Chapter 4

Management Challenges and Opportunities for Change

What you're about to read is a preliminary identification of opportunities to change existing management direction across the BioA area. While much of the landscape-level direction across the 19 national forests and grasslands is consistent, in many cases it isn't compatible with the unique and dynamic ecological, economic, and social issues faced by local national forests and grasslands.

The BioA area contains about **24 million acres of national forests and grasslands** with a myriad of unique and common management challenges; therefore, this chapter is not is a comprehensive look at all the management challenges in the BioA. During the next steps of the planning process, we'll determine the challenges and opportunities for management change on each forest and grassland in the BioA area to gain insight on how we can better support local economies and sustain ecological integrity.

Ecological Integrity

Land management plan direction for national forest and grassland restoration is needed to improve and maintain ecological function. Improved restoration will better meet the needs of communities now and for future generations.[89] About 18 million acres (65 percent) of the national forests and grasslands in the BioA area lack structural diversity and resilience and do not adequately contribute to ecological integrity. Unless we address this issue, often through active management, ecological integrity could continue to decline and the benefits we receive from the national forests and grasslands today could be diminished for future generations.

About 10 million acres within the BioA area need some type of forest structure restoration to improve and maintain ecological function and resilience (figure 4-1). About 2.2 million acres, primarily in our wettest, most fire-infrequent ecosystems, need restoration to enhance tree growth and snag development. Natural ecosystem processes and active treatments that maintain and enhance old-growth forest are needed to develop and maintain ecosystem function. **An estimated 7 million acres, where there is denser vegetation than would have been naturally supported, would benefit from mechanical treatment, fire treatment, or both** to achieve more natural, sustainable, and resilient densities. This would help these areas be more resilient to drought, insects and disease, as well as fire and climate change. Of the 7 million acres, about 3 million acres lack large trees and need disturbance to alter density and provide time to develop old-forest attributes. Even when the best available science indicates that active management restoration is needed, conflicting management direction makes restoration in riparian areas and upland forests challenging.[90] Desired conditions identified in most land management plans are too general and not linked to landscape-level vegetation restoration or resiliency (figure 4-1).

[89] Spies and other, 2018b.
[90] Reeves and others, 2018.

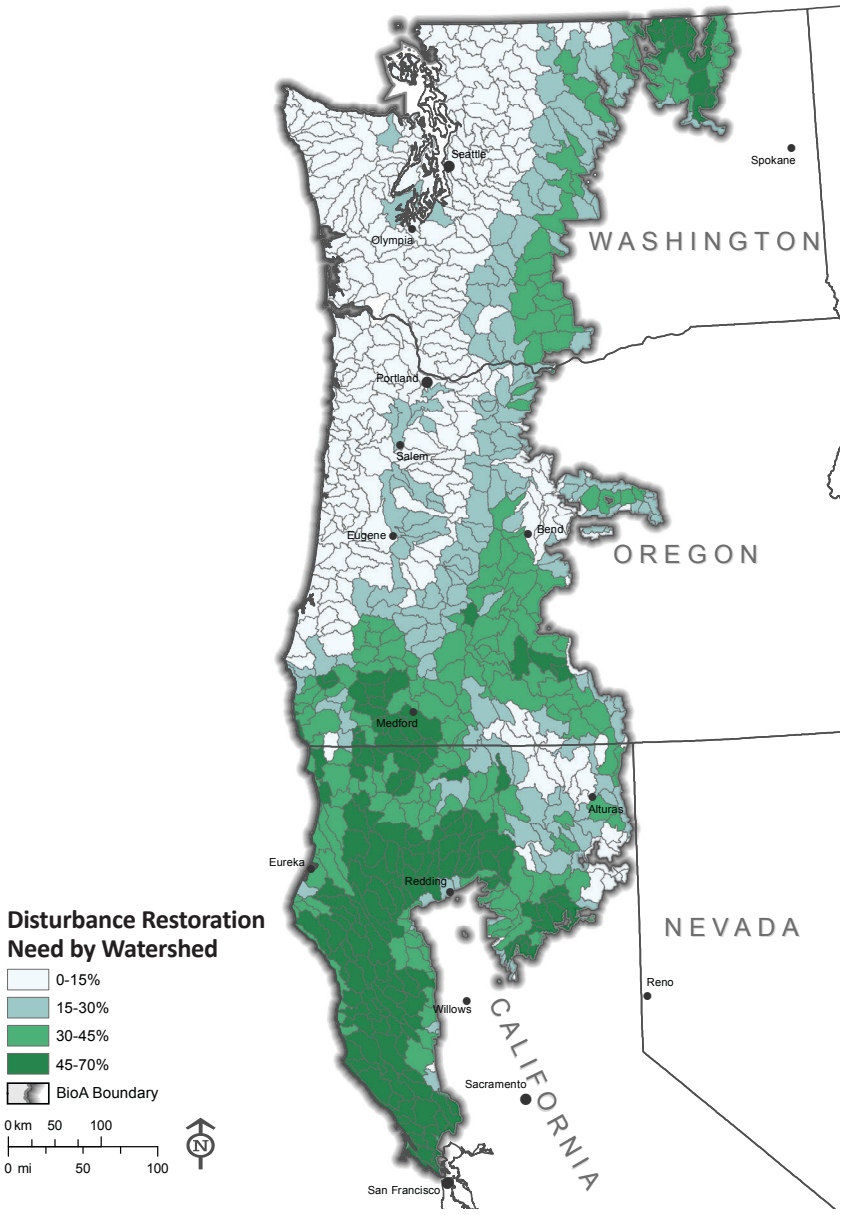


*Figure 4-1 Map A—**7 million acres of national forests and grasslands within the BioA area need disturbance restoration** (for example, mechanical or fire treatments) to reduce density and restore forests (disturbance restoration). If a watershed has a 45 to 70 percent restoration needed, it urgently needs restoration to maintain ecosystem resilience.*

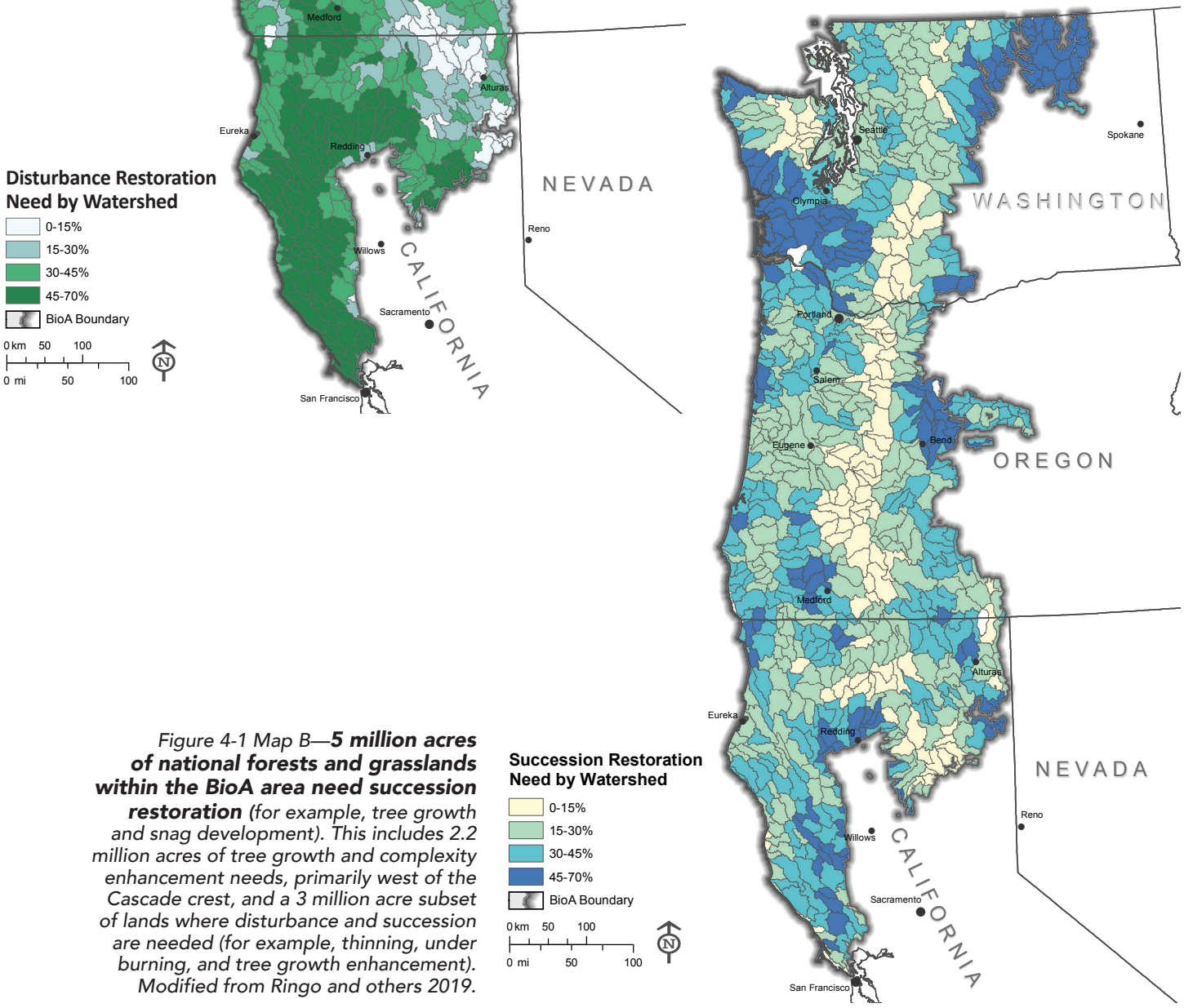


*Figure 4-1 Map B—**5 million acres of national forests and grasslands within the BioA area need succession restoration** (for example, tree growth and snag development). This includes 2.2 million acres of tree growth and complexity enhancement needs, primarily west of the Cascade crest, and a 3 million acre subset of lands where disturbance and succession are needed (for example, thinning, under burning, and tree growth enhancement). Modified from Ringo and others 2019.*

Late-successional reserve direction needs to reflect the dynamic nature of landscapes. The current land management plan direction for late-successional reserves is static both in location of the reserves and goals for ecosystems within the reserve boundaries. The static condition doesn't account for or reflect the increasing patch size of large fires and other disturbances (for example, drought or insect and disease related mortality), habitat fragmentation, and the dynamic nature of the ecosystems within and around the late-successional reserves.[91] Although revising late-successional reserve assessments might be a way to incorporate new science, updated management direction that reflects the dynamic nature of the ecosystems would help provide for connected habitat.

Land management **plan direction needs to be more compatible with the unique ecosystems across the BioA area** to help restore and protect national forests and grasslands. It's necessary to better align management direction with the best available science to achieve desired conditions. For example, fire exclusion is leading to unintended ecological consequences[92] across much of the BioA, but the restoration work needed to address the consequences is difficult to implement because plan direction limits our available options. Additionally, there's a need for plan direction that addresses using timber harvest to achieve ecological desired conditions, but existing plans focus on timber outputs rather than desired landscape conditions.

Harvest restrictions on lands within the NWFP reserve network[93] and other amendments, such as the Eastside Screens, that restrict the size or age of trees available for harvest don't reflect the best available science.[94] The restrictions also limit our ability to capitalize on using timber harvest as a tool to improve ecological integrity. For instance, restriction on harvesting trees that are more than 80 years old in NWFP late-successional reserves is inconsistent with the best available science in many ecosystems.[95] Due to the restriction, land management activities in stands older than 80 years is complicated, takes additional time and resources, and is generally avoided. Furthermore, the Endangered Species Act consultation processes and public controversy are complex.

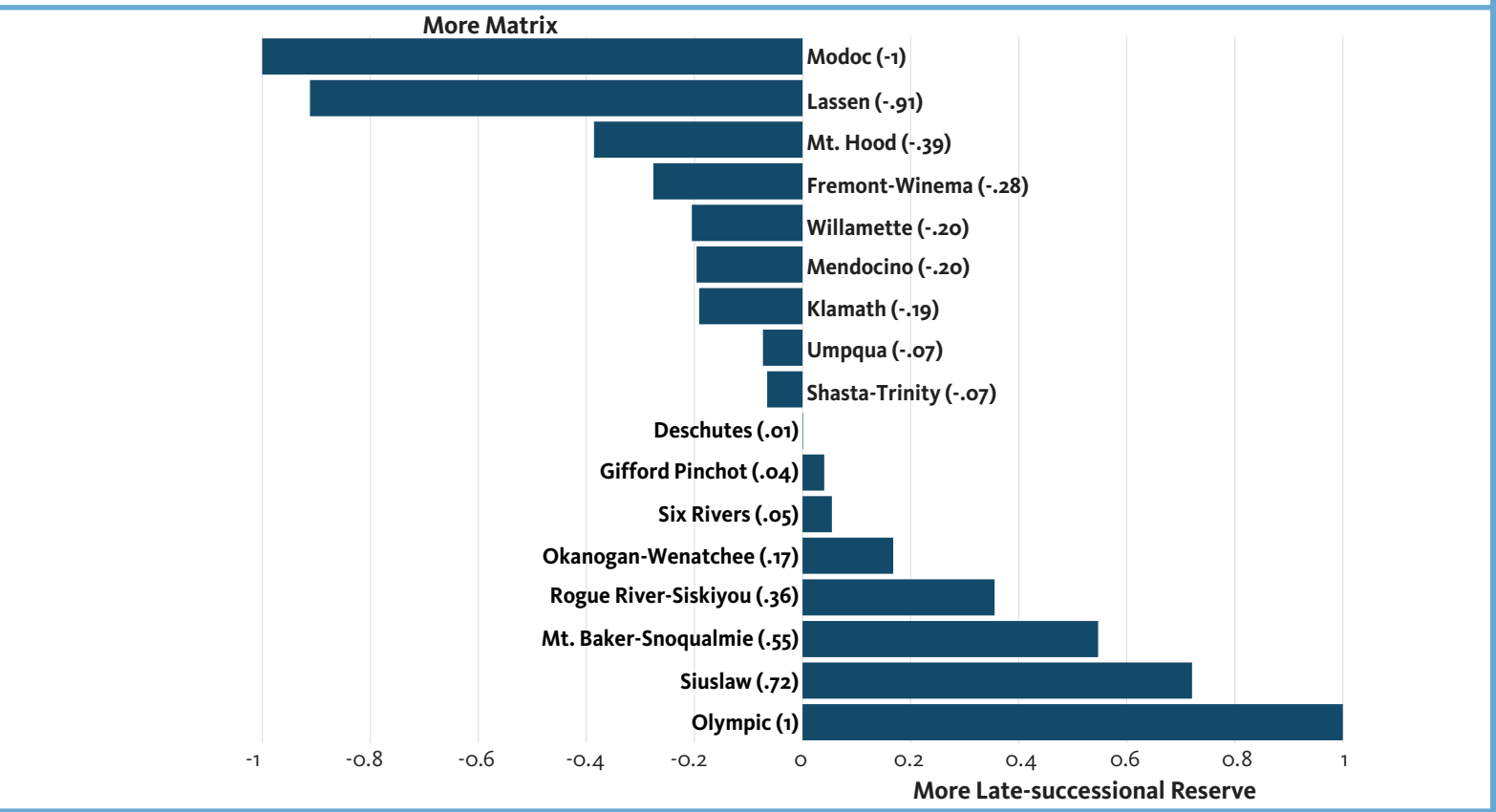


Figure 4-2—Index of late-successional reserve and matrix land by national forest. Forests with an index of 1 have almost all potential active management land in late-successional reserves. Forests with a value of negative 1 have almost all potential active management land in matrix. The Olympic and Siuslaw National Forests have almost all their potential active management in late-successional reserves (value of 1). The Rogue River-Siskiyou National Forest has almost 40% more late-successional reserve land than matrix land. The Mount Hood National Forest has almost 40% more matrix land than land in late-successional reserves. More land in late-successional reserves means that constraints, like the 80-year exemption, will likely make old forest restorative or enhancing treatments more difficult, especially as trees naturally age.

[91] Spies and others, 2018a.
[92] Spies and others, 2018a.
[93] Late-successional reserves, riparian reserves, and congressionally reserved lands.
[94] Stine and others, 2014.
[95] Spies and others, 2018a.

Stand age and tree size are not the only, nor necessarily the best, measures of ecological health. For example, forests more than 80 years old on low productivity sites might be dense and lack understory diversity due to slow growth and development and exclusion of fire. When this happens, land management activities could help move the stand toward a more natural condition. The 21-inch standard associated with the wildlife standard of the Eastside Screens, restricts harvest of trees greater than 21-inches in diameter when old-forest structure is lacking. Due to this constraint, relatively young, shade tolerant trees that should be removed to improve ecological resiliency are overly abundant but cannot be harvested because they have grown beyond 21 inches in diameter.[96] Restrictive management direction in late-successional reserves, ungulate habitat, and scenic corridors, which hinders our ability to reduce the risk of insect and disease mortality (figure 4-3),[97] is another example of the need to update plan direction to reflect the best available science.

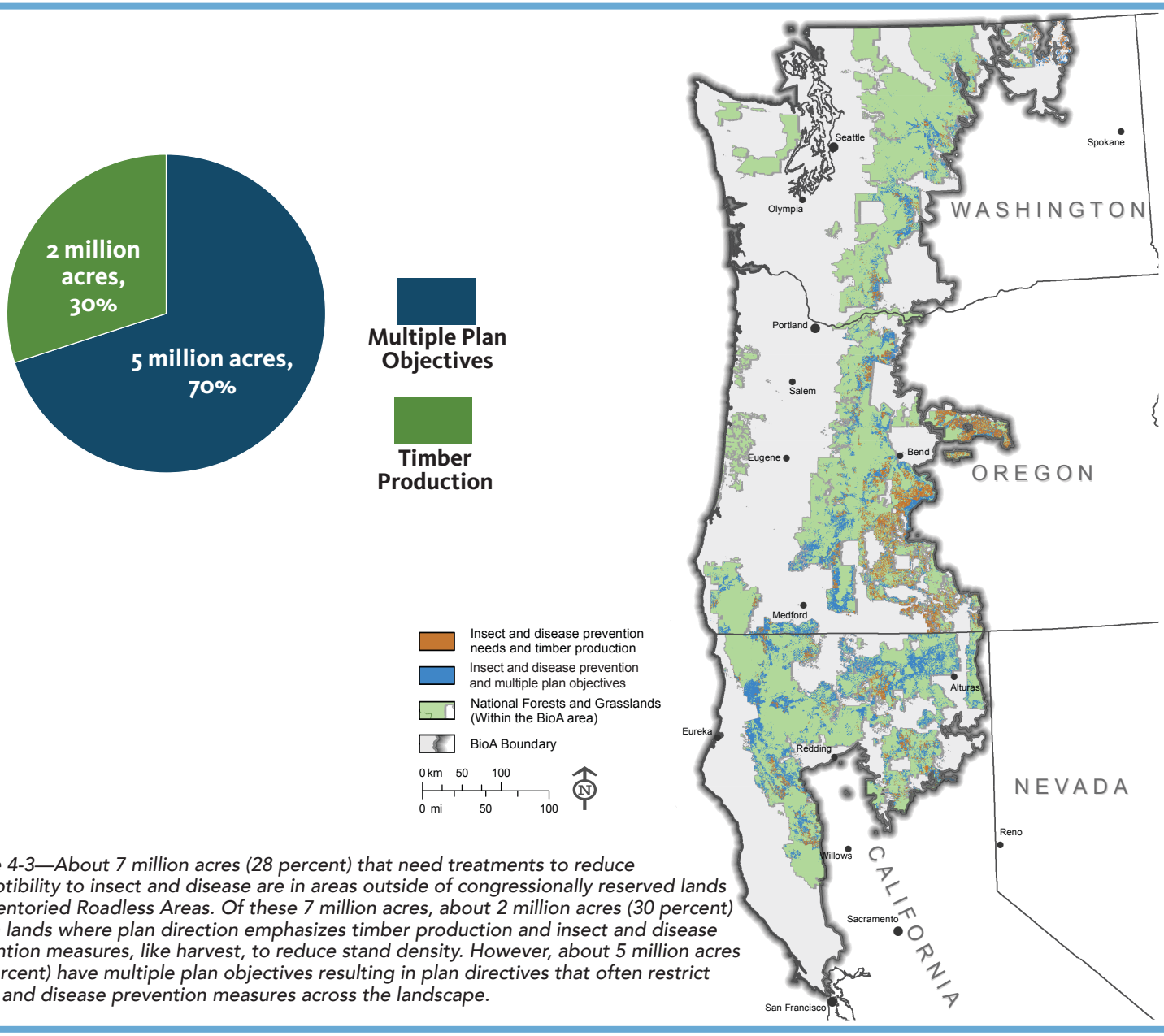


Figure 4-3—About 7 million acres (28 percent) that need treatments to reduce susceptibility to insect and disease are in areas outside of congressionally reserved lands or Inventoried Roadless Areas. Of these 7 million acres, about 2 million acres (30 percent) are on lands where plan direction emphasizes timber production and insect and disease prevention measures, like harvest, to reduce stand density. However, about 5 million acres (70 percent) have multiple plan objectives resulting in plan directives that often restrict insect and disease prevention measures across the landscape.

Land management plan direction needs to better anticipate the extent or degree of invasive species including plants, insects, and animals. Invasive species have changed the nature of forests, grasslands, and aquatic systems, which will negatively affect ecosystem function and processes in the future.[98] Invasive species generally reduce ecosystem resilience, which is of heightened concern in the face of climate change.[99] Invasive species were not considered through a contemporary lens, or often at all, in the existing land management plans in the BioA area. The result is that managing for invasive species is difficult and inefficient due to a lack of consistent guidance within and between forests.

[96] Stine and others, 2014.
[97] Krist and others, 2014.
[98] Spies and others, 2018a.
[99] Spies and others, 2018a.

Invasive Species

Along with climate change, invasive plant and animal species are a significant threat to native biodiversity and ecological integrity. Climate change also will likely influence the expansion of nonnative plant and animal species, while at the same time reducing or even eliminating local occurrences of native species. It's particularly challenging to manage for species biodiversity in the face of both climate change and invasive species. Likewise, invasive species, climate change, and fire exclusion have altered fire regimes and vegetation dynamics.

BioA national forests and grasslands store some of the highest levels of carbon in the United States,[100] and land management plans need to consider carbon management. Areas that store carbon across the landscape, especially in fire-infrequent systems, are important to land management planning and need to be protected from disturbances that can release carbon, such as those that increase soil erosion or decomposition beyond inherent levels. We need to leverage opportunities to mitigate or limit overall carbon emissions in frequent-fire dependent ecosystems where fire-resiliency treatments are needed.

Land management plan direction needs to better address the unintended consequences on aquatic systems, wildlife habitat and distribution, and invasive species from Forest Service roads and recreation infrastructure. Lack of direction affects the ecological integrity of national forests and grasslands.[101]

Work is needed to create more effective processes and to build trust and collaboration that could more successfully integrate adaptive management into land management plans. Adaptive management areas, a land use allocation in the NWFP, were designed to study new or experimental treatments to improve land management practices and incorporate results into future land management plan direction. Unfortunately, adaptive management areas were rarely used, and their goal wasn't fully realized due to risk aversion and lack of acceptance[102] by regulatory agencies, environmental groups, and the public about experimental design implementation, as well as insufficient funding.[103]

"Trust among interested parties is essential for developing adaptive management strategies that can nimbly and effectively respond to changing climate, species, disturbances, human values, and markets."

Spies and others 2018b

Fire and Fuels Management

In the past few decades, we have learned a lot about the benefits of wildfire on the landscape and the critical importance of fire in maintaining ecological integrity in fire-adapted ecosystems.[104] At the same time, we have experienced some of the biggest and most impactful fire seasons in recent memory. Fire can be a destructive and devastating force, and it can also serve important ecological functions. As we have learned more about the effectiveness of fuels treatments and explored the benefits of using prescribed fire and natural wildfire, we better understand that fire helps to restore balance to national forests and grasslands. In the BioA area, ecological systems fall into three groups (figure 4-4) based on fire ecology characteristics.

Frequent-fire dependent ecosystems are those where fire is essential to overall ecosystem function. Before Euro-American settlement, fires were quite frequent and of low or mixed severity and were the primary driver of disturbance. Fire in these systems drives structural and successional dynamics, favoring fire-dependent and fire-adapted species. In these areas, we need to increase disturbance and modify conditions, where appropriate, to prevent uncharacteristically large and severe fires from occurring.

[100] USDA Forest Service, 2015. figure 3-4.
[101] Reeves and others, 2018.
[102] Spies and others, 2018b.
[103] Stankey and others, 2006.
[104] Spies and others, 2018.

Fire diverse (mixed-severity) ecosystems are those where fire can be important to ecosystem function, but it is not the primary driver of successional dynamics, including structure and composition. Historically, fires were moderately frequent and primarily ranged between mixed and high severity in a variety of patch sizes. There is a need on these landscapes to find places where naturally occurring wildfires can and should be managed for long-term resource benefit.

Fire infrequent ecosystems represent a broad range of ecosystem types from high-elevation spruce-fir forests to coastal temperate rainforests where fires were historically infrequent and of mixed to high severity in large areas. In these areas, naturally occurring fires need to be managed for ecological benefit without compromising firefighter or public safety; this can be particularly challenging in more populated coastal areas.

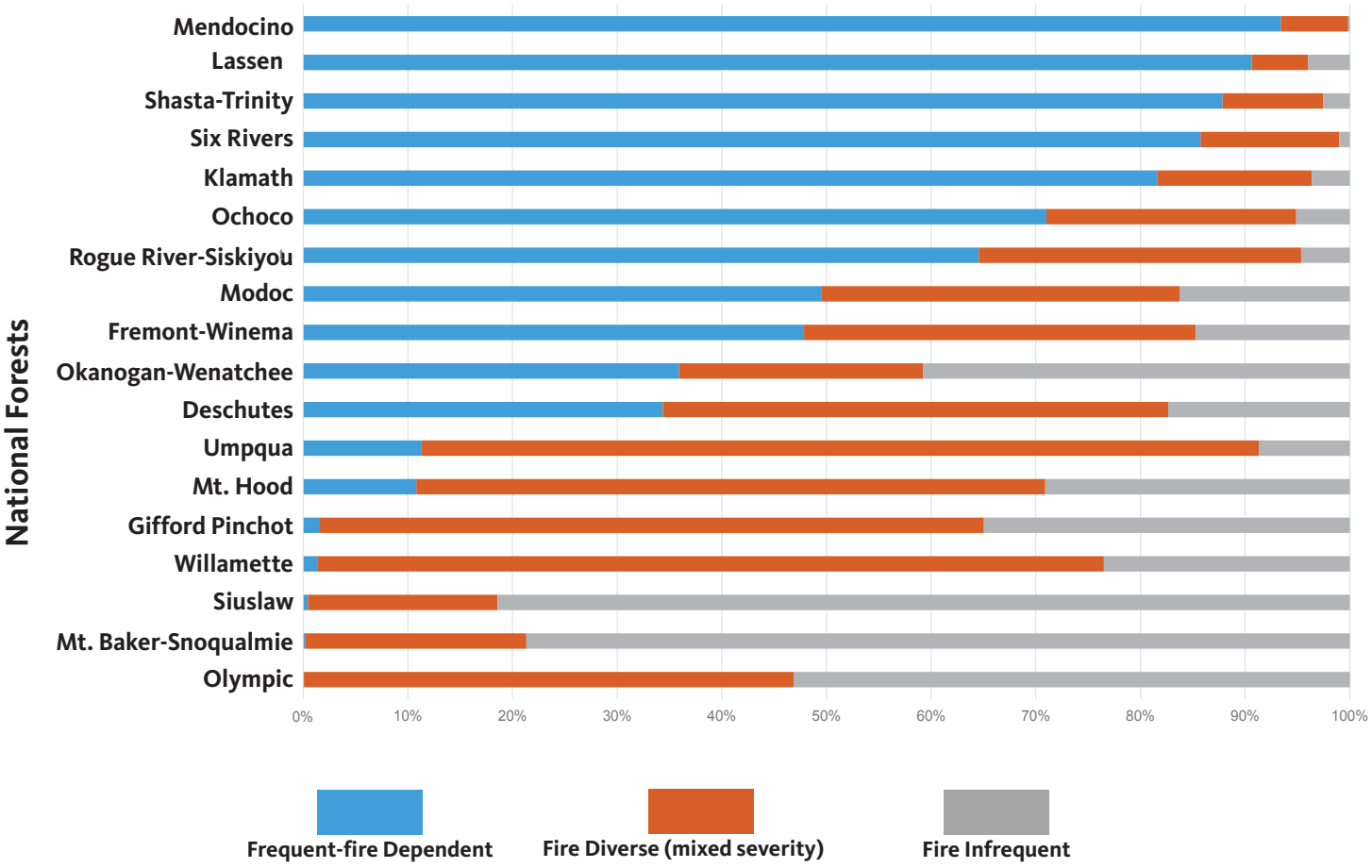


Figure 4-4—Percentage of fire ecological groups, based on historical fire regime, by national forest. No forest is all in one fire ecology group.

Land management plans need to address strategic wildfire-risk mitigation in and around communities in the wildland-urban interface and around infrastructure. There's been a dramatic increase in people living in the wildland-urban interface (figure 4-5).[105] To ensure that fire management needs are supported, plan direction needs to be better aligned with today's understanding of fire management and fire strategies, as well as with land management allocations. In addition to aggressively suppressing fires, modern strategies to protect communities should include reducing fuels through mechanical treatments and prescribed fire. When wildfires occur, they should be managed under specific and limited conditions to achieve risk-reduction objectives.

[105] Charnley and others, 2018.

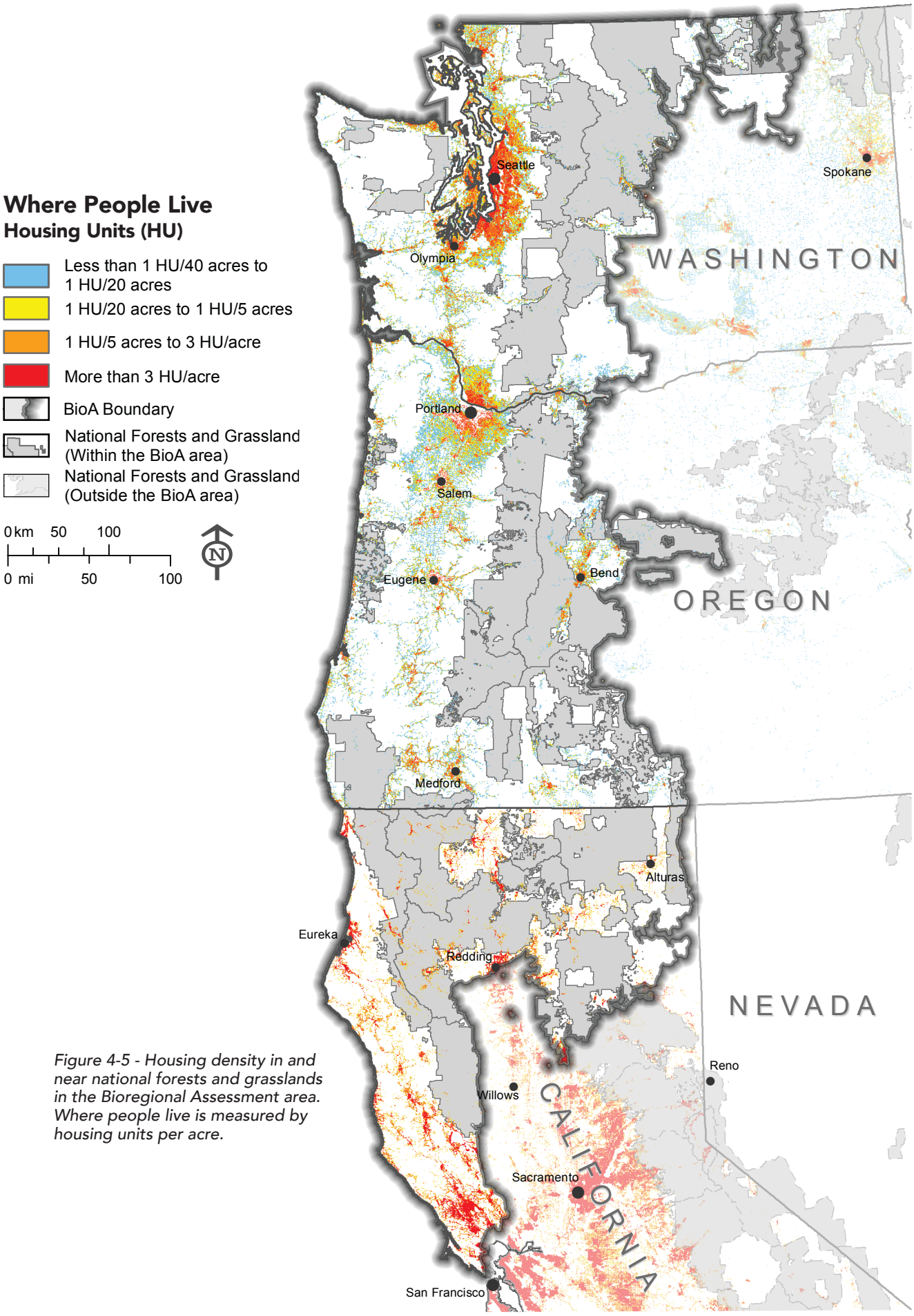


Figure 4-5 - Housing density in and near national forests and grasslands in the Bioregional Assessment area. Where people live is measured by housing units per acre.

Better alignment of fire management objectives includes ensuring that land allocations support management activities that reduce risk around important assets, such as communications and energy infrastructure. There's about 1,700 miles of transmission lines on national forests and grasslands within the BioA area. These facilities often cross multiple national forest and grassland boundaries, as well as other municipal and private boundaries. Improved management consistency across the BioA, as well as alignment of plan direction, can help increase public safety and reduce fire risk concerns by improving agency responses to facility maintenance needs and system upgrade proposals.

A strategic risk-based approach to fire management and loss mitigation is needed to help reduce losses from unwanted wildfire and reduce the high cost of fire suppression in and near communities and other resources and assets.[106] This approach would help ensure we are making progress toward the intent of the *National Cohesive Wildland Fire Management Strategy*. The Strategy is a broad national strategic framework that addresses wildland fire across landscapes as a vitally important natural ecological process. The subsequent report, The National Strategy, provides a path forward to address key issues associated with wildfire; create resilient landscapes by managing vegetation and fuel; create fire-adapted communities by treating hazardous vegetation to protect communities, infrastructure, and other highly valued resources and assets; and provide a safe and effective wildfire response by using a risk-management approach that includes all jurisdictions when developing a response plan.

Land management plans need an improved focus on managing wildfires, acknowledging the important ecological role of fire in fire-adapted ecosystems, and promoting the use of unplanned ignitions to meet ecological and resource objectives. Existing land management plans primarily focus on suppression rather than on fuels management, managing fires, and other tactics to help meet ecological and resource objectives. High-severity fire can alter important habitat, impact water quality, and create dangerous or even lethal conditions for rural communities. There has been an increase in high-severity wildfires in predominantly low-severity fire areas since our land management plans were written (figure 4-6).[107] We need to increase the pace and scale of work in frequent-fire dependent ecosystems to reduce the risk of uncharacteristic effects from large-scale, stand-replacing fire using strategies in addition to aggressive fire suppression (figure 2-4).

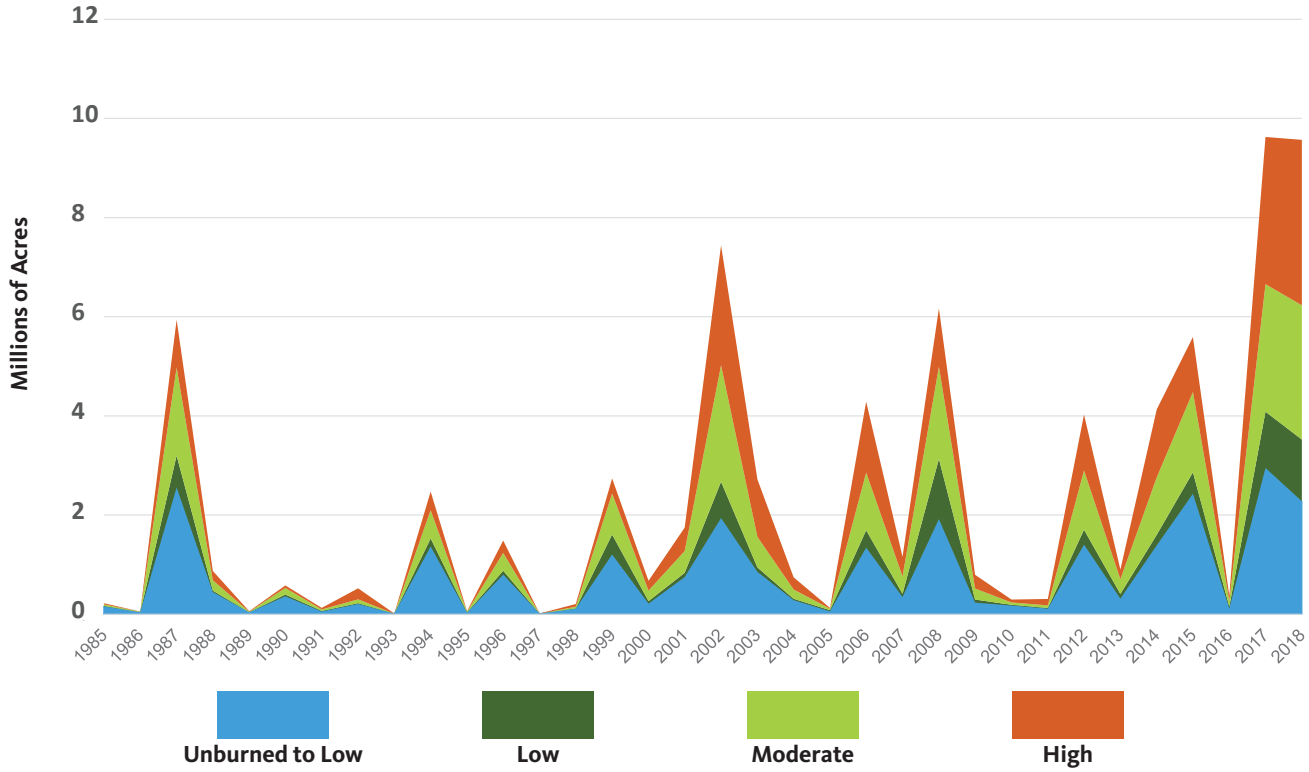


Figure 4-6—Total annual acres burned by severity class on national forests and grasslands in the BioA area from 1985 to 2018. There is a widely variable nature of area burned and an apparent annual increase in burn area and regularity of fire. While the overall area burned each year remains below historic and natural levels, a noticeable increase in high- and moderate-severity fire has occurred since 1985, which helps explain how the perception of fire and fire risk was different when current land management plans were written.

[106] Thompson and others, 2015.
[107] Thompson and others, 2015.

Land management plan direction is needed to facilitate the use of prescribed and natural fire, along with timber harvest and mechanical fuel treatments, to achieve desired conditions in fire-adapted ecosystems. Existing management direction, although consistent, is not compatible with desired conditions or natural disturbance ecology in the variety of ecosystems across the BioA area (figures 2-2 and 2-4). There's a high proportion of densely stocked forests with highly flammable fuel on drier, frequent-fire dependent areas. Fires on these lands are often uncharacteristically severe and can have negative ecological impacts. Additionally, climate change is expected to expand uncharacteristic fire effects across the BioA area, especially in frequent-fire dependent ecosystems. **Combining timber harvest, other mechanical fuel treatments, and prescribed or natural fire can achieve desired conditions** where using only one option would not fully meet the landscape needs.

Sustainable Timber

Timber processing infrastructure and a skilled workforce has declined in the BioA region in recent decades.[108] Many rural communities in and around the BioA area that rely on federal timber and landscape restoration have been socially and economically affected by declines since the 1990s. Economically feasible restoration projects, timber processing infrastructure, and a skilled workforce are needed to support ecological integrity and benefits to communities in the region.

The ability to implement restoration treatments on federal lands is influenced by several factors including the status of markets, sawmill facilities, and a capable workforce (figure 5-5). In turn, the types of restoration treatments implemented and products generated influence the viability of the infrastructure and the presence of a capable workforce. For timber production to function as a tool to meet ecological objectives, purchasers must be able to meet the requirements for minimum acceptable bid prices, use the offered wood material, and perform the required work. Therefore, it is difficult to rely on timber harvest to fund forest management and restoration on all but the most valuable timberlands.

Timber processing infrastructure and a skilled workforce are sparse in some locations, especially east of the Cascades. The number of mills has decreased regionally but those that remain have modernized and total wood processing capacity has increased.[109] However, the average distance between large mills has grown to about 100 miles, resulting in an increased cost to transport logs to mills throughout much of the BioA area.

[108] Charnley and others, 2018.
[109] Charnley and others, 2018.

Timber harvest anticipated under the land management plans has never been met[110] *primarily because management direction restricts active management.* As with limited timber processing infrastructure, timber harvest below projected levels restricts our ability to achieve restoration objectives and support communities. Harvest levels are unlikely to increase under current plans because the objectives for **timber production and restoration often conflict with habitat protection objectives.** For example, timber production is no longer emphasized on much of the NWFP matrix land because large areas of matrix have been designated as critical habitat for the northern spotted owl (figures 4-7 and 4-8).

Similar management conflicts exist in BioA forests outside the NWFP area. For example the Eastside Screens, which restrict commercial timber sale activities in late- and old-structural stages, restricts the diameter of trees harvested to less than 21 inches diameter at breast height. Another example is the requirement for 40 to 70 percent ungulate canopy cover in frequent-fire dependent forests that naturally have a more open canopy.

Commercial thinning to restore historic plantations is generally only commercially viable every 30 to 50 years on the most productive sites; growth is slower in drier areas. So, restrictions on harvesting trees that are more than 80 years old mean that sustainable timber production will be more difficult for the next couple of decades. The challenge arises because areas available for restoration and commercial timber production will be thinned or have already been thinned within the last 30 years. This progression through time results in stands that are too old and trees that are too large to be commercially harvested under the restrictions in the land management plans.

Northern Spotted Owl Critical Habitat

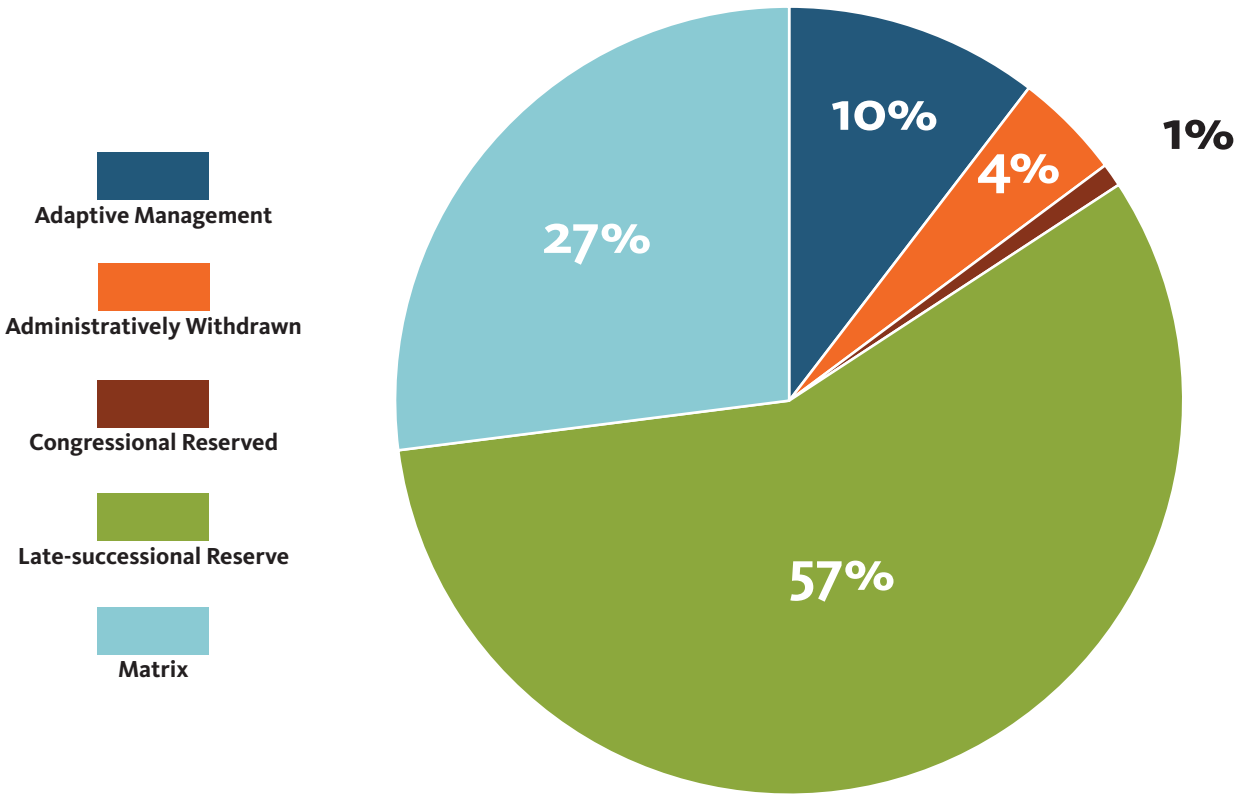
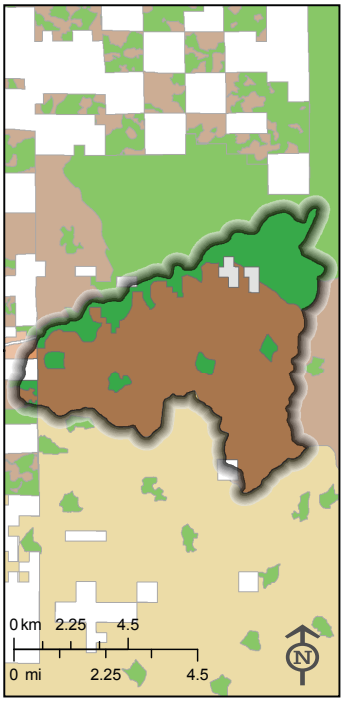
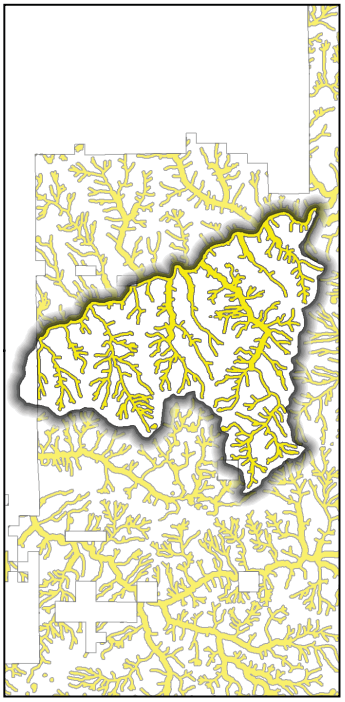


Figure 4-7. Designated critical habitat for northern spotted owl is most aligned with late-successional reserve, congressional reserves, and administratively withdrawn land allocations.

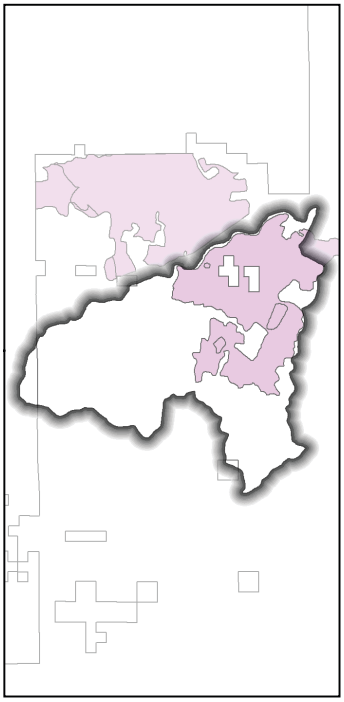
[110] Charnley and others, 2018.



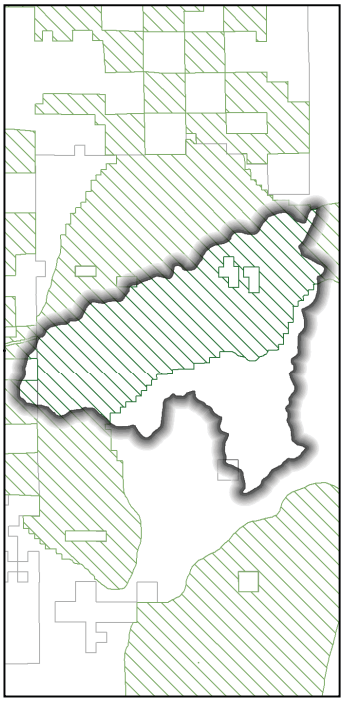
NWFP Land Use Allocations



Riparian Management Areas



Inventoried Roadless Areas



Northern Spotted Owl Critical Habitat

- Adaptive Management Areas
- Late Successional Reserve
- Not Designated
- Matrix
- Riparian Management Areas
- Inventoried Roadless Areas
- NSO Critical Habitat

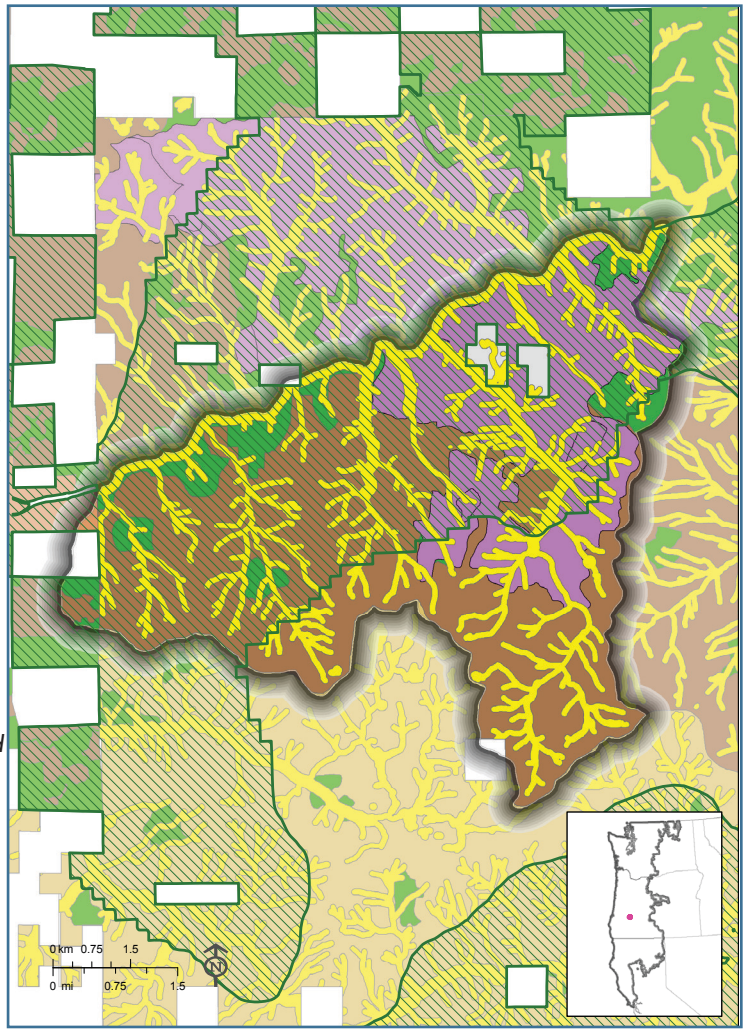


Figure 4-8—The land available for timber production under the NWFP is much less than what was left undesignated in NWFP matrix land. Plan direction and Inventoried Roadless Area designation often conflict with assumptions about timber production. Matrix was assumed to emphasize timber production, but timber production goals in matrix are superseded by more restrictive stipulations, such as minimum canopy cover requirements for ungulates and requirements for tree retention or limited tree stumps. Inventoried Roadless Areas limit timber harvest. Unmapped riparian reserve, survey and manage standards and guidelines, and northern spotted owl critical habitat designations create further complexity and unpredictability for timber production. And, northern spotted owl critical habitat designation has reduced the land base available for primary timber production.

Projects that produce timber do not closely adhere to planned harvest methods like regeneration harvest of old forest in matrix lands. Existing land management plans don't incorporate today's harvest methods and technology, like variable density thinning and modern logging methods, or consider the mutual benefits of timber harvest and ecological resilience and integrity. Existing plans focus more on setting standards and guidelines for timber harvest than on working toward desired conditions. Such a focus can prevent leveraging a new technology that, for example, can harvest on steep slopes with little impact to soils. Timber outputs from our highly productive fire-infrequent and fire-diverse (mixed severity) lands have been particularly curtailed. However, social values related to land management have begun to shift toward recognition of the broad benefits associated with our natural resources and the importance of balancing resource protection with timber production.[111]

NWFP late-successional reserves and matrix are similar in their current need for disturbance restoration, which involves mechanical treatments, including timber harvest, in combination with fire treatments (figure 4-9).

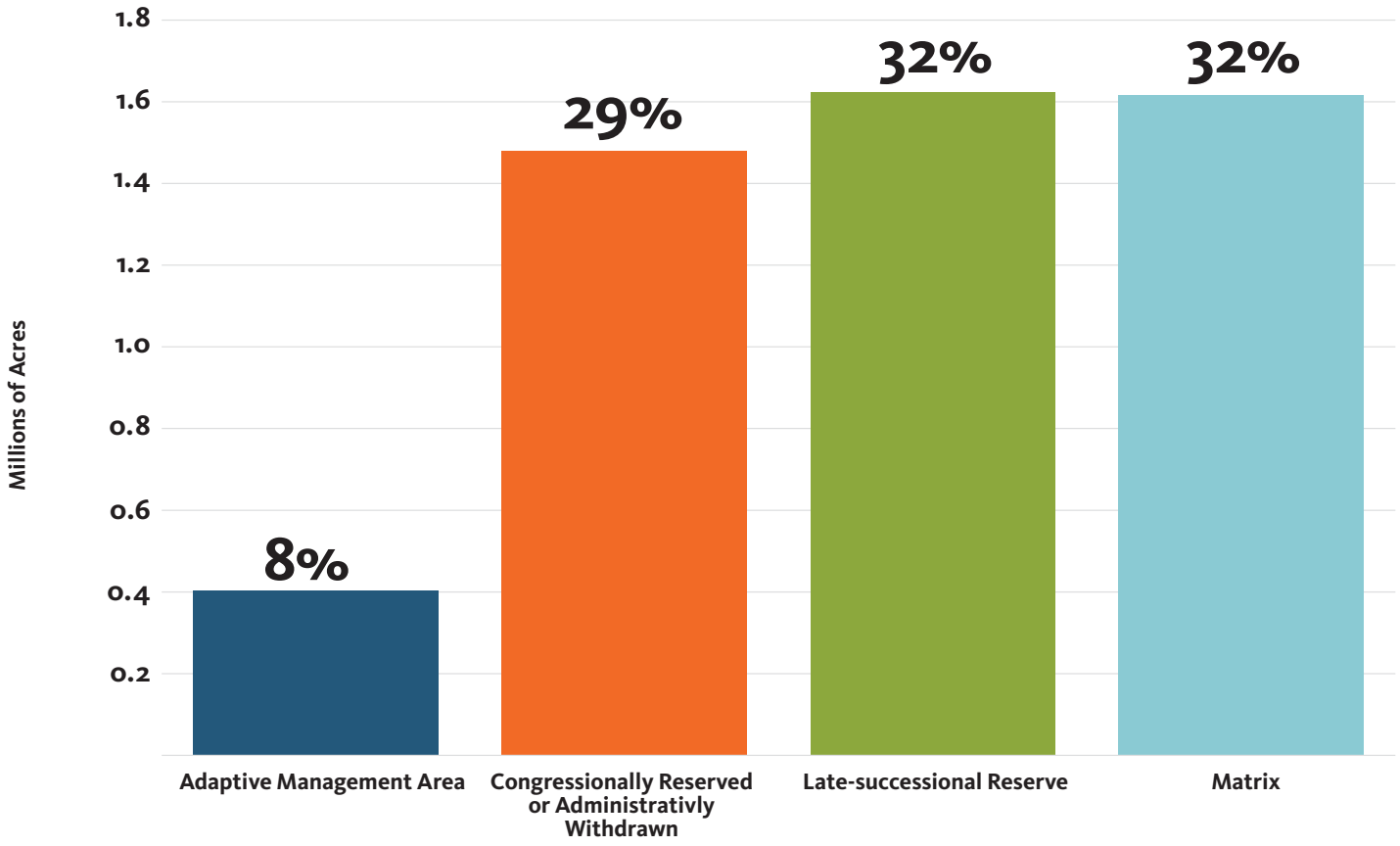


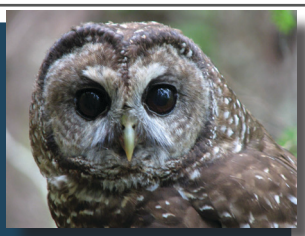
Figure 4-9—Millions of acres need some combination of mechanical or fire treatment to reduce density and restore forests (disturbance restoration need) in land use allocations including matrix, late-successional reserve, congressionally reserved and administratively withdrawn, and adaptive management areas. Percent of land use allocation needing disturbance restoration is indicated above each colored bar. Mechanical treatments to achieve restoration goals can often produce commercial timber as a co-product of improving ecological resilience. (Modified from Ringo and others 2019)

[111] Charnley and others, 2018.

There is a need for land management plan direction that better aligns with the U.S. Fish and Wildlife Service's northern spotted owl recovery plan[112] (figure 2-7) and critical habitat final rule.[113] Better alignment is needed between designated critical habitat for spotted owls and the late-successional old-growth portion of the late-successional reserve network; this could help simplify management direction and better protect high-quality habitat for owls and other old growth-dependent species, such as marbled murrelet. In addition to protecting these habitats, management direction that allows active management to restore and improve ecosystem resilience could help conserve and develop northern spotted owl habitat in the long term (chapter 4, Ecological Integrity).

Modification of land management plan desired conditions associated with old-forest management in drier, frequent-fire dependent ecosystems is needed. Loss of old forest from high-severity wildfire has been concentrated in frequent-fire dependent ecosystems (figure 3-2).[114] It will be important to update land management plans to reflect ecological resilience and expected ecosystems in these areas.[115]

Northern Spotted Owl



The historic range of the northern spotted owl stretches from southwest British Columbia through the Cascade Mountains and coastal ranges in Washington, Oregon, and northern California. A key component of northern spotted owl habitat is structurally complex old-growth forests, especially for nesting and roosting. Early seral habitat (for example, openings) is also important, especially in the drier portions of the northern spotted owl's range.

The Northwest Forest Plan and the Endangered Species Act have helped protect and enhance spotted owl habitat on federal lands, but habitat protection will not be enough to ensure long-term viability of the species (Lesmeister and others 2018).

Despite current protections, the species' population continues to decline each year throughout its range. These declines are thought to be driven by continued reduction of nesting and roosting habitat, particularly on nonfederal lands, increasing habitat loss from wildfires, and competition with expanding populations of barred owls. Climate change projections indicate that suitable habitat for spotted owls will shift northward and to higher elevations.

Despite the protections afforded by the NWFP, old-growth dependent species, such as the northern spotted owl, continue to decline due to factors that weren't anticipated.[116] One of these factors is the barred owl, an invasive species in the BioA area, which has expanded its range in the past 25 years and become a more significant threat to northern spotted owls. The expansion of the barred owl's range, in combination with disturbances outside of federal lands, have led scientists to conclude that the protections in the NWFP alone are not enough for spotted owl recovery.

Barred Owl Invasion

A threat to the northern spotted owl that was not anticipated by the NWFP is the invasion and establishment of a non-native competitor. The barred owl, once confined to eastern North America, now co-occupies habitat and outnumbers spotted owls throughout much of their range and continues to increase in population density.[117] Barred owls have higher annual survival, produce more offspring, and inhabit smaller home ranges than spotted owls.

> *"It appears unlikely that spotted owls can persist without significant reductions in barred owl polulations."*
> *Spies and others 2018- NWFP Science Synthesis*

They compete for resources that would otherwise be available to spotted owls, including nest sites. They are slightly larger, and are strongly aggressive toward their native counterparts, usually quickly excluding spotted owls from territories and habitat. The competitive relationship between the two owl species has become a key limiting factor to spotted owl recovery (figure 4-10).

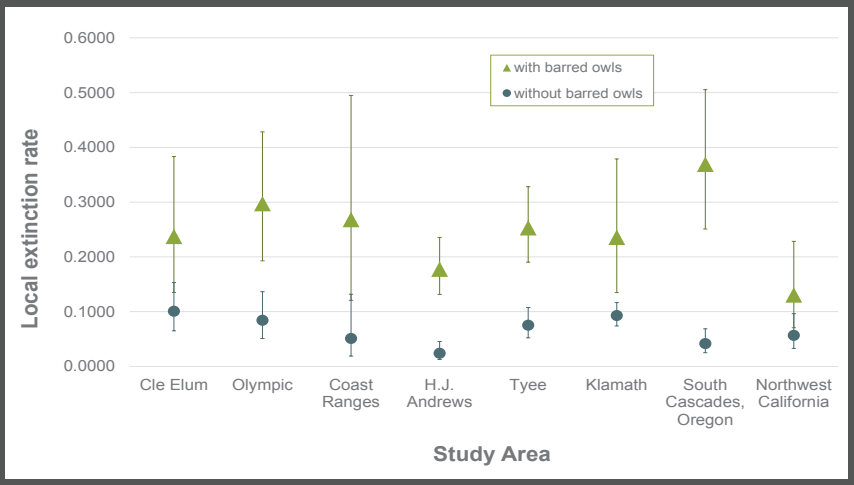


Figure 4-10—Mean annual local extinction rates for northern spotted owl on 11 study areas relative to presence of barred owls.[118] *Northern spotted owls are more at risk of extinction when barred owls are living in the area. After Dugger and others 2016*

[112] US Fish and Wildlife Service, 2011a.
[113] Spies and others, 2018b.
[114] Spies and others, 2018a.
[115] Spies and others, 2018a.
[116] Lesmeister and others, 2018.
[117] Lesmeister and others, 2018. p. 259.
[118] Dugger and others, 2016.

Conservation of qualifying survey and manage species should be screened to determine if they should be transitioned to at-risk species of conservation concern. The survey and manage standards and guidelines need modernization to be consistent with and complement the 2012 planning rule and a coarse filter species conservation approach. Complexity of direction has made it difficult to conduct the annual species review, which is required as part of adaptive management under the survey and manage standards and guidelines. Therefore, changing the status of species has not occurred since 2003. Complex and lengthy survey protocols and requirements for managing known sites have been obstacles to some land management and restoration objectives. Additionally, the survey and manage standards and guidelines require region-wide periodic strategic surveys to update the program's species list and make changes to management recommendations. These survey protocols are costly and have not been conducted as intended.

Managing aquatic and riparian ecosystems in the BioA area under the Aquatic Conservation Strategy, Sierra Nevada Framework Aquatic Management Strategy, and PACFISH and INFISH strategies needs to be integrated under a single management approach. Management under these strategies has created conflicts and increased Forest Service planning costs. For example, in some planning areas both PACFISH and the NWFP apply; therefore, it's necessary to meet consultation, reporting, and analysis requirements for both sets of management direction.

Land management plan direction is needed that improves management of riparian areas by consolidating existing information to better describe desired conditions. Some direction under the NWFP Aquatic Conservation Strategy, Sierra Nevada Framework, and PACFISH and INFISH strategies, while consistent, does not adequately describe the diversity of riparian area in the BioA area.

Adjust key watershed locations to consider science since 1994. Information to consider includes designated critical habitat for ESA-listed fish, high-intrinsic potential assessments, bull trout core areas, climate change vulnerability assessments, presence of vulnerable non ESA-listed aquatic species, and refuge areas for ESA-listed aquatic species identified in federal recovery plans.

Land management plan direction needs to consider the requirements of complex early-seral habitats, meadows, and other types of habitat. Oversimplification of the landscape, often through management practices such as fire suppression, historic clear cutting, or focus on old-forest development, has resulted in reduced habitat diversity in the BioA area.[119] Additionally, the habitat needs of broad-ranging species, such as marten, fisher, wolverine and other mammalian carnivores, are not adequately addressed within land management plan objectives.

[119] Spies and others, 2018a.

Sustainable Recreation

There is a need for land management plan direction that sustains recreation opportunities considering increasing use and the need to maintain existing developed recreation sites. The 2012 planning rule specifies that land management plans include direction for sustainable recreation defined as the set of recreation settings and opportunities on national forests and grasslands that are ecologically, economically, and socially sustainable for present and future generations.[120] Existing land management plans did not anticipate the significant increase in recreation demand from a growing population[121] nor the advances in recreation technology that have occurred in the past few decades.

Land management plans need proactive direction to address the potential effects of climate change and other landscape-altering events on recreation and its infrastructure. Sustainable recreation depends on availability of activities and facilities. A changing climate might result in less snow at lower elevations, which would reduce the geographical extent and length of the winter-sport season. Increased flooding could affect trails, roads, campgrounds, boat launches, and other infrastructure that supports recreation-related services and benefits. Uncharacteristically severe fires, insects and disease impact recreation through direct damage or destruction of infrastructure, reduced air, water, and visual quality, and decreased safety. Land management plan direction needs to address the connection between resilient landscapes and sustainable recreation and prioritize when and how management activities apply to desired conditions related to recreation.

Recreation management direction needs overall cohesion and consistency within and across the 19 national forests and grasslands in the BioA area to effectively and efficiently sustain recreation opportunities. Updated plans need to address inconsistencies between current direction and objectives for sustainable recreation; this is particularly needed within NWFP riparian settings where recreational use conflicts with Aquatic Conservation Strategy objectives. Many national forests and grasslands in the BioA area have outdated recreation opportunity spectrum and scenery management system inventories that don't reflect current recreation uses and patterns of use. Updated mapping techniques combined with findings from monitoring and other methods to determine existing and desired recreation opportunities would help planners identify desired conditions and develop consistent recreation direction where uses cross administrative boundaries.

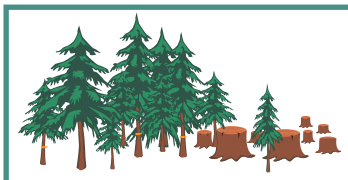
[120] 36 CFR 219.19.
[121] Charnley and others, 2018.

Conclusion

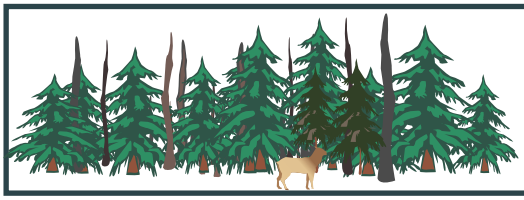
This chapter supports the 10 key recommendations presented in chapter 2. In this chapter, we acknowledged that there have been management challenges, and we talked about the potential opportunities for change. In chapter 5, we'll show you where urgent management challenges exist across multiple national forests and grasslands in the BioA area and discuss how the opportunities for change vary across the landscape. Chapter 5 geographically shows where consistent management direction has been working well and highlights where different management direction would be appropriate.

At a Glance

BioA area Treatment Needs

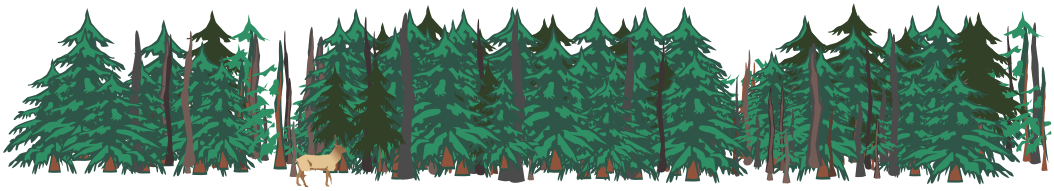


2 million acres
have plan direction that emphasizes timber production and these acres need active management to reduce susceptibility to insects and disease.

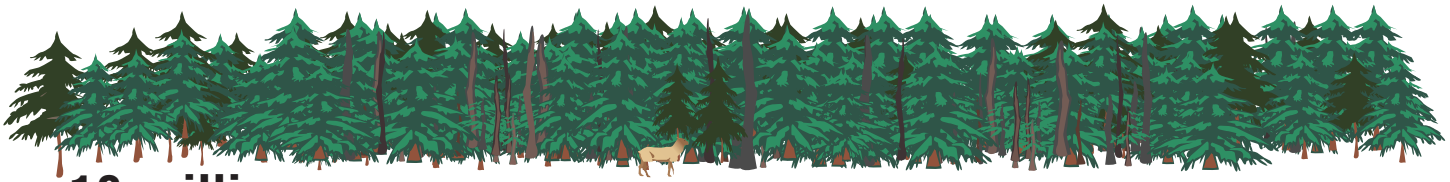


5 million acres
in old-growth forest, ungulate cover, wildlife habitat, and scenic corridors have multiple plan objectives that inhibit active management to reduce susceptibility to insects and disease.

7 million acres
need disturbance restoration



10 million acres
need some type of restoration treatment



18 million acres
lack structural diversity and resilience and do not adequately contribute to ecological integrity

Above graphic totals more than the 24 million acres that compromise the BioA area because some areas have multiple treatment needs, while others have no treatment needs.