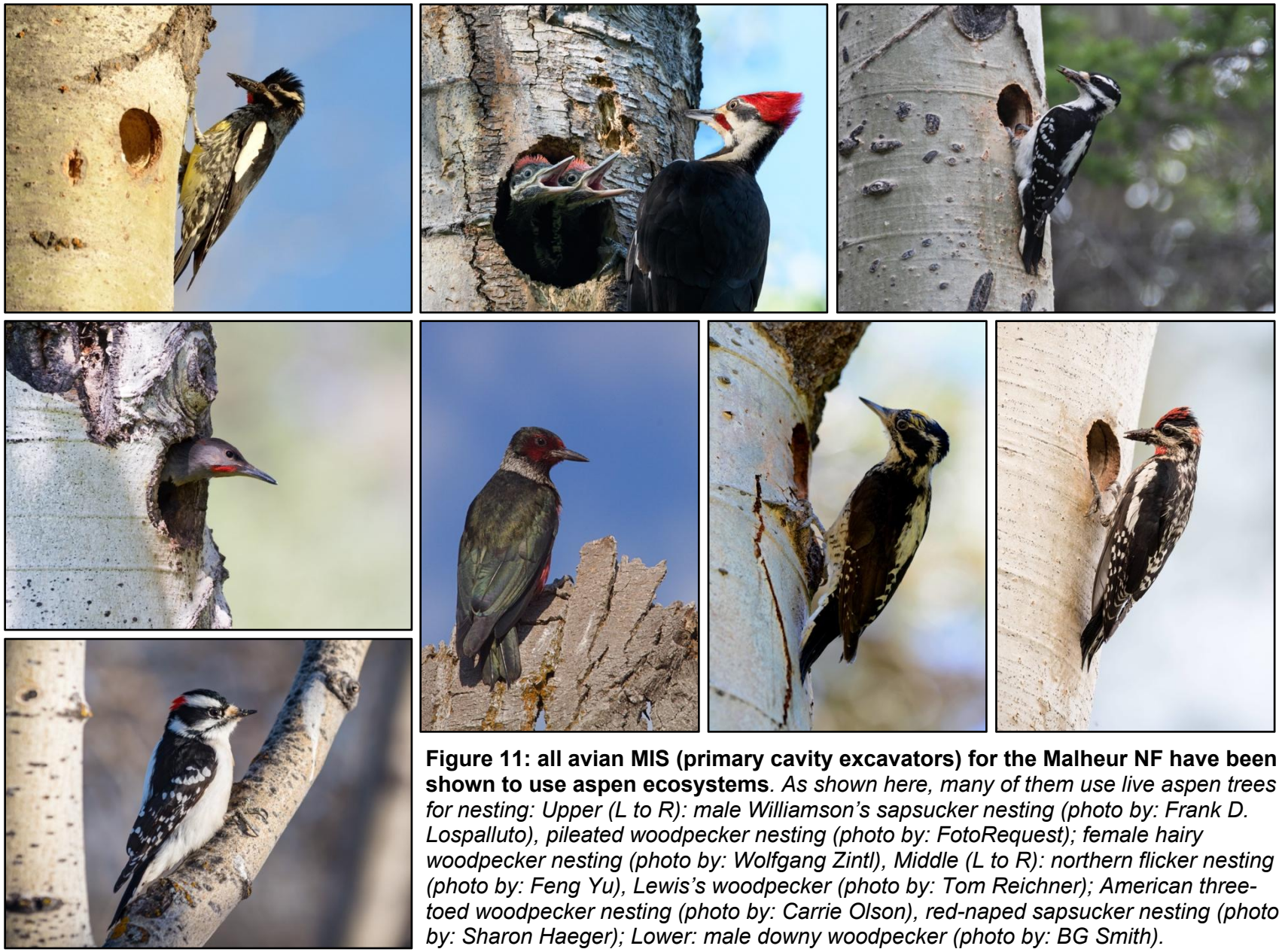


Figure 11: all avian MIS (primary cavity excavators) for the Malheur NF have been shown to use aspen ecosystems. *As shown here, many of them use live aspen trees for nesting: Upper (L to R): male Williamson's sapsucker nesting (photo by: Frank D. Lospalluto), pileated woodpecker nesting (photo by: FotoRequest); female hairy woodpecker nesting (photo by: Wolfgang Zintl), Middle (L to R): northern flicker nesting (photo by: Feng Yu), Lewis's woodpecker (photo by: Tom Reichner); American three-toed woodpecker nesting (photo by: Carrie Olson), red-naped sapsucker nesting (photo by: Sharon Haeger); Lower: male downy woodpecker (photo by: BG Smith).*

4. Wildlife Habitat within Meadows

Meadows should be restored to their original boundaries based on soil lines, topographical features, and historical photos. Restoration should include and emphasize:

- conifer retention and removal based on species composition appropriate to the site and historical fire and flooding regime, conifers older than 150 years, fire scars, and history of conifers (old growth snags, logs, etc.)
- hydrological connectivity, including restoration of incised areas
- soil types and associated soil moisture levels and plant communities within individual meadows
- disturbance regime of fire and flooding to support nutrient cycling and plant communities (and removal of encroaching conifers)
- gradients of riparian areas within meadows, such as willows, season surface water, and perennial surface water
- gradients of deciduous trees within meadow boundaries
- cultural plant communities important to Tribes

5. Pine Savannas and Transition Zones (from meadow to forest edge)

Pine savannas, or the transition zone/ecotone between meadows and associated upland forest type, should be restored as habitat types. These transition zones are defined by soil, elevational rise, plant communities, and openly spaced old growth conifers (or signs of their historical presence such as stumps, logs, and snags). Savannas can include deciduous trees, such as aspen stands, in addition to scattered old growth conifers. However, these transition zones are dominated by shrubs and forbs. The plant communities can include species from the meadows. These communities can change based on soil moisture, topographic features, and elevational gain as the ecotone reaches the upland forest edge. The fire return interval often burned more frequently in the meadow systems due to the grasses and fine fuels. As these burned more often, this included the savanna area around the meadow. Fire scars and low density of old trees show this pattern. For some small meadows and swales, the transition zone can be short (150 feet) while larger meadows can have more extensive transition zones (2000+ feet). Assessment of this can be done using shifts in plant communities along with density of old growth trees or signs of their

historical presence. Preliminary research shows that shift in elevational gain (height related to distance) is a good proxy at the project or planning scale.

It is important to note that transition zones greatly increase the total area of food for large suites of wildlife species and of historical plant communities, including some that may have been important to Tribes. Savannas shift overstory resources to understory plants, including forage for large mammals (deer, elk, bear) and flowering plants for pollinators. Additionally, these areas provide refuge for burrowing mammals to escape spring flooding and summer/fall drying of some meadow types, the predators that depend upon those small mammals (e.g., goshawk, great gray owl, carnivores). Transition zones can provide more abundant, diverse, and different food webs than those in the meadows and the forest types.

6. **Snags, Defective Trees, and Downed Wood:**

Snags: while snags are discussed as a general term for habitat needs, many wildlife species have specific habitat requirements for snag size, height, spatial placement, species, and new cavity versus re-use (see Decision Support Tool for details).

- As above in #2 Meso filter species, snag as a habitat structural condition should be lumped when possible (across size, spatial placement, etc.) and considered in categories (rather than listed for all Meso filter species needing this element).
- In particular, snag analysis should include: size (dbh), decay class, tree species (if possible), and spatial placement (open stands, closed stands, partially closed stands, near openings, near water or riparian areas, etc.).

Snag Retention and Recruitment
Snags should be retained as much as possible during management activities. Recent research related to salvage harvest within the Canyon Creek Complex showed that tree felling and harvest can occur with retention of snags.

For stands and project areas where snag retention is not possible, or existing snag densities/size/spatial placement are not enough to meet the structural habitat needs of Meso filter species, then snag creation (recruitment) should occur post-treatment. The emphasis should be on snag creation through prescribed fire or damage to the upper 1/4 of the bole/stem either purposely during logging operations or with the equipment on site.

Silvicultural prescriptions should include green tree retention for immediate (post-restoration) and future snag recruitment. These numbers can be modified for stands and management activities that retain higher numbers of existing snags. While immediate stress from harvest activities (e.g., opening the stand) or post-treatment prescribed fire can recruit snags, future recruitment is based on fire return interval or other future disturbances.

Snag retention and recruitment should be included in the agency's NEPA analysis and evident through multi-party monitoring during immediate post-treatment and in monitoring during multi-year intervals after treatment.

Pictured here: fir and lodgepole pine trees were girdled in a meadow-aspen system on the Malheur NF (photo Trent Seager). While effective girdling will kill the conifer trees, research shows that this approach creates short-lived snags due to the creation of a weak point down low. Prescribed burning or damage to trees up high are better for recruiting snags from green trees.

Pictured here: this ponderosa pine snag with a broken top contains multiple excavated cavities (photo Trent Seager). Snag deficit ecosystems show repeated excavation in individual trees, leading to the use of a single stem by multiple wildlife species during a breeding season. Located near the edge of a dry meadow, retention of this snag would help meet a habitat structural need for multiple species, potentially at the same time (as shown by this cavity complex).

Pictured here: this central Oregon moist mixed conifer stand includes a large diameter ponderosa pine snag (photo Trent Seager). While the broken top is near the ground, it still contains a woodpecker cavity. Snag height requirements vary depending on primary and secondary cavity users, meaning shorter snags such as this one are still used by some wildlife species. Retention of this snag helps meet wildlife habitat structural needs.

Defective Trees can be Living Snags

The structural conditions for Meso filter species that need a cavity is not necessary a snag, but rather a live or dead tree with: (1) a natural cavity, (2) a deformity that would allow a strong or weak excavator to create a cavity, or (3) bole with heartrot, soft structure, decayed wood, or wood hardness that allows primary excavator to create a cavity (Lorenz et al. 2015).

Defective trees are stems that have a portion of their structure that is dead or decaying, thus a snag component within a live tree (e.g., living snags). Defective trees and trees that are decaying (e.g., heart rot) can provide the same structural conditions as a snag for many wildlife species (Bull et al. 1997). Defective and decaying trees can also provide structural conditions for weak excavators and secondary cavity users, such as easily excavated areas or natural cavities (Guzat et al. 2018). Research shows that many excavators use live trees when snags are not available, including black-backed woodpeckers using green mixed conifer forests in the central Oregon Cascade Mountains (Verschuyl et al. 2021) and Sierra Nevada Mountains of California (Fogg et al. 2014).

Snag densities in Dry Pine and Xeric Pine forest types were most likely very low in past centuries based on HRV stem density and recruitment. Still, wildlife species needing a structural condition of cavities were able to persist and be present in these forest and habitat types. Limb death, limb breakage, internal damage (e.g., heart rot), or external damage (e.g., lightning strike) to part of the tree (see photos below) allow excavators to create cavities in living trees.

Defective and decaying trees should be retained in prescriptions and implementation. Live trees and snags showing existing cavities should be retained as both primary and secondary cavity nesters can reuse cavities. This is especially important in forest types and stands/areas where recruitment of snags will be under the thresholds needed for meso filter species structural characteristics.

Pictured here: ponderosa pine trees in the snow (photo by Dennis Swena). Note the branching structure, including dead or partially dead branches, that is provided by the older trees and are absent in younger trees. Additionally, on the far-right tree in the foreground, the split bark has multiple cavity holes in it, thus providing emphasizing the importance of defective trees to primary and secondary cavity users.

Figure 12: Defective trees can be living snags. *Left: live lodgepole pine tree on edge of a meadow in eastern Oregon showing primary cavity excavation; and live old growth ponderosa pine tree on edge of meadow showing damage from fire (cat face) with cavity being used by secondary nesters (photos Trent Seager). While snags may have different expected duration based on conifer species, size, and site characteristics, defective green trees can be living snags that last for decades or a century decreasing recruitment needs in low stem density stands and forest types.*

Figure 13. Avian species using natural cavities in hardwood trees. *Top row: western screech owl (photo Brian Luke Seaward); white-breasted nuthatch (photo Dean Bouton); tree swallow (photo Hayley Crews); Middle row: Northern saw whet owl (photo Ghost Bear); Lower row: American kestrel nestling and adult (photo: Ghost Bear); great-horned owl nestlings (photo Harry Collins Photography).*

Figure 14. Mammalian species using natural cavities in hardwood trees. *Top row: young North American red squirrels in a den (photo Jukka Jantunen); young common raccoons in a den (photo Agnieszka Bacal); Lower row: Pacific marten (photo Michelle Holihan); northern flying squirrel (photo Liz Weber).*

Pictured here: aspen on the Malheur NF with a natural cavity being used by wildlife (photo Trent Seager). Aspen are one of the few deciduous trees large enough (DBH) and present enough on the Malheur NF to provide natural cavities, with cottonwood trees providing the same on adjacent private land. As such, natural cavities should not be considered common, and instead NEPA planning should include the retention and recruitment of defective trees and snags to meet this structural condition need of Meso filter wildlife species.

Downed wood

Consider log size related to habitat function. In addition to logs, consider coarse woody debris as a function of prey base and/or other habitat needs. Restoration to restore fire prone forests and historical fire regimes to increase resistance and resilience of ecosystems and old growth trees should include prescriptions to maintain downed wood, especially downed logs, to address wildlife habitat structural condition needs (Lehmkuhl et al. 2006a, Lehmkuhl et al. 2006b, Bull et al. 1997).

Recruitment of downed wood should be based on wildlife habitat structural condition needs, and thus retention of green trees and snags for future downed logs and wood should align with those needs (e.g., hollowed out live tree, soft heartwood) as outlined in Bull et al. (1997).

Pictured here: long-tailed weasel in downed wood (photo by Bildagentur Zoonar GmbH). This the structural condition provides hiding cover for the weasel and increases available prey. Decaying wood provides insects, fungi, and bases for food webs in dry forest systems.

7. **Wildlife Habitat at the Fine Level (Plant Community + Seral Stage + Structural Conditions + Habitat Elements) should be analyzed at the Forest Level to help inform restoration at the Project Level**

   Forest-wide viability analysis can help inform project-level planning. Use careful planning of habitat area, patch size, arrangement, and connectivity across a planning area for these species. Consider modeling existing habitat based on structural and habitat elements needed for each species (see Pacific Marten Modeling and Detection above). This approach of predictive index allows each component to be identified in the model, allowing management to focus on specific structural or habitat elements missing and protecting existing habitat.

   a. Pacific marten (gradient across MMC, DMC, and Dry Pine)
   b. Pileated woodpecker (consider separating nesting from foraging; using different needs in MMC vs DMC).

Pictured here: pileated woodpecker on a log in a meadow with flowering plants (photo by Sarah Jessup). This species has specific habitat elements required for nesting that are separate from the structural condition needs for foraging. These requirements can vary depending on the forest type, as we see with other avian species such as the northern goshawk.

IX. Lists of All Terrestrial Vertebrates on the Malheur National Forest

List #1: Coarse Filter wildlife species

1. American crow
2. American goldfinch
3. American robin
4. American redstart
5. Black bear
6. Black-billed magpie
7. Black-chinned hummingbird
8. Black-headed grosbeak
9. Black-throated gray warbler
10. Belding's ground squirrel
11. Bobcat
12. Bobolink
13. Brewer’s blackbird
14. Brewer’s sparrow
15. Brown-headed cowbird
16. Bullock's oriole
17. Bushtit
18. Calliope hummingbird
19. California quail
20. Canada jay
21. Cassin's finch
22. Cassin's vireo
23. Cedar waxwing
24. Chestnut-backed chickadee
25. Chipping sparrow
26. Clark's nutcracker
27. Coast mole
28. Columbian ground squirrel
29. Common garter snake
30. Common nighthawk
31. Common poorwill
32. Common raccoon
33. Common raven
34. Common yellowthroat
35. Cooper's hawk
36. Cordilleran flycatcher
37. Coyote
38. Dark-eyed junco
39. Deer mouse
40. Douglas' squirrel
41. Dusky flycatcher
42. Dusky grouse
41. Dusky shrew
42. Ermine
43. Eastern kingbird
44. Evening grosbeak
45. Fox sparrow
46. Golden-crowned kinglet
47. Golden eagle
48. Golden-mantled ground squirrel
49. Gopher snake
50. Gray catbird
51. Gray flycatcher
52. Gray wolf
53. Great basin gopher snake
54. Great basin rattlesnake
55. Great basin spadefoot
56. Greater sage-grouse
57. Green-tailed towhee
58. Hammond's flycatcher
59. Hermit thrush
60. Hoary bat
61. Horned lark
62. House finch
63. Lark sparrow
64. Lazuli bunting
65. Least chipmunk
66. Least flycatcher
67. Lesser goldfinch
68. Lincoln's sparrow
69. Long-eared owl
70. Long-billed curlew
71. Long-tailed weasel
72. MacGillivray's warbler
73. Merriam's ground squirrel
74. Mountain cottontail
75. Mountain lion
76. Mountain quail
77. Mourning dove
78. Nashville warbler
79. North American porcupine
80. North American red squirrel
81. Northern harrier
82. Northern rough-winged swallow
83. Northern waterthrush
84. Orange-crowned warbler

85. Pacific-slope Flycatcher
86. Pacific chorus frog
87. Pacific rattlesnake
88. Pallid bat
89. Pine grosbeak
90. Pine siskin
91. Purple finch
92. Racer
93. Red crossbill
94. Red fox
95. Red-eyed vireo
96. Red-shouldered hawk
97. Red-tailed hawk
98. Rocky Mountain tailed frog
99. Rubber boa
100. Ruby-crowned kinglet
101. Ruffed grouse
102. Rufous hummingbird
103. Sandhill crane
104. Savannah sparrow
105. Say’s phoebe
106. Sharp-shinned hawk
107. Short-eared owl
108. Short-horned lizard
109. Silver-haired bat
110. Snowshoe hare
111. Song sparrow
112. Spotted sandpiper
113. Spotted bat
114. Spotted towhee
115. Steller's jay
116. Striped skunk
117. Striped whipsnake
118. Swainson's thrush
119. Townsend's solitaire
120. Townsend's warbler
121. Turkey vulture
122. Upland sandpiper
123. Vagrant shrew
124. Varied thrush
125. Veery
126. Vesper sparrow
127. Warbling vireo
128. Western fence lizard
129. Western jumping mouse
130. Western kingbird
131. Western skink
132. Western small-footed myotis
133. Western spotted skunk
134. Western tanager
135. Western terrestrial garter snake
136. Western toad
137. Western wood-pewee
138. White-crowned sparrow
139. White-tailed deer
140. Wild turkey
141. Willow flycatcher
142. Wilson's snipe
143. Wilson's warbler
144. Yellow warbler
145. Yellow-breasted chat
146. Yellow-pine chipmunk
147. Yellow-rumped warbler
148. Yuma myotis

List #2: Meso Filter wildlife species

1. American kestrel
2. American three-toed woodpecker
3. Ash-throated flycatcher
4. Bald eagle
5. Barred owl
6. Big brown bat
7. Black-backed woodpecker
8. Black-capped chickadee
9. Brown creeper
10. Bushy-tailed woodrat
11. California myotis
12. Downy woodpecker
13. Flammulated owl
14. Fringed myotis
15. Great gray owl
16. Great-horned owl
17. Hairy woodpecker
18. House wren
19. Lewis's woodpecker
20. Little brown myotis
21. Long-eared myotis
22. Long-legged myotis
23. Long-toed salamander
24. Mountain bluebird
25. Mountain chickadee
26. Mule deer
27. Northern flicker
28. Northern flying squirrel
29. Northern goshawk
30. Northern pygmy-owl
31. Northern rough-winged swallow
32. Northern saw-whet owl
33. Olive-sided flycatcher
34. Osprey
35. Pacific wren
36. Pileated Woodpecker (foraging only)
37. Pygmy nuthatch
38. Red-breasted nuthatch
39. Red-naped sapsucker
40. Rocky Mountain Elk
41. Southern red-backed vole
42. Townsend's big-eared bat
43. Tree swallow
44. Vaux's swift
45. Violet-green swallow
46. Western bluebird
47. Western screech-owl
48. White-breasted nuthatch
49. White-headed woodpecker
50. Williamson's sapsucker

List #3: Fine Filter wildlife species

1. Pacific marten (*previously listed as pine and American marten on the Malheur NF*)
2. Pileated woodpecker (nesting habitat only; separate from foraging habitat)


Pictured here: pileated woodpecker feeding young at nest cavity (by Harry Collins Photography) and Pacific marten (by Mike Norkum). These are the only two Fine filter species on the Malheur NF.

Potential species in the future: Canada lynx and wolverine (currently not detected or considered present).


Pictured here: Canada lynx (by Agnieszka Bacal), and wolverine (by Richard Seeley). These two Fine filter species are currently not detected on the Malheur NF but are on the Regional Forester's Sensitive Species list for the National Forest. Note that these two plus the Pacific marten above are all forest carnivores that have large home ranges and specialized needs.

List #4: Wildlife species not included

During the research for this document, terrestrial vertebrate species were noted as present on the Malheur NF, but they were not considered here in this ZOA. The species were excluded for one or more of the following reasons, they: (1) did not use the Upland Forest Types or other Special Habitat types that BMFP focuses on for restoration; (2) were a non-native (introduced) species; and/or (3) used the National Forest or habitat types for transition only (e.g., birds that were breeding and wintering elsewhere).

We capture this list of terrestrial vertebrate wildlife species here to note that our research and review showed that they were present on the Malheur NF, but they are not addressed in this ZOA. We openly share these with our Forest Service partners and for full transparency. They are not categorized into Coarse, Meso, or Fine filter species, but rather are listed alphabetically.

Pictured here: an adult ferruginous hawk with young on a nest platform on a juniper tree (photo by Dan Streiffert). This is a species of Conservation Concern for the Northern Rockies Region and is found in nearby agricultural and sagesteppe habitat, but it is not found nesting on the Malheur NF.

Wildlife species not included

1. American avocet
2. American badger
3. American bittern
4. American bullfrog
5. American coot
6. American dipper
7. American pika
8. American pipit
9. American white pelican
10. American wigeon
11. Barn swallow
12. Belted kingfisher
13. Black-crowned night-heron
14. Black-necked stilt
15. Black rosy-finch
16. Black swift
17. Black tern
18. Black-bellied plover
19. Bufflehead
20. Bighorn sheep
21. Canada goose
22. Canvasback
23. Canyon wren
24. Caspian tern
25. Clark's grebe
26. Chukar
27. Cinnamon teal
28. Cliff swallow
29. Columbia spotted frog
30. Common merganser
31. Double-crested cormorant
32. Eared grebe
33. Eurasian collared-dove
34. European starling
35. Ferruginous hawk
36. Forester's tern
37. Gadwall
38. Grasshopper sparrow
39. Gray-crowned rosy finch[29]
40. Great blue heron
41. Great egret
42. Greater yellowlegs
43. Green-winged teal
44. Hooded merganser
45. Killdeer
46. Least sandpiper
47. Lesser scaup
48. Loggerhead shrike
49. Mallard
50. Marsh wren
51. McCown's longspur
52. Merlin
53. Northern pintail
54. Northern shoveler
55. Northern shrike
56. Peregrine falcon
57. Pied-billed grebe
58. Prairie falcon
59. Pronghorn
60. Pygmy rabbit
61. Redhead
62. Red-winged blackbird
63. Ring-billed gull
64. Ring-necked duck
65. Ring-necked pheasant
66. Rock pigeon
67. Rock wren

[29] The Wallowa subspecies of the gray-crowned rosy finch (

[26] The Wallowa subspecies of the gray-crowned rosy finch (*Leucosticte tephrocotis wallowa*) is on the Regional Forester's Sensitive Species list as Suspected for the Malheur NF. All eBird records for the gray-crowned rosy finch report unknown spp. and winter sightings only for the Malheur NF and surrounding private land.

68. Rough-legged hawk
69. Ruddy duck
70. Sagebrush sparrow
71. Sage thrasher
72. Semipalmated plover
73. Solitary sandpiper
74. Short-eared owl
75. Snow goose
76. Sora
77. Swainson's hawk
78. Trumpeter swan
80. Virginia rail
81. Western grebe
82. Western meadowlark
83. Whimbrel
84. White-faced ibis
85. White-throated swift
86. Willet
87. Wilson's phalarope
88. Wood duck
89. Yellow-bellied marmot
90. Yellow-headed blackbird

79. Tundra swan

Table 12. List of scientific names of non-avian wildlife taxa included in this document. The American Ornithological Society standardizes the official English names of birds. This allows the common name of avian species to be used in place of the scientific one. Therefore, here, we only list the scientific names of the non-avian species referred to within this Zones of Agreement document.

Taxon/Common Name	Scientific Name	Other Common Name
Amphibian		
American bullfrog	*Rana catesbeianus*	formerly *Rana catesbeiana*
Columbia spotted frog	*Rana luteiventris*	
eastern long-toed salamander	*Ambystoma macrodactylum columbianum*	central or Columbia long-toed salamander[30]
Pacific chorus frog	*Pseudacris regilla*	
western toad	*Anaxyrus boreas*	formerly *Bufo boreas*
Mammal		
American black bear	*Ursus americanus*	
American badger	*Taxidea taxus*	North American badger
American pika	*Ochotona princeps*	
Belding's ground squirrel	*Spermophilus beldingi*	
big brown bat	*Eptesicus fuscus*	
bighorn sheep	*Ovis canadensis*	
bobcat	*Lynx rufus*	
bushy-tailed woodrat	*Neotoma cinerea*	
California myotis	*Myotis californicus*	
Canada lynx	*Lynx canadensis*	
coast mole	*Scapanus orarius*	
Columbian ground squirrel	*Spermophilus columbianus*	
common racoon	*Procyon lotor*	
coyote	*Canis latrans*	
deer mouse	*Peromyscus maniculatus*	
Douglas' squirrel	*Tamiasciurus douglasii*	
dusky shrew	*Sorex monticolus*	
ermine	*Mustela erminea*	short-tailed weasel
fringed myotis	*Myotis thysanodes*	
golden-mantled ground squirrel	*Callospermophilus lateralis*	
gray wolf	*Canis lupus*	

Table 12 (continued). List of scientific names of non-avian wildlife taxa included in this document.

[30] See AmphibiaWeb 2020.

Taxon/Common Name	Scientific Name	Other Common Name
Mammal (cont.)		
hoary bat	*Aeorestes cinereus*	
least chipmunk	*Neotamias minimus*	
long-tailed weasel	*Mustela frenata*	
Merriam's ground squirrel	*Spermophilus canus*	
mule deer	*Odocoileus hemionus*	
mountain cottontail	*Sylvilagus nuttallii*	
mountain lion	*Puma concolor*	cougar
North American porcupine	*Erethizon dorsatum*	common porcupine
North American wolverine	*Gulo gulo*	
North American red squirrel	*Tamiasciurus hudsonicus*	
northern flying squirrel	*Glaucomys sabrinus*	
Pacific marten	*Martes caurina*	
pallid bat	*Antrozous pallidus*	
pronghorn	*Antilocapra americana*	antelope
pygmy rabbit	*Brachyiagus idahoensis*	
red fox	*Vulpes vulpes*	
Rocky mountain elk	*Cervus canadensis nelsoni*	
silver-haired bat	*Lasionycteris noctivagans*	
snowshoe hare	*Lepus americanus*	
spotted bat	*Euderma maculatum*	
striped skunk	*Mephitis mephitis*	
Townsend's big-eared bat	*Corynorhinus townsendii*	
vagrant shrew	*Sorex vagrans*	
western jumping mouse	*Zapus princeps*	
western small-footed myotis	*Myotis ciliolabrum*	western small-footed bat
western spotted skunk	*Spilogale gracilis*	
white-tailed deer	*Odocoileus virginianus*	
yellow-bellied marmot	*Marmota flaviventris*	
yellow-pine chipmunk	*Neotamias amoenus*	
Yuma myotis	*Myotis yumanensis*	
Reptile		
common garter snake	*Thamnophis sirtalis*	
great basin gopher snake	*Pituophis catenifer deserticola*	bullsnake

Table 12 (continued). List of scientific names of non-avian wildlife taxa included in this document.

Taxon/Common Name	Scientific Name	Other Common Name
Reptile (cont.)		
northern pacific rattlesnake	*Crotalus oreganus oreganus*	western rattlesnake
racer	*Coluber constrictor*	
rubber boa	*Charina bottae*	
striped whipsnake	*Masticophis taeniatus*	
short-horned lizard	*Phrynosoma douglasii*	
western fence lizard	*Sceloporus occidentalis*	
western skink	*Plestiodon skiltonianus*	
western terrestrial garter snake	*Thamnophis elegans*	

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XI. Appendices

Appendix A.

Predicted Habitat Maps for Suspected Species

The following are predicted habitat maps for species that are listed as *Suspected* by Regional Forester in the Sensitive Species List (USDA FS 2019) that are within the vegetation and forest types addressed by BMFP. With few to no sightings of the following species on the Malheur NF, we looked for resources or data that might provide insight into their habitat or potential presence on the Malheur NF. The maps provided below were produced through Oregon Explorer's Wildlife tool (accessed on July 2020 [website]). These maps show that the following three species should be considered to have habitat present on the Malheur NF and are therefore included in the Coarse-Meso-Fine filter species list in this document.

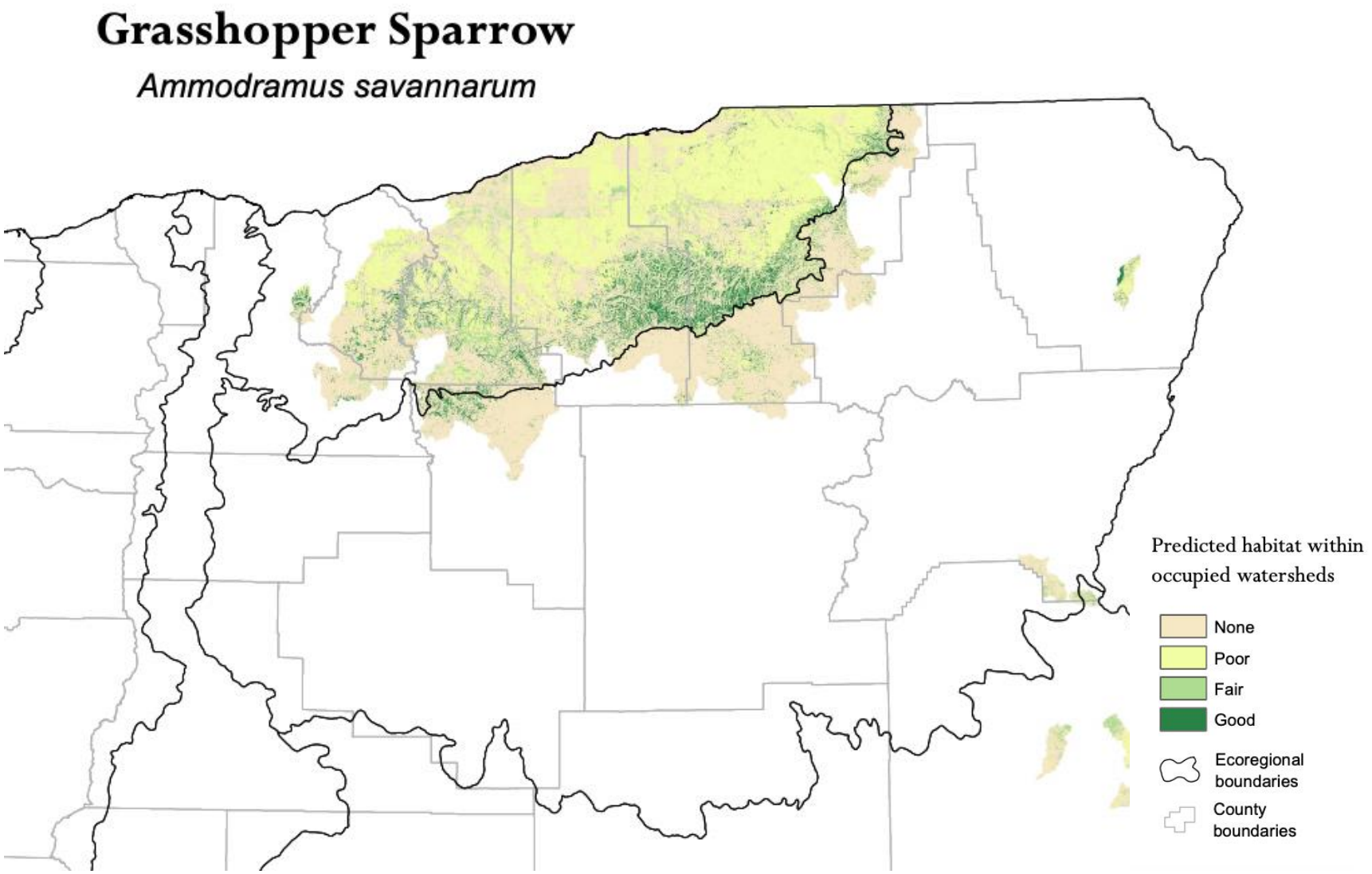

***Figure A15. Grasshopper sparrow predicted habitat map for the Blues**. Malheur NF not shown; Blues Ecoregion prominent center area with black outline; Grant and Harney Counties in middle center and lower. Source: Institute for Natural Resources, 2011.*

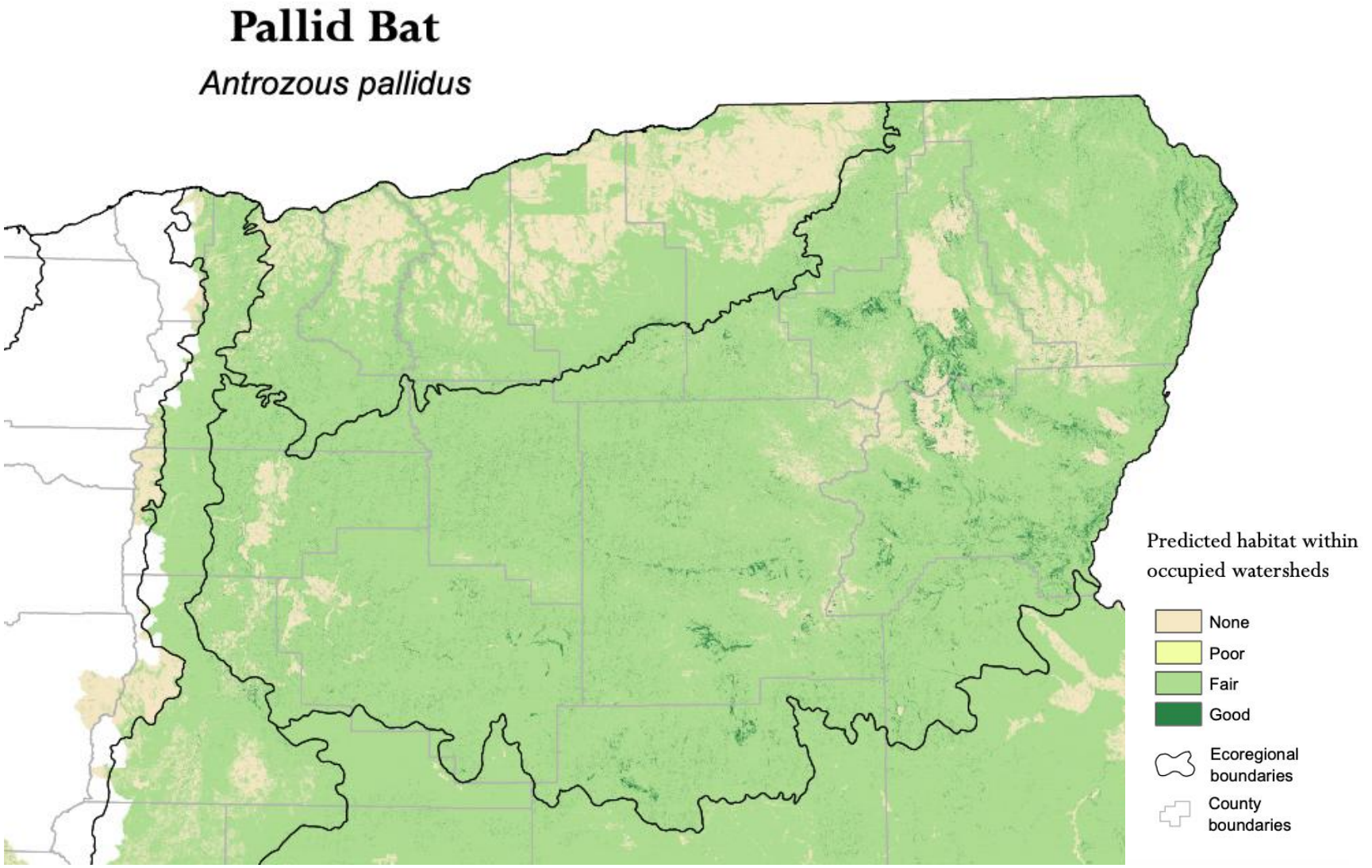

***Figure A16. Pallid bat predicted habitat map for the Blues**. Malheur NF not shown; Blues Ecoregion prominent center area with black outline; Grant and Harney Counties in middle center and lower. Source: Institute for Natural Resources, 2011.*

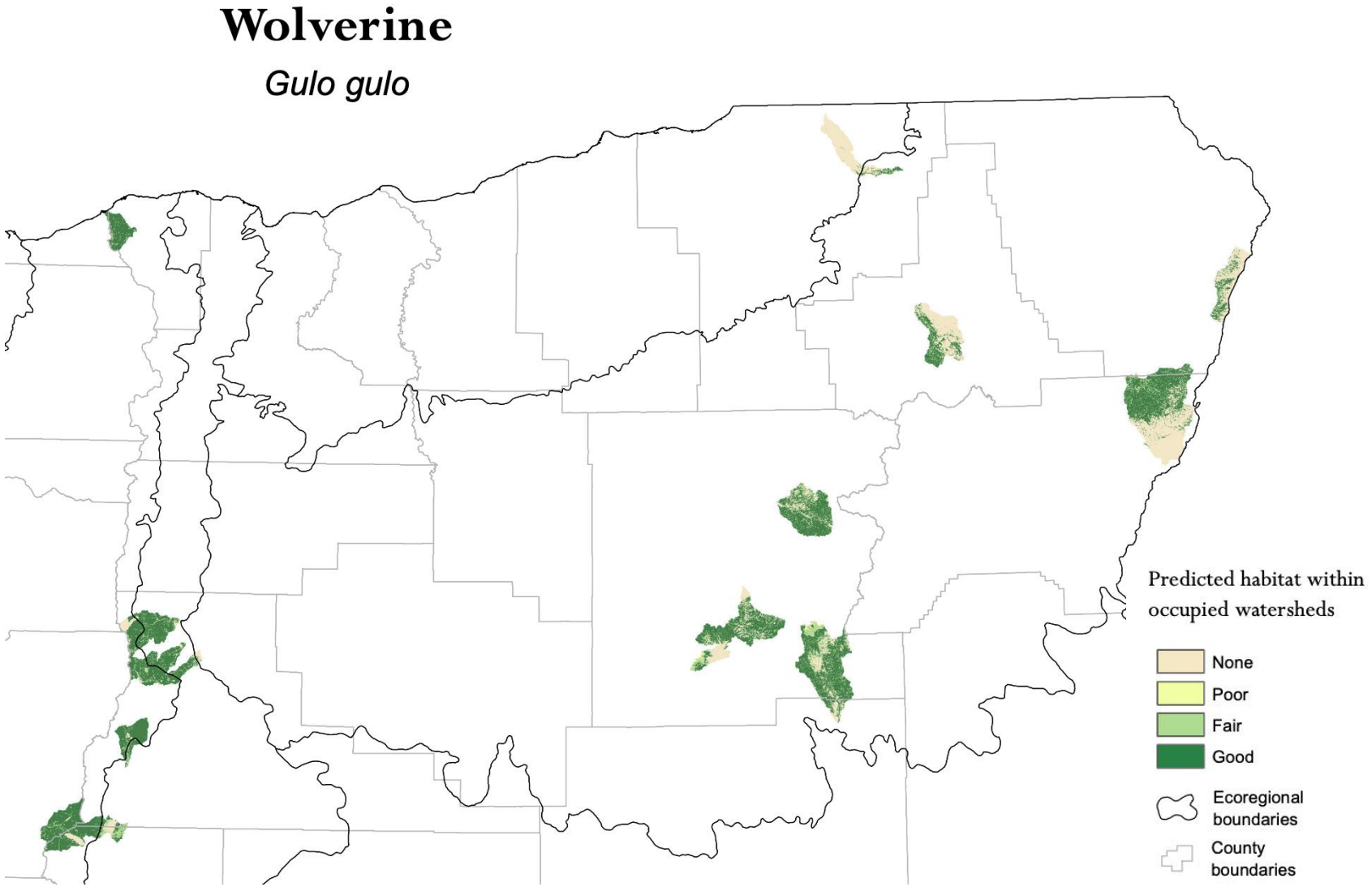

Figure A17. Wolverine predicted habitat map for the Blues*. Malheur NF not shown; Blues Ecoregion prominent center area with black outline; Grant and Harney Counties in middle center and lower. Source: Institute for Natural Resources, 2011.*

Appendix B.

Forest-wide Standards: Fish and Wildlife from the Malheur Forest Plan

Below is a summary of the forest-wide standards from the Malheur Forest Plan (USDA FS 1990) that directly address terrestrial vertebrate wildlife and their habitats. This list is purposely abbreviated and is included here only for ease of access while reviewing these ZOA.

Please note that the text below is purposely not complete, and as such, is not intended to replace or interpret the original Forest Plan. For the exact text, including missing descriptions, tables, and models, see the Malheur Forest Plan (USDA FS 1990).

Forest-wide Standards

Big Game Summer Range

28. Manage elk and deer summer range to provide for 20% cover and an elk habitat effectiveness index (HEI) of 0.4.

29. Select satisfactory cover to meet elk habitat objectives in stands within ½ mile of Class I, II, and III streams... Protect calving/fawning areas, migratory corridors and transition zones (areas of concentrated use in the late fall prior to arrival on winter range).

30. In the Malheur and Silvies watersheds, provide for satisfactory and marginal cover in blocks of at least 10 acres and a minimum of 600 foot wide to ensure effective use of cover by big game

31. In all other watersheds, provide for satisfactory and marginal cover in blocks of at least 30 acres and a minimum of 600 feet wide to ensure effective use of the cover by big game...

32. Maintain or enhance significant communities of mountain shrubs. Timber harvest and road construction activities should avoid these areas.

33. To limit disturbance to big game, the open road density will be no greater than 3.2 mi/mi^2 by 1999…

Forest-wide Standards (cont.)

34. Provide annual recommendations for the Access Management Plan to achieve wildlife management objectives. Monitor use of forest roads to identify any emerging conflicts with objectives.

35. Utilize road and/or area closures to achieve the specific wildlife habitat management objectives of individual management areas.

36. To prevent harassment in designated calving areas, restrict off-highway vehicles and other motorized traffic use to designated roads and trails from May 1 to June 31.

37. Identify on a subwatershed basis…areas that are of greater importance to mule deer than elk…

Primary Excavators

38. Manage dead tree (snag) habitat to provide for at least 40% of the potential populations of primary excavator species throughout stand rotations (Wildlife Habitat in Managed Forests, 1979). See Chapter IV, Forest Management Direction, IV – 29, for "snags per 100 acres" table.

39. Maintain dead tree habitat capable of supporting at least 20% of the potential population level within land areas no greater than 40 acres and an additional 20% or greater within land areas no larger than the respective subwatershed.

40. Where existing snag numbers are below the 20% of management requirements per 40-acre area, additional snags should be created to meet the desired population potential.

41. Utilize modeling techniques in conjunction with silvicultural practices. This will ensure desired population potential by providing adequate number of green replacement trees throughout the full stand rotation. If snags cannot be created, manage for higher snag levels and green tree replacements in adjacent areas and average them to achieve the required density.

42. On lands under even-aged management, provide snags and green replacement trees with emphasis on patchy distribution. Lands under uneven-aged management should emphasize a uniform distribution.

43. Only hard snags will be counted in meeting population potential goals; however, provide for retention of soft snags where feasible.

44. Marking guides for green replacement trees will be developed jointly by a silviculturist and wildlife biologist to minimize conflicts. Mistletoe and other

Forest-wide Standards (cont.)

disease and insect infected trees may be retained if they do not pose a significant hazard to the residual stand.

45. Select snags and green replacement trees using the descending order of preference as follows:

    ponderosa pine
    western larch
    Douglas fir
    White fir
    subalpine fir
    lodgepole pine

46. Locate snags and green replacement trees to minimize safety hazards…

47. Maintain woody debris for wildlife habitat and long-term site productivity by providing at least 2 down sound logs per acre which are a minimum of 10 inches in diameter at the small end and 12 feet or more in length…

48. In the absence of down logs or marginal cover, leave unburned slash pile concentrations and additional wildlife trees to meet long-term site productivity and habitat needs.

49. Maintain feeding areas for pileated woodpeckers that contain an average of two hard snags or more per acre within ¼ mile of old growth units. Each of these areas should total 300 acres in patches of at least 50 acres in size…

Featured Species

51. Maintain grouse winter roost habitat. The preferred habitat is clumps of mistletoe infected Douglas-fir on tops or upper slopes of ridges.

52. Protect and enhance sagebrush habitats with documented use by sage grouse or high potential for use. Coordinate with other resource uses and the Oregon Department of Fish and Wildlife.

53. Maintain the openness that is characteristic of antelope habitat by controlling the invasion of trees as identified through project level environmental analysis. Incorporate design modifications in all new construction and major reconstruction projects on fences to facilitate the movement of antelope where needed.

Forest-wide Standards (cont.)

54. Protect and enhance occupied habitats of upland sandpipers that are critical to nesting and rearing of young Cooperate with other agencies and groups in determining habitat use areas.

55. Maintain or create large nesting snags and green replacement trees for osprey within 1/2 mile of streams, lakes, or reservoirs that are currently used for feeding by osprey Preference will be given to large (30 inches or greater in diameter, 60-foot minimum height) ponderosa pine with broken tops and large limbs at a density of one per 1/4 mile of linear stream length or shoreline. Provide green tree replacements, which include a minimum of one tree 30 inches or greater in diameter and two trees 20 inches or greater in diameter, for each 1/4 mile of linear stream length or shoreline. All dead and green trees will be counted towards the minimum Forest-wide wildlife tree standards. Generally, snags and replacements should be located in areas of solitude.

56. Maintain the openness that is characteristic of bighorn sheep habitat. Do not stock livestock allotment pastures within bighorn sheep range with domestic sheep. On all fence projects within bighorn range involving new construction or significant reconstruction, implement design changes to facilitate bighorn sheep movements where needed and practical Review all activities within prime habitat, including migration routes, to identify and mitigate human disturbance Cooperate with the Oregon Department of Fish and Wildlife in all bighorn releases.

Unique and Sensitive Habitats (Microhabitats)

56. Maintain the integrity of unique habitats including meadows, rimrocks, talus slopes, cliffs, animal dens, wallows, bogs, seeps, and springs...

57. Maintain or enhance quaking aspen stands…

Elk Calving Habitat

58. Maintain the vegetative structure of confirmed calving habitats for elk…

Old Growth Lodgepole

59. Identify potential or existing old growth lodgepole pine habitat for three-toed woodpeckers as required by management requirements in 75-acre units at the proper spacing for species viability.

Forest-wide Standards (cont.)

Raptors

60. Protect active raptor nest sites:

a. Hawks and owls – maintain the nest trees of active raptor nests and habitat immediately surrounding, and mitigate potential adverse impacts from management activities during the nesting season… Where possible, retain trees with inactive nests that may be important to secondary nesters (e.g., great gray owl).

b. Bald and golden eagles – refer to the Pacific Bald Eagle Recovery Plan for Protection of Bald and Golden Eagles for direction…

Management Indicator Species

61. Provide habitat requirements for the following selected management indicator species.

Species	Reason for Selection and/or Habitat
Rocky Mountain elk	species commonly hunted
pileated woodpecker	old growth
pine marten	old growth
three-toed woodpecker	old growth
Lewis' woodpecker	primary cavity excavator; dead and defective habitat
yellow-bellied sapsucker	primary cavity excavator; dead and defective habitat
red-breasted sapsucker	primary cavity excavator; dead and defective habitat
Williamson's sapsucker	primary cavity excavator; dead and defective habitat
downy woodpecker	primary cavity excavator; dead and defective habitat
hairy woodpecker	primary cavity excavator; dead and defective habitat
white-headed woodpecker	primary cavity excavator; dead and defective habitat
three-toed woodpecker	primary cavity excavator; dead and defective habitat
black-backed woodpecker	primary cavity excavator; dead and defective habitat
northern flicker	primary cavity excavator; dead and defective habitat
pileated woodpecker	primary cavity excavator; dead and defective habitat
steelhead	anadromous riparian
bull trout	non-anadromous riparian
cutthroat trout	non-anadromous riparian
rainbow/redband trout	non-anadromous riparian

*as noted in these ZOA, some of the species found on this 1990 list have changed in common name, taxonomy, and/or range. However, this table is included here for reference to the original Malheur Forest Plan (USDA FS 1990).

Forest-wide Standards (cont.)

Threatened, Endangered, and Sensitive Species

62. Meet all legal and biological requirements for the conservation of threatened, and endangered plants and animals…

63. Maintain and update lists of threatened, endangered and sensitive plants and animals…

64. When threatened or endangered species or habitat are present, follow the required biological assessment process, according to the requirements of the Endangered Species Act (Public Law 93-205)…and USDI FWS…

65. Specify all protection or mitigation requirements (36 CFR 219.27(a) (8)) before project implementation begins. Manage all habitat for existing Federally classified threatened and endangered species to help achieve recovery objectives.

66. Perform a biological (field) evaluation for use in planning of proposed projects when sensitive species are present or suspected…

67. Determine…and follow the Pacific Bald Eagle Recovery Plan…

- *note*: the US Fish and Wildlife Service considered the Bald Eagle recovered and removed it from the list of federally threatened and endangered species in August 2007. It was subsequently removed from the state threatened list in Oregon in March 2012. Currently, the Bald Eagle is protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (MBTA) with no recovery plan as referenced in the 1990 Malheur Forest Plan. The USFWS post-delisting monitoring plan requires surveys every 5 years from 2009-2029.

Pictured here: Bald eagle on nest with chick (photo by KGrif). While the bald eagle was an endangered species in 1990 when the Malheur Forest Plan was written, the species has since been delisted at the federal (2007) and state (2012) and level. The post-recovery monitoring plan has also concluded.

68. Cooperate with the Peregrine Fun, USFWS, and ODFW…in support of the Pacific Coast Recovery Plan for the American Peregrine Falcon

- *note*: the US Fish and Wildlife Service removed the American peregrine falcon from the list of federally threatened and endangered species in 1999. It was subsequently removed from the state threatened list in Oregon in April 2007. Currently, the peregrine falcon is protected by the Migratory Bird Treaty Act (MBTA) with no USFWS recovery plan as referenced in the 1990 Malheur Forest Plan. Post delisting monitoring plans ended in 2003 and 2015.

Pictured here: adult peregrine falcon flying along a cliff (photo by Harry Collins Photography). Like the bald eagle, the peregrine was a federally listed endangered species when the Malheur Forest Plan was written in 1990. Since then, DDT and other chemical contaminants (e.g., insecticides) that were causing thin eggshells have greatly decreased in the environment. This allowed the return of many other wildlife species, including the osprey. The American peregrine falcon has been delisted at the federal (1999) and state (2007) level. Post delisting monitoring for the species ended in 2015.

Appendix C.

Forest Goals: Fish and Wildlife from the Malheur Forest Plan

The text below is copied from the Malheur Forest Plan (USDA FS 1990) for ease of access here in these ZOA. Goals specific to fish and fish habitat are kept here even though these ZOA do not address aquatic species. The 1990 Forest Plan sometimes addressed aquatic, riparian, fish, and terrestrial wildlife in the same paragraphs.

Please note that the text is not intended to replace or interpret the original Forest Plan. To see the text in its original format and context, please view the Malheur Forest Plan (USDA FS 1990).

The Malheur Forest Plan has 49 separate goals, including five listed under Fish and Wildlife.

15. Assist in the identification, protection and recovery of threatened, endangered and sensitive species.

16. Coordinate fish and wildlife management activities with other agencies and organizations to achieve mutual resource goals and utilize project cost share opportunities.

17. Provide for the maintenance and enhancement of big-game habitat so as to sustain elk and deer populations at the state management objective level.

18. Provide for improved fish habitat conditions to support increased populations of anadromous and resident fish.

19. Provide a diversity of habitat sufficient to maintain viable populations of all species.

Appendix D.

Desired Future Conditions: Fish and Wildlife from the Malheur Forest Plan

The text below is copied from the Malheur Forest Plan (USDA FS 1990) for ease of access here in these ZOA. Paragraphs addressing fish and fish habitat are kept here even though these ZOA do not address aquatic species. The 1990 Forest Plan sometimes addressed aquatic, riparian, fish, and terrestrial wildlife in the same paragraphs.

Please note that the text below may contain errors or updated grammar and spell-check changes and is not intended to replace or interpret the original Forest Plan. To see the text in its original format and context, please view the Malheur Forest Plan (USDA FS 1990).

The Forest in 1999: Fish and Wildlife (IV-6)

Approximately 215,000 acres of old-growth habitat occurs across the Forest. This includes 47,690 acres of dedicated old growth stands and 25,000 acres of replacement old growth stands distributed across managed forest lands. Riparian areas, visual corridors and semi-primitive unroaded areas provide travel routes between old growth units.

Many of the recently harvested riparian area stands of lodgepole pine will have been reestablished and will have attained sufficient size to once again provide shade and water temperature regulation in the affected streams.

Wildlife species which utilize riparian areas will be responding positively to improved riparian vegetation conditions. The production of both anadromous and resident fish will be greater than it is now. Smolt habitat capability for Chinook salmon and steelhead trout will have increased to approximately 350,000 smolts. Most of the identified structural habitat improvement work on anadromous streams will have been completed (approximately 30 structures per year). Substantial work will also have been accomplished on resident streams (approximately 50 structures per year).

Approximately 8,000 acres of fish and wildlife habitat improvements will have been completed by the end of the first decade. The types of improvements which will have occurred include prescribed burning, seeding, browse planting, pruning, mechanical

The Forest in 1999: Fish and Wildlife (IV-6) cont.

disturbance, and fertilizing to enhance forage production. Other projects will include aspen stand enhancement and riparian vegetation plantings.

Big-game habitat effectiveness will increase through vegetation manipulation and road management. Total forest open road mileage will be reduced approximately 30% to meet HE1 standards within each of the seven watersheds. Total cover will decrease to 51%. Close coordination on forage utilization by big game and livestock and application of enhancement techniques will result in increase of browse condition and forage quality and quantity.

An aggressive access management plan will have helped reduce road densities to at least 3.2, 2.2 and 1.5 miles of road per square mile area in summer range, winter range and wildlife emphasis areas respectively. Many watersheds will have achieved even lower road densities, approaching the desired levels of 1.0 mi/mi^2 in winter range and 1.5 mi/mi^2 in summer range.

Habitat for cavity excavators and cavity nesters will be provided Forest-wide; at natural levels in wilderness areas, Vinegar Hill-Indian Rock Scenic Area, bald eagle winter roosts, and research natural areas, at 80-100% of potential population levels in dedicated old growth and riparian areas, at 60-100% in wildlife emphasis areas, and 40% in the general forest and elk winter ranges. Snags will be well distributed and green replacement trees will be available to provide snag replacements through time.

Bald eagle winter habitat will have been maintained and viable populations of other candidate species for listing as Threatened or Endangered will have been maintained.

American peregrine falcons will have been reintroduced in the Strawberry Mountain Wilderness and other suitable areas of the Forest, as part of the recovery effort to reestablish this species in the western United States.

The Forest in 2039: Fish and Wildlife (IV-9)

Old-growth habitat will exist on approximately 121,000 acres Forest-wide and will be found within designated old growth areas, semiprimitive areas, wilderness areas, and bald eagle winter roosts. In addition, there will be 25,000 acres of old growth replacement stands being managed of which some additional acres will be at or near old growth. Viable populations of mature/old growth dependent species will be maintained.

All riparian areas in less than desirable condition will have been improved to provide for all riparian-dependent resources. These improvements will have been brought about by better control and administration of livestock use in riparian areas, reduced timber harvest in forested riparian areas, more road closures and obliteration, completed

The Forest in 1999: Fish and Wildlife (IV-9) cont.

watershed and fisheries habitat improvement projects on all priority streams, and increased or reestablished riparian hardwood communities. Bank stability, water quality, fish and wildlife habitat, recreation opportunities, and aesthetics will all have improved. Streamside vegetation will be more diverse and abundant with native species.

Anadromous fish production potential on the Forest will have about doubled. Resident fish habitat capability will have also increased substantially. Wildlife species which utilize riparian areas will respond positively to improved riparian conditions.

Satisfactory cover will have increased slightly; total cover approaches the optimum level, and distribution and size of cover stands will improve slightly. Forage quantity and quality will have improved as a result of habitat improvement techniques, and a reduction in total cover. Big game populations should experience a slight increase in conjunction with an increase in habitat capability. Road management is a major element in balancing habitat effectiveness needs and the hunter recreation experience with other resource activities and public uses of the Forest.

Access management planning will be an aggressive program. Road closures, both year-round and seasonal, will have achieved road densities of 1.0 mi/mi^2 in big game winter range and 1.5 mi/mi^2 in big game summer range.

Habitat for cavity excavators and cavity dependent species will continue to be provided through time at the levels outlined for the year 1999.

Approximately 40,000 acres of fish and wildlife habitat improvement projects will have been completed by this time. The types of improvements that will have occurred include prescribed burning, seeding, and fertilizing to enhance forage production in winter range: aspen stand enhancement; and riparian vegetation planting.

Bald eagle roosts will continue to be maintained and increased use of the roosts should be evident from a larger population of bald eagles in the Pacific States. As outlined in the bald eagle recovery plan, there should be two or three pairs of bald eagles established in nesting territories on major river systems on the Forest.

Populations of the American peregrine falcon should be well established in the western United States, with the Forest contributing nesting habitat for at least a pair of these birds.

Appendix E.

Forest Management Objectives: Fish and Wildlife from the Malheur Forest Plan

The text below is copied from the Malheur Forest Plan (USDA FS 1990) for ease of access here in these ZOA. Paragraphs addressing fish and fish habitat are kept here even though these ZOA do not address aquatic species. The 1990 Forest Plan sometimes addressed aquatic, riparian, fish, and terrestrial wildlife in the same paragraphs.

Please note that the text below may contain errors or updated grammar and spell-check changes and is not intended to replace or interpret the original Forest Plan. To see the text in its original format and context, please view the Malheur Forest Plan (USDA FS 1990).

Fish and Wildlife Objectives:

Manage big-game habitat to achieve a sustained habitat capability level over time which supports elk and mule deer population levels identified by Oregon Department of Fish and Wildlife. This will be achieved through the management of cover, forage quality, quantity and distribution as well as road use.

Plan and design all management activities to avoid actions which may cause a species to become threatened or endangered. Critical habitats and other habitats necessary for the conservation of these species will not be destroyed or suffer adverse modification. All actions will be coordinated with other agencies as appropriate.

Cooperate with future recovery efforts on…threatened, endangered, or sensitive species. Consult with the US. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, the Oregon Department of Agriculture, and the Natural Heritage Foundation for technical assistance in developing management guides and in determining viable population levels.

Manage habitat of candidate species for listing as threatened or endangered in cooperation with the U.S. Fish and Wildlife Service. Monitor known populations and survey for additional populations with the cooperation of the Nature Conservancy and the Oregon Natural Heritage Data Base

Fish and Wildlife Objectives cont.

Cooperate with other resources such as timber, range, recreation, minerals, etc., to identify means of facilitating the achievement of fish and wildlife standards. Cooperate with other agencies and groups to promote mutual objectives including funding through the Challenge Cost-Share Program and program accomplishment through use of volunteer efforts.

Projects to improve wildlife habitat include prescribed burning, seeding, browse planting, pruning, mechanical disturbance and fertilizing to enhance forage production. In addition, aspen stands will be enhanced and riparian vegetation planted along streambanks.

Manage fish habitat and riparian areas to achieve increases in fish habitat capability. This habitat improvement will be accomplished by a combination of the following.

(a) Implementation of livestock management strategies to achieve better distribution of livestock, and better control of forage utilization in riparian areas. This will help achieve a more diverse and abundant riparian vegetation condition and geomorphic recovery of the stream channel.

(b) Implementation of the riparian timber management prescriptions, which will provide for improved stream shading and a better supply of large woody material to the stream channel.

(c) Implementation of watershed and fish habitat improvement structures, to improve habitat conditions and accelerate geomorphic recovery of the stream channel.

Similar management activities will be applied to resident and anadromous streams and riparian areas, but emphasis for appropriated funds will go to anadromous streams until major structural improvements are completed in most of these streams.

Habitat for cavity excavators will be managed to provide continuous supplies of dead and down trees to maintain populations of dead tree dependent species. Dead tree habitat will be provided by subwatershed to maintain 40% of potential populations of cavity excavators in lands scheduled for timber harvest like the general forest, visual corridors, and the forested areas of elk winter ranges. In riparian areas dead tree habitat will be managed to provide 60% of cavity excavator population potential, 60-100% in wildlife emphasis areas, and at or near natural levels in areas not scheduled for timber harvest.

Provide old growth units on lands managed for timber production to sustain populations of dependent species at 30% above minimum viable levels. Maintain a total of 121,208

acres of old growth Forest-wide to provide habitat for at least 166 pairs of pileated woodpeckers, 120 pairs of pine marten, and other old growth dependent species.

Appendix F.

Forest Management Objectives: Riparian Areas from the Malheur Forest Plan

The text below is copied from the Malheur Forest Plan (USDA FS 1990) for ease of access here in these ZOA. Paragraphs addressing fish and fish habitat are kept here even though these ZOA do not address aquatic species. The 1990 Forest Plan sometimes addressed aquatic, riparian, fish, and terrestrial wildlife in the same paragraphs.

Please note that the text below may contain errors or updated grammar and spell-check changes and is not intended to replace or interpret the original Forest Plan. To see the text in its original format and context, please view the Malheur Forest Plan (USDA FS 1990).

Riparian Areas (IV-19:20)

All riparian areas will be managed to protect or enhance their value for water quality, fish habitat and wildlife.

Uneven-aged timber management will be emphasized on all riparian areas. Scheduled harvest may occur on Class III streams outside a 66-foot interior corridor. Timber harvest (nonscheduled) may occur on all other riparian areas If needed to accomplish specific riparian resource objectives. All timber harvest in riparian areas will be subordinate to riparian-dependent resources.

All new or updated allotment management plans will include a strategy for managing riparian areas for a mix of resource uses. A measurable desired future riparian condition will be established based on existing and potential vegetative conditions. When the current riparian condition is less than that desired, objectives will include a schedule for improvement. Allotment management plans will identify management actions needed to meet riparian objectives within the specific time frame. The allotment management plan will address the monitoring needed to determine if the desired rate of improvement is occurring.

A riparian inventory will be completed by 2000 for the entire Forest based on the process described in “Managing Riparian Ecosystems (Zones) for Fish and Wildlife in

Eastern Oregon and Eastern Washington" 1979. This inventory procedure will evaluate the present condition of riparian habitat, its potential for improvement, and provide a

Riparian Areas (IV-19:20) cont.

basis for establishment of riparian area habitat management objectives for all riparian dependent resources. The schedule for updating the allotment management plans may be amended based on this inventory (Activity Schedule A-IO). The riparian inventory that will be implemented on the Forest will accomplish the following:

(a) Identify and prioritize riparian areas where high riparian resource value potential exists.
(b) Evaluate riparian areas using parameters such as percent stream surface shaded, percent streambank stability, percent streambed sedimentation, and percent grass, shrub, and tree cover.
(c) Determine the site potential of each stream reach for vegetative response, the time frame required to attain the desired response, and the management actions needed to meet the objectives.

Grazing allotments with riparian areas in less than desirable condition are identified in this Forest Plan. Activity Schedule A-IO establishes a schedule for updating all the allotment management plans on the Forest. This schedule has been prioritized to update the allotments in less than desirable condition first.

The annual use of available forage in riparian areas on allotments in a satisfactory condition will be 45% of grass and grasslikes; and 40% of shrubs. In riparian areas on allotments in unsatisfactory condition the annual use of available forage will range from 0 to 35% of grass and grasslikes; and 0 to 30% of shrubs. This corresponds to Strategy C, Extensive Management in Tables IV-4 and IV-5.

All available methods may be employed to achieve the desired levels of utilization by permitted livestock and big game. Design the methods selected for controlled livestock use to ft the site-specific requirements for improving the riparian area to satisfactory condition. Any one or a combination of methods may be used to treat less than desirable riparian areas such as: corridor fencing, herding, additional water developments, salting, nonuse for resource protection, early and late season use, shorter grazing season, reduced livestock numbers, control of degree of use, and/or creating additional pastures through fencing.

Approximately 1,715 acres of watershed improvement projects will be implemented during the first decade of the plan (see Activity Schedule A-7). These projects are identified on a map which is available for review in the Forest Supervisor's Office in John Day, Oregon.

Cavity excavator habitat levels will be managed to provide for 60% of potential populations in riparian areas.

Appendix G.

State Sensitive Species and Conservation Strategy Species

Oregon Department of Fish and Wildlife (ODFW) produces state Sensitive and Conservation Strategy wildlife species. Both sets of lists consider the species by ecoregions, and only the ones listed for the Blue Mountains ecoregion and found within the Malheur NF are included here.

Table G1. List of Oregon State Sensitive Species (ODFW 2021) and Conservation Strategy Species (ODFW 2016) listed for the Blue Mountain ecoregion and found on the Malheur NF in BMFP forest and habitat types.

	Species	Detected or Suspected	Species Type	Current Status
1.	American three-toed woodpecker	D	avian	State Sensitive Species; Strategy Species
2.	black-backed woodpecker	D	avian	State Sensitive Species; Strategy Species
3.	bobolink	D	avian	State Sensitive Species; Strategy Species
4.	California myotis	D	mammal	State Sensitive Species; Strategy Species
5.	flammulated owl	D	avian	State Sensitive Species; Strategy Species
6.	fringed myotis	D	mammal	State Sensitive Species; Strategy Species
7.	gray wolf	D	mammal	Strategy Species
8.	great gray owl	D	avian	State Sensitive Species; Strategy Species
9.	greater sage-grouse	D	avian	State Sensitive-Critical Species; Strategy Species
10.	hoary bat	D	mammal	State Sensitive Species; Strategy Species
11.	Lewis' woodpecker	D	avian	State Sensitive-Critical Species; Strategy Species
12.	long-billed curlew	D	avian	State Sensitive Species; Strategy Species
13.	long-legged myotis	D	mammal	State Sensitive Species; Strategy Species
14.	olive-sided Flycatcher	D	avian	State Sensitive Species; Strategy Species
15.	Pacific marten	D	mammal	State Sensitive Species; Strategy Species
16.	pallid bat	D	mammal	State Sensitive Species; Strategy Species
17.	pileated woodpecker	D	avian	State Sensitive Species; Strategy Species

Table G1. (cont.) List of Oregon State Sensitive Species (ODFW 2021) and Conservation Strategy Species (ODFW

2016) listed for the Blue Mountain ecoregion and found on the Malheur NF in BMFP forest and habitat types.

	Species	Detected or Suspected	Species Type	Current Status
18.	Rocky Mountain bighorn sheep	D	mammal	State Sensitive Species; Strategy Species
19.	Rocky Mountain Tailed Frog	S	amphibian	State Sensitive Species; Strategy Species
20.	silver-haired bat	D	mammal	State Sensitive Species; Strategy Species
21.	spotted bat	D	mammal	State Sensitive Species; Strategy Species
22.	upland sandpiper	D	avian	State Sensitive-Critical Species; Strategy Species
23.	Townsend's big-eared bat	D	mammal	State Sensitive-Critical Species; Strategy Species
24.	western toad	D	amphibian	State Sensitive Species; Strategy Species
25.	wolverine	S	mammal	Threatened Species; Strategy Species

Note: the Malheur Forest Plan (see Table 1 and 2 above) and Regional Foresters Sensitive Species (see Table 3 above) includes all state listed species that require analysis for Malheur NF projects. Here, we review ODFW's comprehensive list of Sensitive and Conservation Strategy species to show inclusion in other lists for recommendations in land and habitat management.

Appendix H.

US Forest Service 2012 Planning Rule

§219.8 Sustainability.

The plan must provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area, as follows:

(a) Ecological sustainability.

(1) Ecosystem Integrity. The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account:

(i) Interdependence of terrestrial and aquatic ecosystems in the plan area.
(ii) Contributions of the plan area to ecological conditions within the broader landscape influenced by the plan area.
(iii) Conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area.
(iv) System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change.
(v) Wildland fire and opportunities to restore fire adapted ecosystems.
(vi) Opportunities for landscape scale restoration.

(2) Air, soil, and water. The plan must include plan components, including standards or guidelines, to maintain or restore:

(i) Air quality.
(ii) Soils and soil productivity, including guidance to reduce soil erosion and sedimentation.
(iii) Water quality.

(iv) Water resources in the plan area, including lakes, streams, and wetlands; ground water; public water supplies; sole source aquifers; source water protection areas; and other sources of drinking water (including guidance to prevent or mitigate detrimental changes in quantity, quality, and availability).

(3) Riparian areas.

(i) The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of riparian areas in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account:
(A) Water temperature and chemical composition;
(B) Blockages (uncharacteristic and characteristic) of water courses;
(C) Deposits of sediment;
(D) Aquatic and terrestrial habitats;
(E) Ecological connectivity;
(F) Restoration needs; and
(G) Floodplain values and risk of flood loss.

(ii) Plans must establish width(s) for riparian management zones around all lakes, perennial and intermittent streams, and open water wetlands, within which the plan components required by paragraph (a)(3)(i) of this section will apply, giving special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams and lakes.
(A) Riparian management zone width(s) may vary based on ecological or geomorphic factors or type of water body; and will apply unless replaced by a site-specific delineation of the riparian area.
(B) Plan components must ensure that no management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions or fish habitat shall be permitted within the riparian management zones or the site-specific delineated riparian areas.
(4) Best management practices for water quality. The Chief shall establish requirements for national best management practices for water quality in the Forest Service Directive System. Plan components must ensure implementation of these practices.
(b) Social and economic sustainability. The plan must include plan components, including standards or guidelines, to guide the plan area’s contribution to social and economic sustainability, taking into account:
(1) Social, cultural, and economic conditions relevant to the area influenced by the plan;

(2) Sustainable recreation; including recreation settings, opportunities, and access; and scenic character;
(3) Multiple uses that contribute to local, regional, and national economies in a sustainable manner;
(4) Ecosystem services;
(5) Cultural and historic resources and uses; and
(6) Opportunities to connect people with nature.

§219.9 Diversity of plant and animal communities.

This section adopts a complementary ecosystem and species-specific approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area. Compliance with the ecosystem requirements of paragraph (a) is intended to provide the ecological conditions to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area. Compliance with the requirements of paragraph (b) is intended to provide for additional ecological conditions not otherwise provided by compliance with paragraph (a) for individual species as set forth in paragraph (b). The plan must provide for the diversity of plant and animal communities, within Forest Service authority and consistent with the inherent capability of the plan area, as follows:

(a) Ecosystem plan components. (1) Ecosystem integrity. As required by §219.8(a), the plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore their structure, function, composition, and connectivity.

(2) Ecosystem diversity. The plan must include plan components, including standards or guidelines, to maintain or restore the diversity of ecosystems and habitat types throughout the plan area. In doing so, the plan must include plan components to maintain or restore:

(i) Key characteristics associated with terrestrial and aquatic ecosystem types;
(ii) Rare aquatic and terrestrial plant and animal communities; and
(iii) The diversity of native tree species similar to that existing in the plan area.
(b) Additional, species-specific plan components. (1) The responsible official shall determine whether or not the plan components required by paragraph (a) of this section provide the ecological conditions necessary to: contribute to the recovery of federally

listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area. If the responsible official determines that the plan components required in paragraph (a) are insufficient to provide such ecological conditions, then additional, species-specific plan components, including standards or guidelines, must be included in the plan to provide such ecological conditions in the plan area.

(2) If the responsible official determines that it is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of a species of conservation concern in the plan area, then the responsible official shall:

(i) Document the basis for that determination (§219.14(a)); and
(ii) Include plan components, including standards or guidelines, to maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range. In providing such plan components, the responsible official shall coordinate to the extent practicable with other Federal, State, Tribal, and private land managers having management authority over lands relevant to that population.

(c) Species of conservation concern. For purposes of this subpart, a species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.

Additional photographs: pictures found throughout the document with no citation are listed here: cow elk (p. iii; by David Drake), mule deer buck (p. iv; by Kimberly Boyles), (p. vii; by Bob Pool), male Townsend's warbler (p. 1; by Agami Photo Agency), red-shafted northern flicker with flowers and cavity (p. 5; by Light Benders Visuals), elk herd in snow (p. 7; by Arina P Habich), wildflowers and old ponderosa pine (p. 11; by USFS), northern saw whet owl (p. 12; by Tim Zurowski), prescribed fire in ponderosa pine on the Malheur NF (p. 21; by Trent Seager), male hairy woodpecker (p. 27; by Gregg Williams), northern goshawk (p. 33; by Albert Beukhof), golden eagle on nest (p. 47; by Mick Thompson, Flickr), red crossbill (p. 49; by Danita Delimont), 2018 BMFP field tour of prescribed fire on the Malheur NF (p. 57; by Trent Seager), 2019 BMFP field tour of post-fire harvest and woodpecker research on the Malheur NF (p. 61, by Trent Seager), red fox (p. 65; by Ondrej Prosicky), prescribed fire on the Malheur NF (p. 66; by Trent Seager), yellow-bellied marmot (p. 89; by Tim Zurowski), American pika (p. 96; by Tom Reichner), eastern long-toed salamander (p. 99; by John P. Claire), mule deer buck in aspen (p. 105, by Tony Campbell), and big brown bat (p. 106; by Ivan Kuzmin), American marten (p. 123; by Joe M. Wilson), great-gray owl (p. 127; by Erni), and house wren (p. 134; by Steve Byland).


Blue Mountains
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