Minor Amendment for the Safe Harbor Agreement for the Northern Spotted Owl

between

Oregon Department of Forestry and the U. S. Fish and Wildlife Service

in the Oregon Coast Ranges Study Area for the Barred Owl Removal Experiment

September 2019

1. INTRODUCTION

The U.S. Fish and Wildlife Service (USFWS) is conducting a Barred Owl Removal Experiment to test benefits to the threatened northern spotted owl (spotted owl) by implementing Recovery Action 29 of the 2011 Revised Recovery Plan for the Northern Spotted Owl (USFWS 2011). The experiment will be conducted on two study areas in Oregon, one in the Oregon Coast Ranges west of Eugene, Oregon, and one in the forest lands around Canyonville, Oregon. While the experiment is focused on Federal lands, the Oregon Coast Ranges Study Area contains interspersed state and private land including lands managed by Oregon Department of Forestry (ODF). Through this Safe Harbor Agreement, ODF will contribute to the implementation of the experiment on the Oregon Coast Ranges Study Area by allowing the researchers legal access to and through lands managed by ODF ("ODF lands") in the Oregon Coast Ranges Study Area for both barred owl surveys and subsequent removal work. This information and access is crucial to efficient and effective implementation of this experiment. Information from this experiment is critical to the development of a long-term management strategy to address the barred owl threat to the spotted owl.

1.1 Background on the barred owl effect on spotted owls

Because the Safe Harbor Agreement is specific to the implementation of the Barred Owl Removal Experiment, understanding the approach and value of the experiment is important to understanding the conservation value of the agreement.

The USFWS noted in their Final Environmental Impact Statement (FEIS) for the experiment that spotted owl populations have been declining for many years, particularly in the northern part of their range (USFWS 2013a, p. 325). Spotted owl populations on the Cle Elum Demography Study Area in the Washington Cascades declined 85 percent between 1990 and 2012. In the Oregon Coast Ranges, spotted owl populations fell by 73 percent between 1997 and 2012. Even in southern Oregon, on the Klamath Demography Study Area, spotted owl populations have declined 45 percent from 2002 to 2012. Some of the declines are likely driven by habitat loss, but not all areas experienced significant declines in habitat during these decline timeframes.

Many of these declines appear to correlate with the invasion by, and increase in, barred owls. Barred owls are not native to the Pacific Northwest, arriving from the East sometime after the 1950s. Recent spotted owl population demography analysis show that barred owls have a strong negative effect on spotted owl survival and colonization of new sites on some study areas (Dugger et al. 2016). (For more information on the background, see USFWS 2013a).

The maintenance and development of spotted owl habitat is important to the long-term conservation of the spotted owl, but habitat management alone will not recover the spotted owl. The effects of barred owl competition may overwhelm habitat management efforts in the short term, and may result in the extirpation of the spotted

owl from large portions of the range. Thus, management of barred owl populations in the Pacific Northwest is crucial to the conservation of the spotted owl.

As early as 2005, scientist, biologists, and managers began exploring options for managing barred owl competition with spotted owls (Buchanan et al. 2007). After several workshops and publications, the option that appears most likely to succeed was the removal of some barred owls in designated areas to increase spotted owl populations (Gutiérrez et al. 2007, Johnson et al. 2008). The USFWS identified the need to conduct an experiment to test this option in Recovery Action 29 of the 2011 Revised Recovery Plan for the Northern Spotted Owl.

In September 2013, the USFWS signed the Record of Decision to conduct experimental removal of barred owls to benefit spotted owls (USFWS 2013b). The experiment is being conducted on four study areas distributed across the range of the spotted owl, including the Oregon Coast Ranges Study Area where ODF lands are located. The experiment involves dividing each study area into treatment and control areas. Barred owls will be removed from the treatment areas and not from the control areas. USFWS anticipates that spotted owls will reoccupy historic sites that are currently unoccupied within the treatment area. Spotted owls reoccupying historic sites may be owls dispersing from sites either within or outside the treatment area, or they may be owls that have gone undetected within the treatment area that reestablish their historical territories when barred owl pressure is reduced. In these cases, spotted owl populations will increase in the treatment area. Spotted and barred owl population trends in the control area are not anticipated to change as a result of the experiment.

To conduct the experiment, researchers will survey the entirety of each study area for barred owls. Barred owls were initially removed from the treatment portion of the study area during the non-breeding season (approximately September to March). A protocol was developed allowing breeding season removal while avoiding orphaning dependent young and removal now occurs throughout the year. Ongoing spotted owl surveys conducted under the Northwest Forest Plan Monitoring program will continue. USFWS will use the data from these ongoing efforts to determine the effect that the removal of barred owls has on spotted owls.

ODF lands are intermingled with Federal and other lands on the Oregon Coast Ranges Study Area. ODF lands represent the single largest individual non-federal land base within the treatment area, making access to ODF lands necessary to obtain the most robust study results and realize the greatest operational efficiency. In the Oregon Coast Ranges Study Area, the experiment will be greatly enhanced by such access for barred owl surveys, and removal.

1.2 Goals and Objectives

1.2.1 USFWS goals and objectives

The goal of the USFWS is to contribute to the conservation of the threatened northern spotted owl by rapidly implementing experimental research in accordance with Recovery Action 29 of the Recovery Plan (USFWS 2011, p. III-65).

> The purpose of the experiment is to implement experimental research necessary for conservation of the spotted owl in accordance with Recovery Action 29 of the Recovery Plan (USFWS 2011, p. 111-65). This action should provide needed information regarding:
> - the effects of barred owls on spotted owl vital rates of occupancy, survival, reproduction, and population trend through experimental removal of barred owls;
> - the feasibility of removing barred owls from an area and the level of effort required to maintain reduced barred owl population levels for the duration of the experiment;
> - the cost of barred owl removal; and
> - the evaluation of this technique to contribute to developing future options for potential management of barred owls as expeditiously as possible.

The experiment will gather information essential to the development of a barred owl management strategy, thereby assisting the USFWS in implementing Recovery Action 30: Manage to reduce the negative effects of barred owls on spotted owls so that Recovery Criterion 1, a stable or increasing spotted owl population trend over 10 years, can be met.

1.2.2 ODF goals and objectives

The mission of ODF is to serve the people of Oregon by protecting, managing, and promoting stewardship of Oregon's forests to enhance environmental, economic, and community sustainability. In alignment with this mission, management of State Forest lands is specifically aimed to provide the "Greatest Permanent Value" to the citizens of the State of Oregon as provided for in Chapter 530 of the Oregon Revised Statues and further defined in Oregon Administrative Rule 629-035-0020. The definition of Greatest Permanent Value includes the protection, maintenance, and enhancement of habitat for native wildlife.

ODF recognizes the Barred Owl Removal Experiment is recommended by the Revised Recovery Plan, and implementation of this project has been initiated. ODF's ownership footprint and operational considerations within the Oregon Coast Ranges Study Area requires cooperation with USFWS to address management considerations regarding spotted owls.

ODF anticipates significant changes and fluctuations regarding spotted owl occupancy of well surveyed sites on lands in the treatment area after barred owl removal occurs. ODF seeks to avoid potential regulatory impacts to operation plans after barred owl removal in the treatment area occurs.

The purpose of ODF participation is to demonstrate good faith cooperation with USFWS regarding this recovery action without significantly affecting ODF ongoing and future management operations by maintaining a reasonable level of certainty regarding regulatory requirements impacting both forest operations and management during and after the experiment period.

1.3 Contents of this Safe Harbor Agreement

This Safe Harbor Agreement submitted in support of an Enhancement of Survival Permit (Permit) includes information about the following:

- Conservation measures, including baseline for the spotted owl within the Safe Harbor Agreement covered lands and actions that would be undertaken by ODF to support the Barred Owl Removal Experiment;
- Contribution to recovery of the spotted owl;
- Net conservation benefits;
- Assessment of incidental take during the term of the Safe Harbor Agreement;
- Monitoring and reporting requirements;
- Responsibilities of ODF and USFWS;
- Landowner assurances;
- Duration of the permit;
- Process for land additions, amendments, dispute resolution, and permit termination, transfer, and renewal; and
- Consistency of the Safe Harbor Agreement with applicable Federal, State, and county laws and regulations.

2 AUTHORITY AND PURPOSE

2.1 Regulatory Environment

2.1.1 Federal - ODF lands within the treatment area are currently managed to comply with the provisions of Section 9 of the ESA. Sections 2, 7, and 10 of the ESA allow USFWS to enter into this Safe Harbor Agreement. Section 2 of the ESA states that encouraging interested parties to develop and maintain conservation programs, through Federal financial assistance and a system of incentives, is a key to safeguarding the nation's heritage in fish, wildlife, and plants. Section 7 of the ESA requires USFWS to review programs that it administers and to use such programs to further the purposes of the ESA. By entering into this Safe Harbor Agreement, USFWS will use its programs to promote such conservation. Section 10(a)(1)(A) of the ESA authorizes the USFWS to issue enhancement of survival permits for listed species. This Safe Harbor Agreement is entered into pursuant to the Final Safe Harbor Policy (U.S. Department of the Interior and U.S. Department of Commerce 1999), Final Rule (U.S. Department of the Interior 1999), and Revisions to the Regulations for Safe Harbor Agreements and Candidate

Conservation Agreements With Assurances (U.S. Department of the Interior 2004), and implements the intent of the Applicants and the USFWS to follow the procedural and substantive requirements of section 10(a)(1)(A) of the ESA.

The purpose of this Safe Harbor Agreement is to facilitate the ability of USFWS, U.S. Geological Survey (USGS), and their contractors/agents to survey for and remove barred owls from ODF lands within the Oregon Coast Ranges Study Area and to provide assurances to ODF that, in allowing the USFWS to remove barred owls from ODF lands as part of the Barred Owl Removal Experiment, ODF will not be encumbered with additional regulatory requirements that may affect the management of their lands beyond the current baseline condition if spotted owls reoccupy currently unoccupied sites. By permitting the USFWS to do this work on its lands, ODF will contribute greatly to the strength and quality of data from this experiment. The information from this experiment is crucial for the development of a barred owl management strategy to support the conservation of northern spotted owls. Once all issuance requirements are met, ODF would receive a permit that authorizes incidental take of spotted owls that reoccupy currently unoccupied sites (defined below) as a result of the removal of barred owls under the experiment, should such take be likely to occur through future planned forest management activities during the permit term.

2.1.2 State of Oregon Forest Practices Act - In Oregon, the Forest Practices Act (ORS 527.610) identifies and regulates non-Federal forest practices. The rules specifically state that compliance with the forest practices rules does not substitute for or ensure compliance with the ESA and nothing in the rules imposes any state requirement to comply with the ESA. Landowners and operators are advised that federal law prohibits a person from taking certain threatened or endangered species, which are protected under the ESA.

2.1.3 State of Oregon Endangered Species Statutes – As a State agency, ODF complies with protection and conservation measures for State listed species as defined in ORS 496.182.

3 BACKGROUND

3.1 Description of Covered Area

This section describes the lands and species covered under the Safe Harbor Agreement and the species baseline conditions of ODF lands.

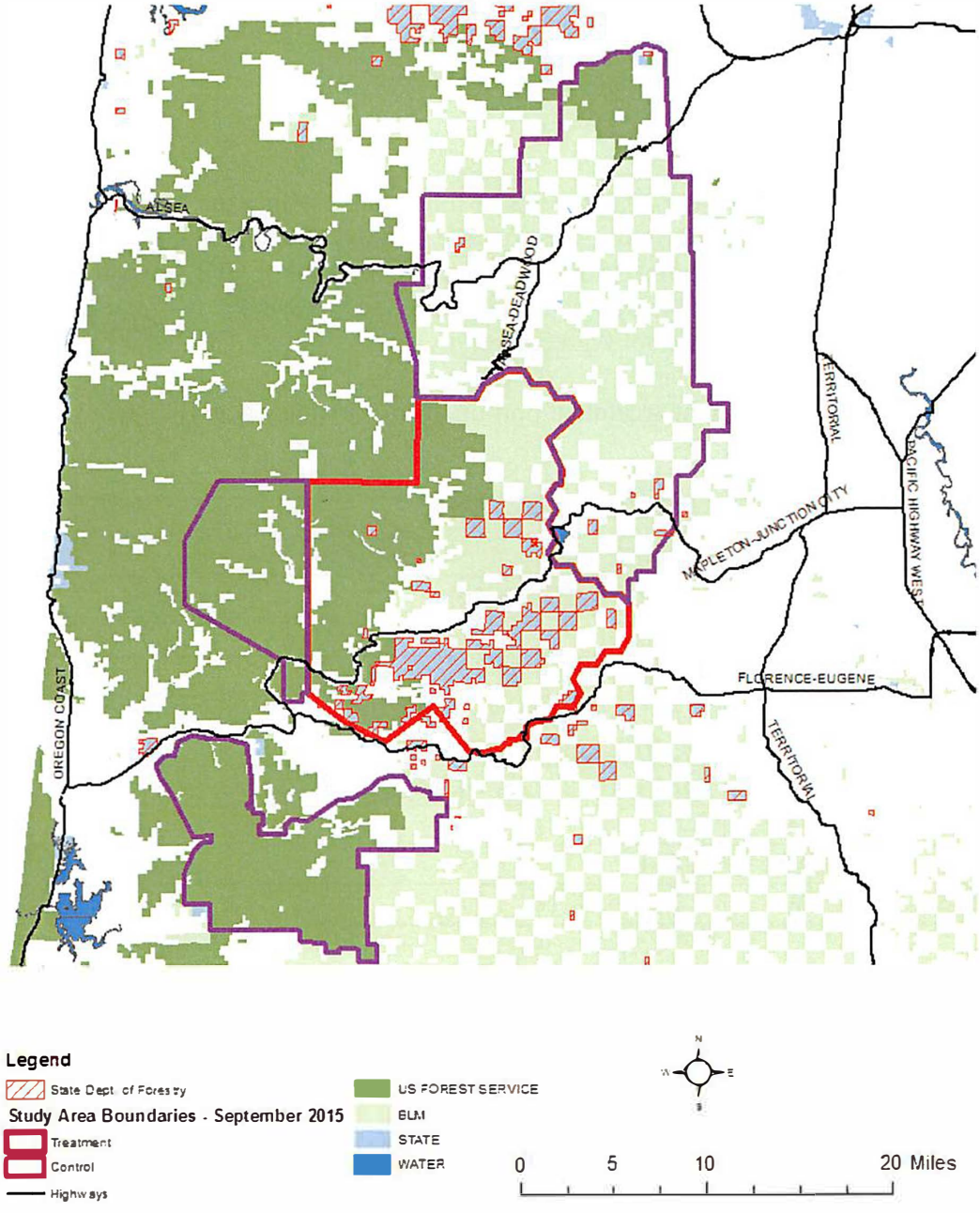
3.1.1 General Area

Oregon Coast Ranges Study Area: The Oregon Coast Ranges Study Area is located along the western coast of Oregon, west of Eugene and south of Highway 20 in Lincoln, Benton, Douglas, and Lane Counties (Map 1). The study area includes a total of 418,000 acres. Barred owl removal would occur on approximately 150,000 acres of the

total study area. This area is one of the eight long-term ongoing spotted owl demography study areas selected as part of Northwest Forest Plan Effectiveness Monitoring Program.

Map 1. Land ownership for Oregon Coast Ranges Study Area, including treatment and control areas, with ODF lands in the treatment area identified.

Land Ownership - Oregon Coast Ranges Study Area



The area consists of a mixture of Federal, State, and privately owned lands. The Siuslaw National Forest and Salem and Eugene Districts of the BLM administer approximately 67 percent of the study area. Oregon Department of Forestry includes 5 percent of the study area. The remaining 29 percent of the study area is in private ownership.

The treatment portion of the study area includes lands managed by the Siuslaw National Forest and Salem and Eugene Districts of the BLM, ODF, and other private landowners. Federal lands represent 57 percent of the treatment area, ODF lands represent 12 percent of the treatment area, and private lands represent 31 percent of the treatment area.

3.1.2 Covered Area

ODF manages approximately 20,000 acres of forest lands within the treatment portion of the Oregon Coast Ranges Study Area in Lane County, Oregon (Map 1). The lands within the treatment area comprise approximately 75 percent of ODF lands managed by the Western Lane District. All ODF lands within the sections listed in Table 1, column 3 are covered in this Safe Harbor Agreement.

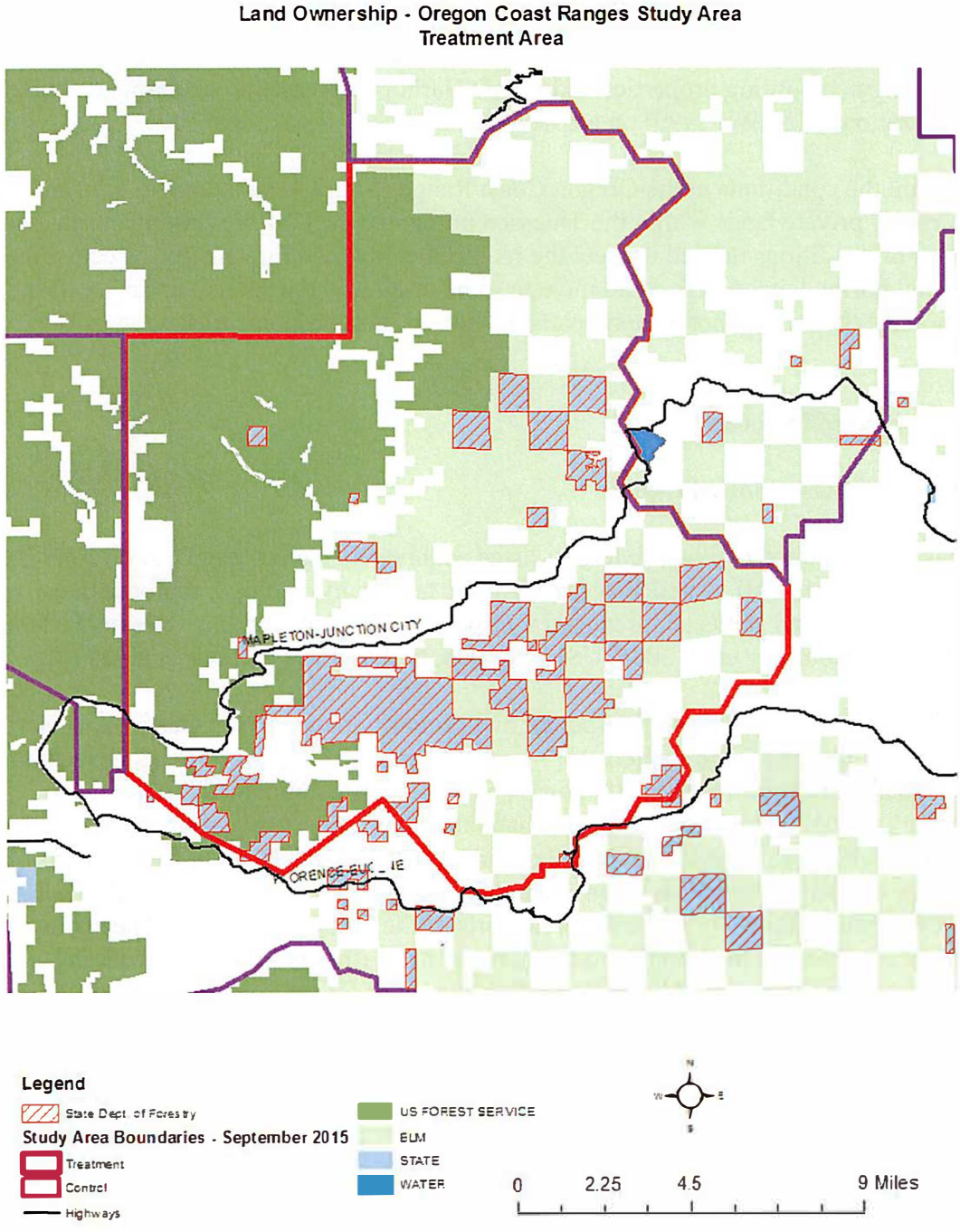
Table 1. Sections within the treatment portion of the Oregon Coast Ranges Study Area where ODF lands occur.

Location		
Township	Range	Sections with ODF ownership
16S	8W	10, 12, 14, 16, 24, 26
16S	9W	16, 25, 36
17S	7W	4, 6, 8, 10, 18, 19, 32
17S	8W	1, 6, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 22, 24, 26, 28, 29, 30, 31, 32
17S	9W	13, 14, 16, 22, 23, 24, 25, 26, 28, 32, 33
18S	7W	5
18S	8W	5, 6, 11
18S	9W	1, 2, 4, 5, 9, 10

3.1.3 Adjacent Landowners

In the treatment portion of the Oregon Coast Ranges Study Area, private lands are intermingled with Federal lands managed by the U.S. Forest Service and Bureau of Land Management, ODF Lands, various timber companies and small landowner-owned properties (Map 2). BLM and State lands are immediately adjacent to many of these lands in the treatment area.

Map 2. Ownership within the treatment portion of the Oregon Coast Ranges Study Area.



A flexible approach for non-participating neighboring landowners could contribute to increased enrollment by other landowners and ultimately increased conservation for the northern spotted owl. If removal of barred owls on lands covered by this Safe Harbor Agreement results in the re-occupancy of non-baseline spotted owl sites that affect neighboring private landowners not covered by a Safe Harbor Agreement or Habitat Conservation Plan, the USFWS will use flexibility as discussed in USFWS policy in addressing neighboring properties under Safe Harbor Agreements and associated take authorizations (USFWS 1999) on a case by case basis.

Based on the conditions in the Oregon Coast Ranges Study Area treatment area and location of private lands within the Thiessen polygons, the USFWS anticipates that any actions or conditions needed to meet the requirements of the Endangered Species Act for neighboring landowners could include some or all of the responsibilities listed in Section 5.1, but would not be anticipated to exceed these responsibilities.

3.2 Covered Species

3.2.1 Northern Spotted Owl

Status – The spotted owl was federally-listed as threatened under the ESA on June 26, 1990 (USFWS 1990a). Detailed accounts of the taxonomy, ecology, reproductive characteristics, and status and trends of the spotted owl are found in numerous Federal documents (Courtney et al. 2004, USFWS 2008, USFWS 2011, Davis et al. 2011).

The USFWS originally listed the spotted owl primarily because of widespread loss of suitable habitat across the spotted owl's range and the inadequacy of existing regulatory mechanisms to conserve the spotted owl. Past and current habitat loss continues to threaten the spotted owl, though loss of habitat due to timber harvest has been greatly reduced on Federal lands for the past 2 decades. Some populations of spotted owls continue to decline even with extensive maintenance and restoration of suitable habitat in recent years, especially in the northern parts of the subspecies' range. The spotted owl has become rare in British Columbia, much of Washington, and the northern coastal ranges of Oregon. Managing sufficient habitat for the spotted owl now and into the future is still considered essential for its recovery (USFWS 2011). However, securing habitat alone may not recover the spotted owl. Based on recent scientific information, competition from the barred owl poses a significant and complex threat to the spotted owl that will need to be further investigated.

On May 16, 2008, the USFWS announced the release of the Final Recovery Plan for the Northern Spotted Owl (USFWS 2008, entire). The Plan was revised in 2011. The Revised Recovery Plan (USFWS 2011, entire) identified past habitat loss, current habitat loss, and competition from the recently arrived barred owl as the most pressing threats to the northern spotted owl (USFWS 2011, p. I-6.). Concern for the effects of competition from barred owls resulted in 10 recovery actions in the Revised Recovery

Plan, including Recovery Action 29 – Design and implement large-scale control [removal] experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival and Recovery Action 30 – Manage to reduce the negative effects of barred owls on spotted owls.

The Revised Recovery Plan states, "Barred owls reportedly have reduced spotted owl site occupancy, reproduction, and survival. Limited experimental evidence, correlational studies, and copious anecdotal information all strongly suggest barred owls compete with spotted owls for nesting sites, roosting sites, and food, and possibly predate spotted owls.... Because the abundance of barred owls continues to increase, the effectiveness in addressing this threat depends on action as soon as possible" (USFWS 2011, p. III-62). Given the continuing range expansion and population growth of barred owl populations in the western United States and concurrent decline in northern spotted owl populations, information on the effectiveness of a removal program is urgently needed.

Recovery Action 29 focuses on acquiring the information necessary to help identify potential effective management approaches and contribute to future decisions on the implementation of appropriate management strategies for barred owls. It proposes experimental removal of barred owls on a scale sufficient to determine if the removal would increase spotted owl site occupancy and improve population trends (USFWS 2011, pp. III-62, III-65), which in turn would contribute toward recovery of the species. Results from these experiments would be used to inform future decisions on potential long-term management strategies for barred owls.

Ecology – The current range of the spotted owl extends from southwest British Columbia through the Cascade Mountains, coastal ranges, and intervening forested lands in Washington, Oregon, and California, as far south as Marin County (USFWS 1990a, p. 26115). Northern spotted owls generally rely on structurally complex forest habitats because they contain the structures and characteristics required for nesting, roosting, foraging, and dispersal. These characteristics include the following: (1) a multi-layered, multi-species canopy dominated by large overstory trees; (2) moderate to high canopy closure; (3) a high incidence of trees with large cavities and other types of deformities; (4) numerous large snags; (5) an abundance of large, dead wood on the ground; and (6) open space within and below the upper canopy for flight (Thomas et al. 1990; USFWS 1990b).

3.3 Current Conditions

3.3.1 Northern Spotted Owl

Spotted owl population dynamics

Spotted owl populations have been monitored at eight long-term study areas on Federal lands in Washington, Oregon, and California and additional study areas on State, private, and Tribal lands during the same period. These studies were initiated between

1985 and 1991 (Lint et al. 1999, entire), and have continued through the present. Data from these areas have been analyzed and region wide analyses have been conducted approximately every 5 years with the most recent completed in 2014 (Dugger et al. 2016).

The 2014 analysis indicated that since monitoring began in the early 1990s, spotted owl populations declined 55-77 percent in Washington, 31-68 percent in Oregon and 32-55 percent in California (Dugger et al. 2016). In addition, population declines are currently occurring on study areas in southern Oregon and northern California that were previously experiencing little to no detectable decline through 2009 (Forsman et al. 2011). For the meta-analysis of all 11 areas combined, the analysis showed a 3.8 percent average annual decline during the 20 plus year time period, which is an increased rate of decline (3.8% vs. 2.9%) from previous meta-analysis conducted in 2009 (Forsman et al. 2011).

In 2014, an occupancy analysis was added to the demographic analyses. Over the period from 1993-2013, modeled occupancy estimates showed 44 to 74 percent, 22 to 47 percent and 32 to 37 percent declines in spotted owl occupancy in Washington, Oregon and California, respectively (Dugger et al. 2016). As demonstrated in the individual study area annual reports, the empirical occupancy rates across individual territories have been in decline for years on most of the areas throughout the range of the northern spotted owl. Factors likely influencing occupancy included competition with barred owls and/or the interactive effects of barred owls and habitat loss on a spotted owl territory (Dugger et al. 2016).

Threats

The northern spotted owl was listed as a threatened species under the ESA in June of 1990, primarily due to the widespread habitat loss throughout the subspecies' range. Since 1990, conservation efforts have focused primarily on securing forest habitat with characteristics essential for the spotted owl's survival.

In the initial listing, competition from the barred owl was identified as a potential threat, though the level of this threat was unknown. By 2004, scientists involved in the status review for the 5-year review of the spotted owl noted that the understanding of this [barred owl] threat has improved, raising it from an issue of concern to a primary threat of greater imminence. Scientists were convinced that Barred Owls are having a negative impact on Spotted Owls at least in some areas (Gutiérrez et al. 2004:7-43).

The 2008 Northern Spotted Owl Recovery Plan identified two predominant threats: increasing competition from barred owls, and habitat loss from timber harvest and fire. The 2011 Revised Recovery Plan confirmed barred owl competition as a predominant threat and noted that barred owls pose perhaps the most significant short-term threat to spotted owl recovery (USFWS 2011 p. II-4).

4 CONSERVATION AGREEMENT

4.1 Conservation Measures

4.1.1 Baseline

For the Safe Harbor Agreement, the baseline condition is defined as habitat that is supporting current resident spotted owls (as defined below) prior to any barred owl removal actions based on annual spotted owl surveys and forest stand/habitat information according to the following process. Thanks to continued monitoring of spotted owls on ODF lands as part of the ongoing spotted owl surveys conducted under the Northwest Forest Plan Monitoring program as well as surveys conducted directly by ODF, we have strong annual survey data for most of the area that may be included in the Safe Harbor Agreement, and can establish a baseline based on the estimated occupancy status of each spotted owl site.

Approach to defining baseline: All survey protocols to date include at least two years of survey data to make a firm determination of current spotted owl presence. Multiple years of data are even more important now as the spotted owl's response to the presence of barred owls may have reduced their propensity to respond to call surveys further. Therefore, for the purposes of this Safe Harbor Agreement, spotted owl sites on which annual surveys detected the presence of at least one resident spotted owl over the last three year period from 2013 through 2015 will be considered to support current spotted owls in the Oregon Coast Range Study Area and are identified as baseline sites.

Spotted owl sites on which annual surveys detected the presence of at least one resident spotted owl in 2011 or 2012 but did not have a response in 2013 through 2015 are considered to be recently-occupied sites that have high value for species' recovery and are identified as elevated baseline sites. This elevated baseline is a commitment to spotted owl conservation by ODF and is intended to be a valuable component of the net conservation benefit provided under Safe Harbor Agreement by conserving sites that would not otherwise be included in the baseline. Both baseline and elevated baseline sites are considered to be baseline sites under this agreement.

Currently occupied, recently occupied, and historic spotted owl territories are delineated by Thiessen polygons (Map 3). We used these territories to define spotted owl sites within the treatment area. To delineate the Thiessen polygons, biologists defined annual site centers (i.e. the most biologically important location from each year based on the following hierarchical ranking: 1) active nest, 2) fledged young, 3) primary roost location, 4) diurnal location, and 5) nocturnal detection) for each site. They used the Euclidean Allocation Distance tool in ArcGIS (ESRI 2011) to delineate a Thiessen polygon around all the annual center locations for each territory. Thus, the Thiessen polygon represents the cumulative area of use by a single or pair of spotted owls during the survey period (March to August). The Thiessen polygon encompasses all the annual territory center locations, and extends outward to a maximum of one half the median

nearest neighbor distance, or midway between the annual territory center locations of spotted owls occupying adjacent territories, whichever distance is shorter.

For ODF lands that lie outside of any Thiessen polygon, we examined habitat maps and forest inventory information, as well as general survey information, to determine if the area might be capable of supporting an undetected resident spotted owl.

Baseline: We analyzed data for all spotted owl sites on the treatment portion of the Oregon Coast Ranges Study Area. The determination of baseline status for the site applies to all areas within the established Thiessen polygon for that site. Spotted owl sites listed in Table 2 are baseline sites for the ODF Safe Harbor Agreement. These sites all have a response from at least one resident spotted owl between 2013 and 2015 and are located on or near (e.g. within 1.5 mi provincial home range radius) ODF lands.

Elevated Baseline: Sites in Table 3 have a response from at least one resident spotted owl in 2011 or 2012. These sites are considered elevated baseline sites. These recently-occupied sites are an important component of the net conservation benefit under this SHA.

Table 2. Baseline spotted owl sites for the ODF Safe Harbor Agreement.

BASELINE SPOTTED OWL SITES	
Master Site #	**Spotted Owl Site Name**
812	Barber Creek
776	East Taylor Creek
762	Failor Creek
160	Miller Creek
3553	Raleigh Creek
2721	Rock Creek
2723	San Antone Creek
3913	South Bear Creek
4680	Upper Greenleaf
4474	Upper Mcvey Creek
159	Walker Creek West

Table 3. Elevated Baseline spotted owl sites for the ODF Safe Harbor Agreement.

ELEVATED BASELINE SPOTTED OWL SITES		
Master Site Number	**Spotted Owl Site Name**	**Last Year With Spotted Owl Response**
2137	Bear Creek West	2012
0773	Cape Horn	2012
0524	Elk Mountain	2011
2549	January Creek	2012
2546	Knapp Creek	2011
2313	Lower Greenleaf	2010
4088	McVey Creek	2012
0519	Meadow Creek	2011
2722	Wheeler Creek	2011

Spotted owl sites on Table 4 have been well surveyed, and have not had any resident spotted owls found between 2011 and 2015. These sites would not be in the baseline for this Safe Harbor Agreement.

Table 4. Spotted owl sites that are not baseline sites, with Thiessen polygons that affect ODF lands.

NON-BASELINE SPOTTED OWL SITES		
Master Site Number	**Spotted Owl Site Name**	**Last year With Spotted Owl Response**
0779	Brush Creek	2008
2545	Chickahominy Creek	2010
4491	Chicken Creek	2010
2543	Druggs Creek	2009
0525	Greenleaf Creek	2006
4688	Iron Mountain	2007
3251	Lake Creek	2010
2552	Little Lake Creek	2007
3126	Lower Deadwood	2009
4492	Lower Nelson Creek	1998
2489	Misery Creek	2009
3554	Nelson Creek	2003
0814	Old Man Rock Canyon	2009
3362	Pat Creek	2007
0086	Upper Elk	2010
4686	Upper Hula	2006
4600	Upper San Antone	2008
0764	Velvet Creek	2008

Table 5. List of ODF lands outside of Thiessen polygons that USFWS has determined are not likely to support current spotted owls, and that are therefore, not considered baseline for the ODF Safe Harbor Agreement (non-baseline areas). This applies to all ODF lands outside of Thiessen polygons in the following sections.

Location		
Township	**Range**	**Sections**
16S	8W	10, 12, 14, and 24
16S	9W	16, 25, and 36
17S	7W	4, 6, 8, 10, 18, and 32
17S	8W	1, 6 10, 11, 12, 13, 14, 15, 16, 18, 19, 26, 28, 29, 30, 31, and 32
17S	9W	13, 14, 16, 23, 24, 25, 26, 28, 32, and 33
18S	7W	5
18S	8W	5, 6, and 11
18S	9W	4, 5, 9, and 10

4.1.2 ODF Contributions

To support the Barred Owl Removal Experiment, ODF will:

- Provide access (gate keys) and permission for USGS and USFWS biologists, or their contractors, to access ODF lands to survey barred owls throughout the Study Area. Surveys are conducted using digital callers from vehicles along improved roads or by walking unimproved, blocked, or decommissioned roads. Surveys for barred owls do not change the baseline condition of spotted owls and do not change any current limitations on ODF management as a result of spotted owl presence.

- Provide access to ODF roads and permission for USGS and USFWS biologists or their contractors to remove barred owls located on ODF lands within the treatment portion of the Study Area (Map 2).

- Provide permission for USGS and USFWS biologists or their contractors to use roads owned or managed by ODF to access sites for the removal of barred owls located on Federal lands, and any other lands for which USFWS has landowner permission to remove barred owls within the treatment area of the experiment.

- Provide historic and current spotted owl survey data in the study area. This includes data on presence, banding, and reproductive surveys, if available.

  Maintain habitat in the 70 acre core area to support nesting spotted owls that may reoccupy non-baseline sites and other areas outside of baseline (i.e. baseline and elevated baseline) Thiessen polygons during the nesting and rearing season (March 1 to September 30 of the year). The intent is to allow spotted

owls that initiate nesting to complete nesting and fledge young. The configuration of the 70 acre core habitat to be maintained will be determined with the technical assistance of the USFWS, based on the best habitat associated with nesting and roosting locations. At any time that biologists determine the pair is no longer nesting, this seasonal restriction would no longer be in effect. Determination of nesting failure will follow the methodology described in Appendix 1.

4.2 Contribution to Recovery

The 2011 Revised Recovery Plan for the Northern Spotted Owl identified competition from barred owls as one of the primary threats to spotted owls. In the Recovery Plan, 10 of the 33 recovery actions address the barred owl threat, including Recovery Action 29 concerning a barred owl removal experiment.

> Recovery Action 29: Design and implement large-scale control experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival.
>
> We [USFWS] believe removal of barred owls would provide benefits to spotted owls in the vicinity of the removal and may have larger population effects. Given the rapidity and severity of the increasing threat from barred owls, barred owl removal should be initiated as soon as possible in the form of well-designed removal experiments. These experiments will have the potential to substantially expand our knowledge of the ecological interactions between spotted owls and barred owls (Dugger et al. 2011) and the effectiveness of barred owl removal in recovering spotted owls. Removal experiments should be conducted in various parts of the spotted owl's range, including a range of barred owl/spotted owl densities, to provide the most useful scientific information (USFWS 2011, p. III-65).

4.3 Net Conservation Benefits

This Safe Harbor Agreement supports implementation of Recovery Action 29. As USFWS noted in developing the experiment, barred owl competition has the potential to result in continuing and increasing impacts to the spotted owl.

> "Although northern spotted owl populations have been declining for many years, the presence of barred owls exacerbates the decline. Recent studies (Olson et al. 2005, p. 918; Forsman et al. 2011, pp. 69-70, 75-76) have established negative relationships between barred owl presence and declines in spotted owl population performance across the range of the subspecies. This could result in the extirpation (local extinction) or near extirpation of the northern spotted owl from a substantial portion of their historical range, even if other known threats, such as habitat loss, continue to be addressed. Given the

> continuing range expansion and population growth of barred owl populations in the western United States and concurrent decline in northern spotted owl populations, information on the effectiveness of a removal program is urgently needed (USFWS 2013a (FEIS) p. xxiv)." As scientists note, "there are no grounds for optimistic views suggesting that Barred Owl impacts on Northern Spotted Owls have been already fully realized" (Gutiérrez et al. 2004:7-38)."

To develop a barred owl management strategy that will conserve spotted owls, the USFWS needs information on feasibility of potential management tools. Biologists and managers have identified barred owl removal as the most realistic and practical tool described to date for such management. Given the controversy around any removal of wildlife, particularly raptors, the USFWS needs clear and credible information on effectiveness and cost of removal as a management tool.

To gather the strongest, most credible information from a removal experiment, USFWS chose to conduct the Barred Owl Removal Experiment on ongoing spotted owl demography study areas, utilizing over a decade of pre-treatment data. While these study areas are focused on Federal lands in most cases, they still contain significant interspersed non-federal lands. To complete the experiment in the most efficient and complete manner, USFWS requires access on non-federal roads and the ability to remove barred owls on the non-federal lands within the treatment area. While the experiment may be possible without access to non-federal lands, failure to remove barred owls from portions of the treatment area could reduce the power of the experiment to detect any changes in spotted owl population dynamics resulting from the removal of barred owls and potentially extend the duration of the experiment. The USFWS has repeatedly indicated the need to gather this information in a timely manner. Failure to access non-federal lands could delay the results.

ODF lands are is the single largest non-Federal land base in the treatment area. Access to ODF lands in the treatment portion of the Oregon Coast Ranges Study Area is important to the efficient and effective completion of the Barred Owl Removal Experiment within a reasonable timeframe.

All of the currently occupied spotted owl sites are within the baseline and no take of these sites is authorized under this Safe Harbor Agreement. Additionally, all recently occupied sites are within the elevated baseline and no take of these sites is authorized under this Safe Harbor Agreement. There are 20 baseline and elevated baseline spotted owl sites associated with ODF lands within the treatment area (Table 2 and Table 3).

If barred owl removal does allow spotted owls to reoccupy sites that are not currently or recently occupied or other areas not associated with baseline sites (non-baseline), ODF will be allowed to take these spotted owls. It is highly unlikely that these sites would be reoccupied by spotted owls without the removal of barred owls because barred owls are currently excluding spotted owls from these areas.

The USFWS anticipates removing barred owls on the treatment portion of the study areas for four years and that scientifically credible results can be reached in these four

years. However, the Record of Decision (USFWS 2013b) for the experiment does allow for up to 10 years of barred owl removal if needed to reach significant results or for a shorter duration of removal if such results are achieved earlier. In all cases, the removal of barred owls on the study areas will end within 4 to 10 years. The USFWS anticipates that, once released from the removal pressure, barred owl populations will rebound to pre-treatment levels within three to five years. This is likely to result in the loss of the newly reoccupied sites. Therefore, any occupancy of these sites by spotted owls is likely to be temporary and short term.

Under this Safe Harbor Agreement, ODF will be authorized to take spotted owls on 18 non-baseline sites and the ODF lands outside baseline Thiessen polygons shown in Table 5 starting with the initial year of the study and extending for eight years after the removal of barred owls ceases. The permit will start on the date of issuance and will be in effect through August 31, 2026, except that for covered activities related to the harvest of timber sales in non-baseline sites and non-baseline areas outside of Thiessen polygons that are auctioned, sold and with a contract signed by ODF prior to August 31, 2026, permit coverage will extend to August 31, 2029. For the period beginning on September 1, 2026 through August 31, 2029, the only incidental take authorized by the permit will be for covered activities related to the harvest of timber sales that were auctioned and sold (with contract signed) by ODF prior to August 31, 2026.

Potential take occurring outside baseline areas as a result of both disturbance and habitat loss may have some effect on the study. Disturbance with no habitat loss is a temporary effect and is not anticipated to disrupt the spotted owl sites to a level that would affect the results of the experiment. Take resulting from habitat loss has longer term effects, and the degree to which it may affect the study depends on the amount of potential habitat loss compared to the condition of the spotted owl site.

Based on the information in Section 4.4, the removal of habitat from the ODF lands may result in the incidental take of spotted owls associated with up to 18 spotted owl sites, but only if these non-baseline sites are reoccupied during the experiment. While the take associated with this Safe Harbor Agreement could, in some cases, affect the re-occupancy of the site by spotted owls, the analysis of the results of the study can identify these effects because changes in habitat conditions can be included in the analyses. A lack of access to these lands could have a greater impact on the study results because barred owls would not be removed from these lands, thus maintaining breeding barred owls within the treatment area.

The primary conservation value of the Barred Owl Removal Experiment is the information it provides on the efficacy of removal as a tool to manage barred owl populations for the conservation of the spotted owl. This information is crucial to the development of a long-term barred owl management strategy, itself essential to the conservation of the spotted owl. Thus, the take of spotted owls on the temporarily-reoccupied sites is more than offset by the value of the information gained from the experiment and its potential contribution to a long-term barred owl management strategy. While take may occur on non-baseline sites, spotted owls that do reoccupy these sites will be detected given the comprehensive spotted owl surveys being

conducted as part of the Experiment, thus allowing the impact of barred owl removal on spotted owls to be rigorously evaluated. This Safe Harbor Agreement advances the recovery of the spotted owl.

4.4 Incidental Take - Northern Spotted Owl

There are a total of 113 current and historic spotted owl territories in the Oregon Coast Ranges Study Area, of which 34 directly overlap some portion of ODF lands and operation base in the treatment portion of the Study Area. The currently occupied sites listed in Table 2 and elevated baseline sites in Table 3 are part of the baseline. Incidental take will not be authorized for these spotted owl sites through the permit. The experimental removal of barred owls from the treatment areas are likely to result in some currently unoccupied (non-baseline) sites or areas outside of historic sites being reoccupied by spotted owls. Spotted owls that reoccupy these non-baseline sites or areas could be taken as part of ODF's ongoing forest operations and management activities. It is highly unlikely these sites would be re-occupied by spotted owls without the experimental removal of barred owls because barred owls are excluding spotted owls from these sites in most cases. It is also likely that these sites will become unoccupied again once the experiment ends and barred owls are allowed to expand into the treatment area again. These sites and areas are not baseline, and are listed in Table 4 and shown on Map 3.

Incidental take of spotted owls under this Safe Harbor Agreement would likely be in the form of harm from forest operation activities that result in habitat degradation, or harassment from forest management activities that cause disturbance to spotted owls. Incidental take in the form of harassment by disturbance is most likely to occur near former spotted owl nest sites if they become reoccupied. Harm and harassment could occur during timber operations and management that will continue during the permit term. ODF will perform routine harvest, road maintenance and construction activities, including rock pit development that may disturb spotted owls. The conditions of incidental take are described below.

If currently unoccupied sites are re-occupied by spotted owl pairs and those pairs initiate nesting, ODF will alter harvest unit configurations and potentially harvest scheduling necessary to maintain 70 acres of habitat in the nest stand either on or adjacent to ODF lands only during the nesting and rearing season (March 1 to September 30 of the year). The intent is to allow spotted owls that initiate nesting to complete their nesting and fledge young, so that these young may contribute to the spotted owl population. At any time that biologists determine the pair is no longer nesting, this seasonal restriction will no longer be in effect.

Beyond nesting spotted owl pairs, ODF may continue to conduct their normal forest operations and management activities, including removal of spotted owl habitat within the non-baseline spotted owl sites and other areas outside of baseline and expanded baseline Thiessen polygons. The permit authorizes the incidental take, via habitat removal or harassment of spotted owls, of spotted owls that may occupy the 18 non-

baseline sites (as defined by the Thiessen polygons) listed in Table 4 and areas outside of the Thiessen polygons shown on Table 5 and Map 3. Take would occur throughout the term of the permit.

The potential effect of the removal of spotted owl habitat under this Safe Harbor Agreement on the experiment depends on the amount of habitat lost relative to the available habitat. The 18 non-baseline sites in the treatment area (Table 4) where take is authorized under this Safe Harbor Agreement include varying amounts of ODF lands. ODF is a minor owner on 6 of these Thiessen polygons with less than 10 percent of the land ownership and less than 10 percent of the remaining nesting/roosting habitat on these sites.

On the remaining 12 sites, ODF lands comprise between 12 and 74 percent of the land and 31 to 84 percent of remaining nesting/roosting habitat within each Thiessen polygon. Some ODF lands within some of the Thiessen polygons are excluded from timber harvest for other resources (e.g. other threatened or endangered species). On 5 of the 12 sites, ODF lands available for harvest contain ≤25% of spotted owl nesting/roosting habitat. On the remaining 7 sites, 28 to 53% of remaining nesting/roosting habitat would be available for timber harvest. For ODF lands outside Thiessen polygons, only small amounts of nesting/roosting habitat are available and spotted owls are not anticipated to occupy these lands.

4.5 Monitoring and Reporting

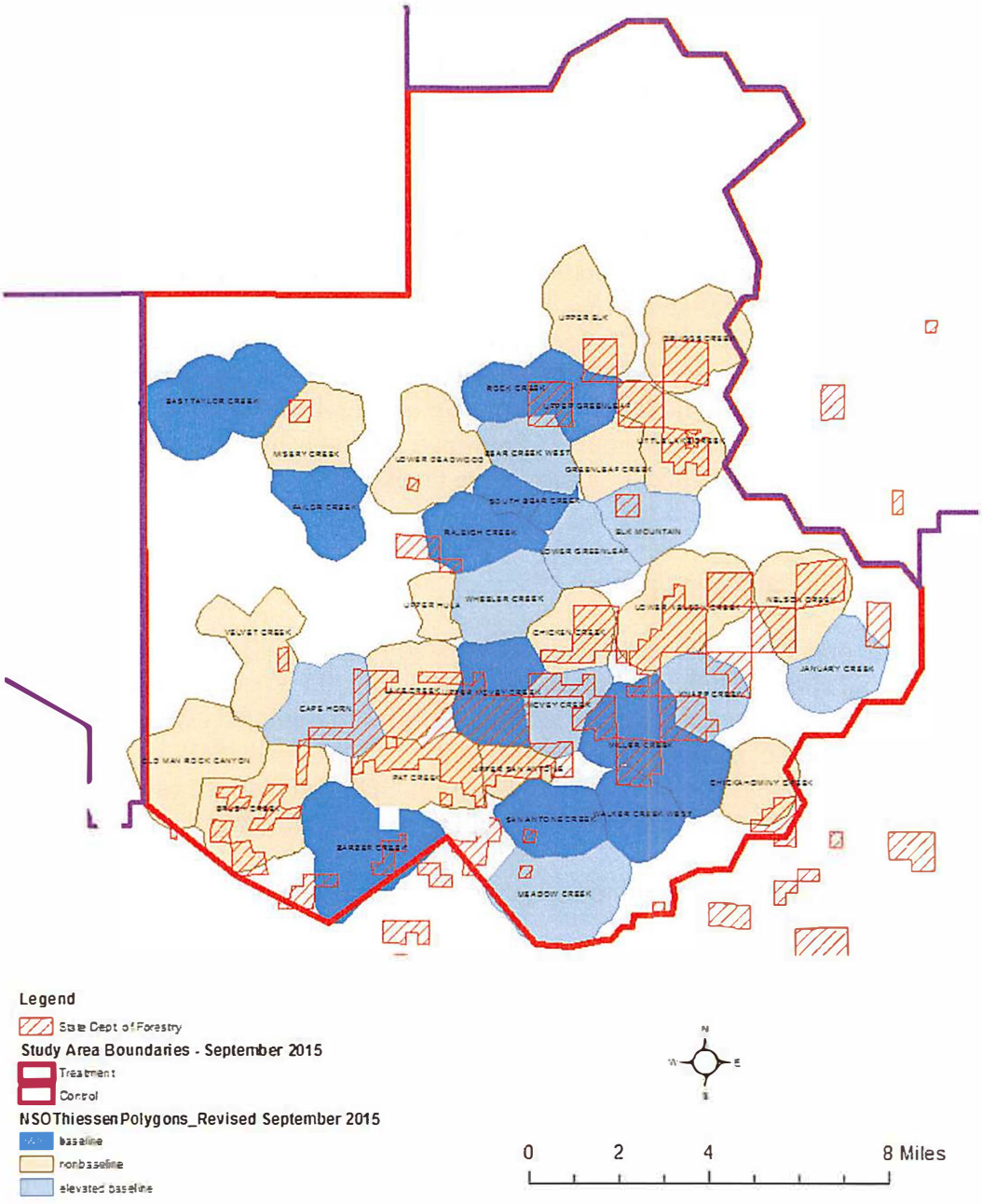
As part of the ongoing spotted owl demography studies and the Barred Owl Removal Experiment, all sites, including non-baseline sites, within the Study Area will be surveyed for spotted owls each year. Currently, most of the spotted owl surveys are conducted under the Northwest Forest Plan and the USFWS and USGS will access this data to track conditions on each spotted owl site. If ODF conducts surveys of spotted owls on the study area, USFWS and USGS will have access to these data.

ODF will provide the following information to USFWS annually by the first day of March:

- Data collected on ODF spotted owl Surveys within the study area, if any are conducted. The total amount of forest acres harvested within the treatment portion of the study area including location of harvest units, age class, and prescription.

Map 3. Baseline and non-baseline spotted owl sites, showing coverage of Thiessen polygons, in the treatment portion of the Oregon Coast Ranges Study Area.

Oregon Coast Ranges Study Area Baseline, Elevated Baseline, and Nonbaseline Spotted Owl Sites for the Oregon Department of Forestry Safe Harbor Agreement



ODF will provide the following information to USFWS annually by the first day of April:

- Planned harvest activities for the upcoming Annual Operations Plan.

USFWS or USGS will provide the following information collected on ODF lands to ODF annually by the first day of November.

- Barred owl survey data
- Number of barred owls removed
- Spotted owl survey data

5 RESPONSIBILITIES OF THE PARTIES

5.1 ODF Responsibilities

To support the Barred Owl Removal Experiment, ODF will:

5.1.1 Provide access (gate keys) and permission for USGS and USFWS biologists, or their contractors, to access ODF lands to survey barred owls throughout the Study Area through August 31, 2021.

5.1.2 Provide access to ODF roads and permission for USGS and USFWS biologists, or their contractors, to remove barred owls located on ODF lands within the treatment portion of the Study Area (Map 2) through August 31, 2021.

5.1.3 Provide permission for USGS and USFWS biologists or their contractors to use roads owned or managed by ODF to access sites for the removal of barred owls located on Federal lands, and any other lands for which they have landowner permission to remove barred owls within the treatment area of the experiment through August 31, 2021.

5.1.4 Provide historic and current spotted owl survey data in the study area. This includes data on presence, banding, and reproductive surveys, if available.

5.1.5 Maintain a 70-acre core in the nest stand to support nesting spotted owls that may reoccupy non-baseline sites and other areas outside of baseline Thiessen polygons during the nesting and rearing season (March 1 to September 30 of the year). The configuration of the 70 acre core habitat to be maintained will be determined in good faith by mutual agreement of the USFWS and ODF, based on the best habitat associated with nesting and roosting locations. At any time that biologists determine the pair is no longer nesting, this seasonal restriction would no longer be in effect. Determination of nesting failure will follow the protocol in Appendix 2.

5.2 U.S. Fish and Wildlife Service Responsibilities

5.2.1 Upon execution of the Safe Harbor Agreement and satisfaction of all other applicable legal requirements, USFWS will issue an enhancement of survival permit to ODF in accordance with ESA section 10(a)(1)(A), authorizing take of the covered species as a result of lawful activities on the enrolled property in accordance with the term of such permit.

5.2.2 The USFWS or USGS will provide annual reports on the activities within the covered areas to ODF.

5.3 Shared Responsibilities

5.3.1 ODF and USFWS will each ensure that their respective actions provided for or covered by the Safe Harbor Agreement are consistent with applicable Federal, State, and local laws and regulations.

5.3.2 Nothing in this Safe Harbor Agreement will be construed to limit or constrain ODF or USFWS, or any other entity from taking additional actions at its own expense to protect or conserve the covered species.

5.3.3 Nothing in this Safe Harbor Agreement will limit the ability of Federal and State conservation authorities to perform their lawful duties, and to conduct investigations as authorized by statute and by court guidance and direction.

5.3.4 ODF and USFWS will have all remedies otherwise available to enforce the terms of the Safe Harbor Agreement and the permit, except that neither will be liable in damages for: (1) any breach of this Safe Harbor Agreement; (2) any performance or failure to perform and obligation under this Safe Harbor Agreement; (3) termination of the permit or Safe Harbor Agreement; or (4) any other cause of action arising from this Safe Harbor Agreement.

5.3.5 ODF and USFWS agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by the parties.

6 LANDOWNER ASSURANCES

Through this Safe Harbor Agreement, USFWS provides ODF with assurances as specified in applicable federal regulations. These assurances depend on compliance with the obligations in the Safe Harbor Agreement and in the permit.

The assurances provided herein apply only to this Safe Harbor Agreement, only if the Safe Harbor Agreement is being properly implemented by ODF, and only with respect to the covered species.

7 IMPLEMENTATION

7.1 Safe Harbor Agreement Term

The term of the Safe Harbor Agreement and permit is 8 years from the cessation of barred owl removal on the Oregon Coast Ranges Study Area. The removal started in September 1, 2015, on the Oregon Coast Ranges Study Area. The permit will start on the date of issuance and will be in effect through August 31, 2026, except that for covered activities related to the harvest of timber sales in non-baseline sites and non-baseline areas outside of Thiessen polygons (Table 5) that are auctioned, sold and with a contract signed by ODF prior to August 31, 2026, permit coverage will extend to August 31, 2029. For the period beginning on September 1, 2026 through August 31, 2029, the only incidental take authorized by the permit will be for covered activities related to the harvest of timber sales that were auctioned and sold (with contract signed) by ODF prior to August 31, 2026.

7.2 Safe Harbor Agreement Renewal

Upon the mutual written agreement of the Parties, and compliance with all laws then applicable, the USFWS may extend the permit and the Safe Harbor Agreement beyond its initial term. If barred owl removal on the experiment extends beyond 2021, for a maximum of 10 years as described in the Record of Decision (USFWS 2013b), the USFWS would consider extending the permit for 5 additional years for all covered activities after the final removal season, and an additional 3 years for the harvest of timber sales in non-baseline sites and non-baseline areas outside of Thiessen polygons (Table 5) that are auctioned, sold and with a contract signed by ODF prior to August 31 of the fifth year following removal, based on continuation of the existing baseline.

The barred owl removal experiment may change the occupancy of spotted owl sites within the treatment area. The USFWS expects the return of barred owls within 3 to 5 years which will likely minimize this change. If a different removal program is initiated in this same area during the initial term of this Safe Harbor Agreement, or if barred owl populations do not recover as anticipated, the USFWS will consider extending this Safe Harbor Agreement using the same baseline under either of these circumstances. The USFWS will also consider extending this Safe Harbor Agreement if removal of barred owls is continued beyond the current Experiment. This may require an amendment of the Safe Harbor Agreement.

The first circumstance that may warrant consideration of an extension of the Safe Harbor Agreement might occur if, for example, a landowner or manager in the area decides to conduct removal as a mitigation measure for other impacts to spotted owls. This would require the project proponent apply for a separate Migratory Bird Treaty Act permit (as the experiment would be completed and the associated permit no longer in effect) and they would have to conduct any additional analyses required for the permit. The second case may occur if barred owl populations do not respond and

recover within 3 to 5 years as anticipated in the Final EIS and the USFWS extends the Experiment for additional years (USFWS 2013b, p. 172-3).

7.3 Safe Harbor Agreement Modifications and Amendments

Either party may propose minor modifications to the Safe Harbor Agreement by providing written notice to the other party. ODF and USFWS will have 30 days to evaluate proposed modifications. Minor modifications must be approved in writing by each party and may be approved only if the effect on covered species and levels of incidental take authorized are not materially different than those described in the original Safe Harbor Agreement. Other changes to the Safe Harbor Agreement will be treated as an amendment to the Safe Harbor Agreement and the Permit and will be processed in accordance with applicable Federal law.

7.4 Transfer of Safe Harbor Agreement Benefits

ODF agrees to notify USFWS in writing if ownership of all or a portion of the enrolled property is to be transferred to another owner. If ODF transfers full or partial ownership of the enrolled property, to the extent allowable under its regulations USFWS will regard the new landowner as having the same rights and obligations as ODF under this Safe Harbor Agreement, if the new landowner agrees, in writing, to become a Party to the original Safe Harbor Agreement, permit, and any subsequent amendments.

7.5 Land Acquisitions & Dispositions

ODF may enroll, at their discretion, new forest lands acquired within the boundary of the treatment portion of the Oregon Coast Ranges (Map 1) Study Area to the Safe Harbor Agreement. Baseline for new lands will be determined using the same approach as the original Safe Harbor Agreement, except that the determination of occupancy will include the five years previous to the land acquisition, not the years used in the initial baseline development. ODF must notify USFWS of the proposed inclusion of additional lands and USFWS will have an opportunity to review, establish the baseline, and concur or object. The USFWS will make a determination as to whether the inclusion of the lands would provide a net benefit to the species, would be consistent with the permit, and not increase the take authorized in the permit. In evaluating the net conservation benefit to the conservation of the spotted owl, the USFWS will consider how the inclusion of the lands complements and supports the totality of the experiment. The contribution will be considered in the context of ODF's entire contribution to the study, and not strictly on the value of specific parcels, consistent with the analysis described in section 4.3. Adding lands can be treated as a minor modification to the Safe Harbor Agreement and will not require an amendment of the permit if the amount of incidental take does not increase.

7.6 Safe Harbor Agreement Termination

ODF can relinquish this Safe Harbor Agreement by providing USFWS with 30 days written notice. ODF acknowledges that terminating the Safe Harbor Agreement will result in a corresponding termination of the permit and loss of the regulatory coverage provided by the Safe Harbor Agreement and permit for the covered species.

8 SIGNATURES

Elizabeth Dent
State Forests Division Chief
Oregon Department of Forestry

9/17/19
Date

Mary Abrams
Deputy Regional Director
Region 1, U.S. Fish and Wildlife Service

7 Oct 2019
Date

9 REFERENCES

Buchanan, J.B., R.J. Gutierrez, R.G. Anthony, T. Cullinan, L.V. Diller, E.D. Forsman, and A.B. Franklin. 2007. A synopsis of suggested approaches to address potential competitive interactions between barred owls (*Strix varia*) and spotted owls (*S. occidentalis*). Biological Invasions 9:679-691.

Courtney, S.P., J.A. Blakesley, R.E. Bigley, M.L. Cody, J.P. Dumbacher, R.C. Fleischer, A.B. Franklin, J.F. Franklin, R.J. Gutiérrez, J.M. Marzluff, L. Sztukowski. 2004. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute. Portland, Oregon. September 2004.

Davis, R.J., K.M. Dugger, S. Mohoric, L. Evers, and W.C. Aney. 2011. Northwest Forest Plan – the first 15 years (1994-2008): status and trends of northern spotted owl populations and habitats. Gen. Tech. Rep. PNW-GTR-850. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 147 pp.

Dugger, K.M., R.G. Anthony, and L.S. Andrews. 2011. Transient dynamics of invasive competition: barred owls, spotted owls, habitat, and the demons of competition present. Ecological Applications 21:2459–2468.

Dugger, K.M., E.D. Forsman, A.B. Franklin, R.J. Davis, G.C. White, C.J. Schwarz, K.P. Burnham, J.D. Nichols, J.E. Hines, C.B. Yackulic, P.F. Doherty., L. Bailey, D.A. Clark, S.H. Ackers, L.S. Andrews, B. Augustine, B.L. Biswell, J.Blakesley, P.C. Carlson, M.J. Clement, L.V. Diller, E.M. Glenn, A.Green, S.A. Gremel, D.R. Herter, J. M. Higley, J. Hobson, R.B. Horn, K.P. Huyvaert, C. McCafferty, T. McDonald, K. McDonnell, G.S. Olson, J.A. Reid, J. Rockweit, V. Ruiz, J.Saenz, and S.G. Sovern.2016. The effects of habitat, climate, and Barred Owls on long-term demography of Northern Spotted Owls. The Condor: February 2016, Vol. 118, No. 1, pp. 57-116.

ESRI (Environmental Systems Research Institute). 2011. ArcGIS Desktop: Release 10. Redlands, CA, USA.

Forsman, E.D., R.G. Anthony, K.M. Dugger, E.M. Glenn, A.B. Franklin, G.C. White, C.J. Schwarz, K.P. Burnham, D.R. Anderson, J.D. Nichols, J.E. Hines, J.B. Lint, R.J. Davis, S.H. Ackers, L.S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, S.A. Gremel, D.R. Herter, J.M. Higley, R.B. Horn, J.A. Reid, J. Rockweit, J. Schaberl, T.J. Snetsinger, and S.G. Sovern. 2011. Population demography of northern spotted owls: 1985–2008. Studies in Avian Biology No. 40.

Gutiérrez, R., M. Cody, S. Courtney, and D. Kennedy. 2004. Chapter seven: assessment of the potential threat of the northern barred owl. Pages 7-1 to 7-51 *in* S.P. Courtney, J.A. Blakesley, R.E. Bigley, M.L. Cody, J.P. Dumbacher, R.C. Fleischer, A.B. Franklin, J.F. Franklin, R.J. Gutiérrez, J.M. Marzluff, and L.

Sztukowski. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute, Portland, Oregon.

Gutiérrez, R.J., M. Cody, S. Courtney, and A.B. Franklin. 2007. The invasion of barred owls and its potential effect on the spotted owl: a conservation conundrum. Biological Invasions 9:181–196.

Johnson, D.H., G.C. White, A.B. Franklin, L.V. Diller, I. Blackburn, D.J. Pierce, G.S. Olson, J.B. Buchanan, J. Thrailkill, B. Woodbridge, and M. Ostwald. 2008. Study designs for barred owl removal experiments to evaluate potential effects on northern spotted owls. Unpublished report, Washington Department of Fish and Wildlife, Olympia.

Lint, J., B. Noon, R. Anthony, E. Forsman, M. Raphael, M. Collopy, and E. Starkey. 1999. Northern spotted owl effectiveness monitoring plan for the Northwest Forest Plan. U.S. Forest Service, Pacific Northwest Research Station General Technical Report PNW-GTR-440, Portland, Oregon.

Olson, G.S., R.G. Anthony, E.D. Forsman, S.H. Ackers, P.J. Loschl, J.A. Reid, K.M. Dugger, E.M. Glenn, and W.J. Ripple. 2005. Modeling of site occupancy dynamics for northern spotted owls, with emphasis on the effects of barred owls. Journal of Wildlife Management 69:918–932.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. Report of the Interagency Scientific Committee to address the conservation of the northern spotted owl. May 1990. U.S. Department of Agriculture Forest Service, U.S. Department of Interior Bureau of Land Management, Fish and Wildlife Service, and National Park Service. Portland, Oregon. 427 pp.

U.S. Department of the Interior [USDI]. 2004. Safe Harbor Agreements and Candidate Conservation Agreements with Assurances: Revisions to the Regulations. Final Rule. Fish and Wildlife Service. Federal Register 69:24084-24094. May 3, 2004.

USFWS (U.S. Fish and Wildlife Service). 1990a. Endangered and Threatened Wildlife and Plants; determination of threatened status for the northern spotted owl. Federal Register 55:26114-26194. June 26, 1990.

USFWS (U.S. Fish and Wildlife Service). 1990b. The 1990 status review: northern spotted owl: Strix occidentalis caurina. U.S. Fish and Wildlife Service, Portland, Oregon. 95 pages.

USFWS (U.S. Fish and Wildlife Service). 1999. Safe Harbor Agreements and Candidate Conservation Agreements with Assurances; Announcement of Final Safe Harbor Policy: Federal Register 64:32706-32726. June 17, 1999.

USFWS (U.S. Fish and Wildlife Service). 2008. Final recovery plan for the northern spotted owl, *Strix occidentalis caurina*. U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 2013a. Final Environmental Impact Statement for the Experimental Removal of Barred Owls to Benefit Threatened Spotted Owls. U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 2013b. Record of Decision for the Experimental Removal of Barred Owls to Benefit Threatened Spotted Owls. U.S. Fish and Wildlife Service, Portland, Oregon.

Appendix 1. Determination of Spotted Owl Site Nesting Failure

Protocol for determining if spotted owl nesting has failed where nesting status has been established using existing protocols. This would apply to spotted owl sites where monitoring surveys concluded that the pair was nesting. USFWS and ODF would mutually examine the data and determine whether the nesting attempt has failed for the year based on that data and the following approach.

Failure of nesting attempt:

To avoid undue disturbance to the spotted owls, conduct no more than 4 visits to determine continued nesting status.

Early Season – before June 1 (fledging). This is the period when the adults should still be tending the nest and the young should be near, if not in, the nest.

Failure of nesting determination is appropriate if, on 2 visits, separated by at least 1 week, between the initial determination of nesting and August 1 one of the following is found:

1. The female is observed roosting and away from the nest for at least 60 minutes on two occasions (Be aware that nesting females with large nestlings often roost outside the nest during warm weather.); **OR**.

2. Prey is offered to 1 or both members of the pair and they cache the prey, sit with prey for an extended period of time (60 minutes), or refuse to take additional prey beyond the minimum of 2 prey items. To be considered a valid nesting survey, an owl must take at least 2 prey items. Surveys where the bird(s) leaves the area with prey and it is not possible to determine the fate of the prey do not count toward the required 2 visits because nesting status could not be classified.

Mid-Season – Approximately June 1 to August 1. During this period, the young begin to move around and the adults range farther and farther to provision them. As the young get older, one parent (or even both) may end up roosting far from the nest site. Young are usually reasonably close to the nest at this time, moving more as they become better flyers.

Failure of nesting determination is appropriate if, on 2 visits, separated by at least 1 week, between the June 1 and August 1, the following is found:

Prey is offered to 1 or both members of the pair in the vicinity of the nest area and they cache the prey, sit with prey for an extended period of time (60 minutes), or refuse to take additional prey beyond the minimum of 2 prey items. To be considered a valid nesting survey, an owl must take at least 2 prey items.

Because at this time of year, young are likely still somewhere near the nest area, adults found far from the core area may not be inclined to take small prey to the young, especially during the day when temperatures are high. Therefore, failure of adults to

transport mice to the nest area, if they are a significant distance from that nest area is not evidence that the nesting attempt has failed.

During the **Late Season** (August 1 to September 30) adult spotted owls may not be roosting with the young, or take prey to young. There is no way to reliably determine whether the spotted owls are still feeding young. Therefore, nesting status cannot be reliably determined at this time. However, coupled with one of the above results, and after examination of the survey details, a determination may still be made by mutual agreement of USFWS and ODF.