

Browder, Chris@CALFIRE

From: Andrew Orahoske <andrew@wildcalifornia.org>
Sent: Monday, April 22, 2013 12:44 PM
To: mrc.hcpitp@noaa.gov; Sacramento Public Comment@CALFIRE
Cc: Browder, Chris@CALFIRE; 'John Hunter'; Valentine, Brad@Wildlife; 'Eric Shott - NOAA Federal'
Subject: MRC PTEIR / ITP/HCP NCCP - Request for extension of public comment period
Attachments: 041713agd.pdf; Northern Spotted Owl Petition Evaluation_1_22_2013.pdf; CESA NSO Petition.pdf



Dear Responsible Officials,

I am writing on behalf of the Environmental Protection Information Center (EPIC), a regional nonprofit environmental organization dedicated to the protection and restoration of forests, watersheds and wildlife in northern California.

EPIC respectfully requests that your agencies extend the public comment period for the proposed issuance of and incidental take permit to the Mendocino Redwood Company under the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA). Significant new information and changed circumstances during the pendency of the comment period require an extension of public comment to fully implement the letter and intent of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This new information also requires that the document be re-circulated under the provisions of CEQA.

One of the primary reasons to extend the public comment period is to take into account that the CA Fish and Game Commission is presently considering whether to list the Northern Spotted Owl as a threatened or endangered species under the California ESA. On April 17, 2013, the commission voted to delay its decision on whether to conduct a status review for 90 days. Upon accepting the petition, the Northern Spotted Owl will be listed as a candidate and afforded full protections under CESA during the pendency of the status review.

Given that the proposed ITP for the Mendocino Redwood Company would involve a significant amount of "take" of Northern Spotted Owls over several decades, the impending new protections under CESA will need to be analyzed in the environmental documentation. As you are already aware, NEPA requires that any threatened violation of state laws must be disclosed and analyzed. Presently, the environmental documentation for the issuance of the ITP as proposed does not disclose or analyze this significant new information.

Therefore, it would make sense for the responsible officials to extend the public comment period for at least 90 days. This would allow for events at the CA Fish & Game Commission to be more fully incorporated into any ultimate decision from your agencies.

Furthermore, given that the development of the proposed incidental take permit has taken more than 10 years, much of which occurred behind closed doors in private negotiations between the company and agency officials, it is extremely prejudicial to allow so little time for the general public to review the extensive documentation. Another 90 days of public review would only strengthen the analysis and would not in any way prejudice the permit applicant.

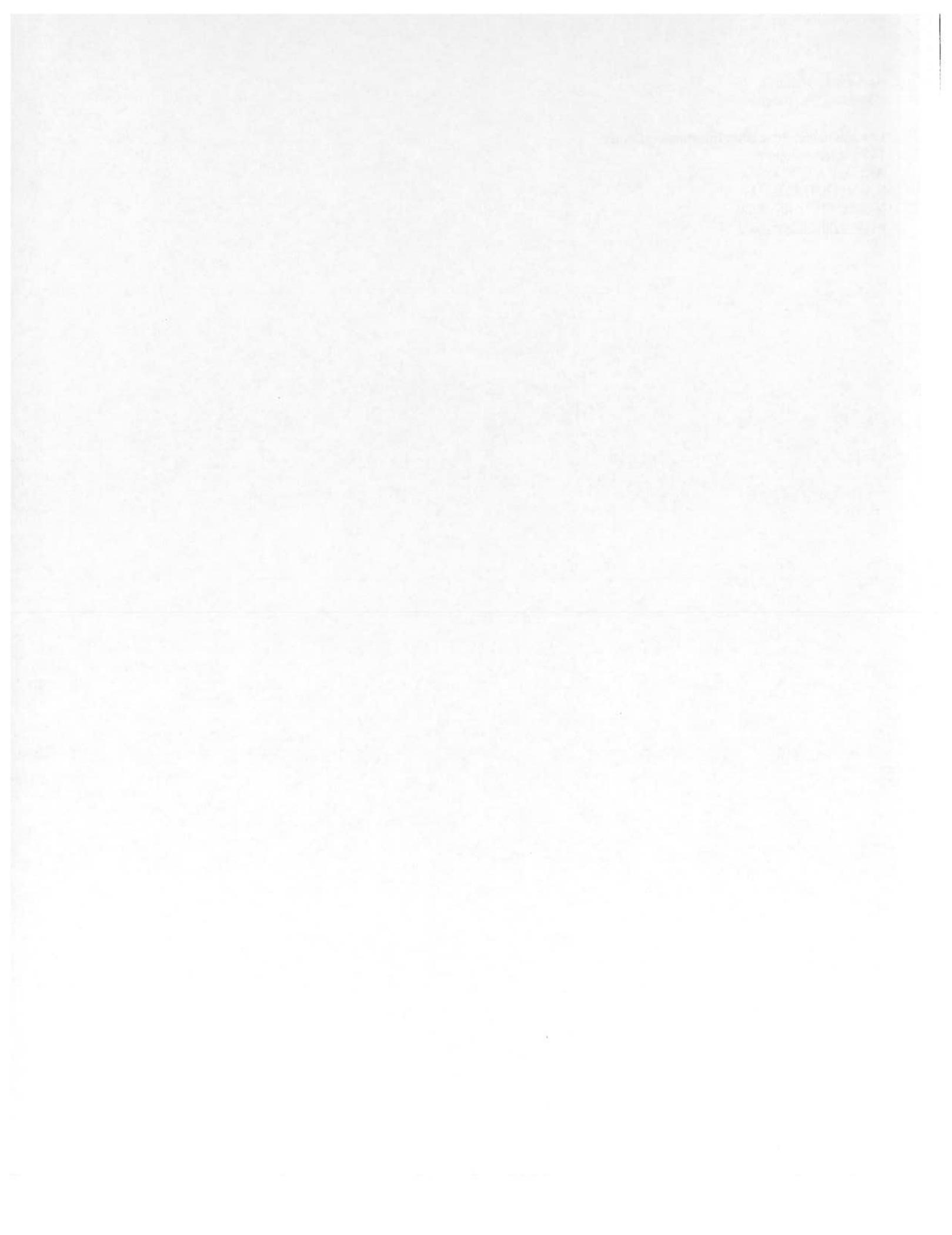
Please find attached, the CA Fish & Game Commission agenda from its April 17, 2013 meeting, as well as the EPIC petition to list the Northern Spotted Owl under CEQA and the CA Department of Fish and Wildlife's positive 90-day evaluation recommending a full status review.

I request the courtesy of a phone call regarding this matter as soon as possible. Thanks.



Andrew J. Orahoske
Conservation Director

Environmental Protection Information Center
145 G Street, Suite A
Arcata, CA 95521
Office: (707) 822-7711
Mobile: (707) 407-9020
www.wildcalifornia.org



**BEFORE THE STATE OF CALIFORNIA
FISH AND GAME COMMISSION**

**PETITION TO LIST THE NORTHERN SPOTTED OWL AS “THREATENED” OR
“ENDANGERED” UNDER THE CALIFORNIA ENDANGERED SPECIES ACT**



ENVIRONMENTAL PROTECTION INFORMATION CENTER

September 4, 2012



Notice of Petition

California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

The Environmental Protection Information Center (EPIC) hereby formally petitions the California Fish and Game Commission to list the northern spotted owl (*Strix occidentalis caurina*) as “threatened” or “endangered” pursuant to the California Endangered Species Act (CESA). California Fish and Game Code §§ 2050 *et seq.* This petition is filed under Sections 2072 and 2073 of the California Fish and Game Code and pursuant to Section 670.1, Title 14 of the California Code of Regulations which grants interested parties the right to petition for issue of a rule. This petition demonstrates that the northern spotted owl clearly warrants listing under CESA based on the factors specified in the statute.

This petition sets in motion a specific process placing definite response requirements on the California Fish and Game Commission and the California Department of Fish and Game and specific time constraints upon those responses. Petitioner certifies that all statements made in this petition are true and complete.

Petitioner:

Andrew J. Orahoske, Conservation Director
Environmental Protection Information Center
145 G Street, Suite A
Arcata, CA 95521

The Environmental Protection Information Center (EPIC) is a nonprofit organization that works to protect and restore ancient forests, watersheds, coastal estuaries, and native species in Northern California. EPIC’s members have a direct interest in the conservation of the forests that support Northern Spotted Owls on both public and private lands which contribute to the continued existence of this species. Consequently, EPIC seeks to promote sustainable, restoration-based forestry through education, outreach, litigation, advocacy, and collaboration.

www.wildcalifornia.org

Executive Summary

The Northern Spotted Owl (*Strix occidentalis caurina*) has been listed under the federal Endangered Species Act (ESA) as “threatened” since 1990. By definition, a threatened species is “. . . likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 16 U.S.C. §1531. Despite more than 20 years of protections, the northern spotted owl is now closer to extinction than ever. Recently, spotted owl biologists have published a comprehensive analysis that determined the species has been declining on seven of eleven active demographic study areas at about 3% annually range-wide from 1985-2008, and that the decline is accelerating in recent years (Forsman et al. 2011). The rate of decline is steepest in northern Oregon and Washington, where spotted owl populations would decline by more than half in the next 20 years. On the remaining federal lands, population decline is accelerating and vital rates are deteriorating (Forsman et al. 2011). On non-federal lands, including areas that once provided some of the highest quality habitat for spotted owls, declines are significantly greater than on federal lands, with vast areas no longer supporting any spotted owls at all. (Forsman et al. 2011, Anthony et al. 2006). The outlook for the northern spotted owl is dire based on the population trends, continued habitat loss, competition by the aggressive, invading barred owl, and the inadequacy of regulatory mechanisms, especially the lack of recovery efforts on state and private lands. This petition requests the U.S. Fish and Wildlife Service (USFWS) to acknowledge the best available science, and to act accordingly by changing the status of the northern spotted owl from “threatened” to “endangered” under the ESA.

The State of California has never acted to protect the northern spotted owl under the California Endangered Species Act (CESA). California Fish and Game Code §§ 2050 *et seq.* This is despite clear declines throughout the species range in California, as well as the remainder of the range. After listing the owl under the ESA, the USFWS and federal land managers developed a strategy, the “Northwest Forest Plan,” to recover the spotted owl by heavily relying on a selection of federal lands to shoulder the burden of conservation. The plan’s centerpiece was a network of habitat islands for spotted owls, termed “late-successional reserves” (LSRs). Unfortunately, the reliance on the Northwest Forest Plan meant that the conservation needs for spotted owls outside of the LSRs were largely ignored. This was especially true on state and private lands where spotted owls have been largely extirpated, with the remaining individuals in dire need of protections. The heavy reliance on fragmented reserves on federal lands without a comprehensive approach to spotted owl conservation on non-federal lands has proven to be a critical error, and one of the primary reasons why recovery has failed. Coupled with continued habitat loss is the very significant threat posed by the barred owl, which displaces spotted owls and thrives in the highly fragmented and simplified industrial forest landscapes.

It is now time for the State of California Fish and Game Commission to recognize its duties under CESA, and based on the overwhelming evidence, act swiftly to protect the northern spotted owl. Without a more holistic view of species recovery and landscape-scale conservation, the spotted owl is likely to go extinct in the foreseeable future.

Table of Contents

Notice of Petition	2
Executive Summary.....	3
I. Introduction.....	5
II. The Listing Process under the California Endangered Species Act.....	5
III. Biology and Ecology of the Northern Spotted Owl.....	7
A. Physical Description and Taxonomy	7
B. Range	7
C. Prey	10
D. Habitat Requirements.....	11
IV. Population Status	12
V. Nature, Degree and Immediacy of the Threat to Northern Spotted Owls in California.....	15
A. Present or threatened destruction, curtailment, or modification of habitat or range	15
1. Ongoing and Threatened Habitat Loss in California	16
2. Habitat Loss and the Decline of Preferred Prey Species.....	17
B. Disease or Predation.....	18
C. Predation.....	18
D. Inadequacy of Existing Regulatory Mechanisms.....	19
1. Non-federal Lands.....	19
2. Federal Lands	22
E. Other natural or manmade factors affecting the continued existence of the species.....	23
1. Barred Owl	23
VI. Recommended Management and Recovery Actions.....	25
VII. Conclusion.....	26
VIII. Literature Cited	27

I. Introduction

The northern spotted owl (*Strix occidentalis caurina*) is a subspecies of spotted owls that was listed as “threatened” under the federal Endangered Species Act (ESA) in 1990, due to widespread loss of suitable habitat and the inadequacy of existing regulatory mechanisms. (USFWS 1990). The State of California has never acted to protect the northern spotted owl under the California Endangered Species Act (CESA). California Fish and Game Code §§ 2050 *et seq.* This subspecies has a low reproductive rate, restrictive habitat requirements and specializes on a limited number of prey species. In this petition we summarize the evidence of population declines and ongoing threats that are well documented in recently published literature making the subspecies vulnerable to extinction (Forsman et al 2011, Courtney et al. 2004, 2008, Davis et al. 2011, Anthony et al. 2006, Noon and Blakesley 2006).

This petition, combined with recent extensive studies of spotted owls, and the extensive documentation provided to the Fish and Game Commission herein, leads to the conclusion that northern spotted owls should be listed as “threatened” or “endangered” under the CESA. The best available science clearly shows that threats faced by the northern spotted owl have increased since listing the subspecies as “threatened” in 1990, and that the owl has been extirpated or nearly extirpated in many portions of its range. In light of this overwhelming evidence, the northern spotted owl is presently in danger of extinction, as defined by the CESA.

II. The Listing Process under the California Endangered Species Act

The State of California enacted the California Endangered Species Act (CESA) in order to address and prevent the extinction of native biological diversity. The purpose of CESA is to “conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat...” Fish & Game Code § 2052. The first step under CESA is to identify and list species as “threatened” and “endangered.” A “threatened species” refers to a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts. Fish & G. Code § 2067. An “endangered species” refers to a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease. Fish & G. Code § 2062.

The California Fish and Game Commission (Commission) is the administrative body that makes all final decisions regarding the listing of species under CESA. The California Department of Fish and Game (DFG) is the expert agency that makes recommendations to the Commission regarding species listings. The listing process may be set in motion in two ways: “any person” may petition the Commission to list a species, or the Department may on its own initiative put

forward a species for consideration. "Petitions shall include information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant." Fish & G. Code § 2072.3. In the case of a citizen proposal, CESA sets forth a process for listing that contains several discrete steps.

Upon receipt of a petition to list a species, a 90-day review period ensues during which the Commission refers the petition to the Department, as the relevant expert agency, to prepare a detailed report. The Department's report must determine whether the petition, along with other relevant information possessed or received by the Department, contains sufficient information indicating that listing may be warranted. Fish & G. Code § 2073.5.

During this period interested persons are notified of the petition and public comments are accepted by the Commission. Fish & G. Code § 2073.3. After receipt of the Department's report, the Commission considers the petition at a public hearing. Fish & G. Code § 2074. At this time the Commission is charged with its first substantive decision: determining whether the Petition, together with the Department's written report, and comments and testimony received, present sufficient information to indicate that listing of the species "may be warranted." Fish & G. Code § 2074.2. This standard has been interpreted as the amount of information sufficient to "lead a reasonable person to conclude there is a substantial possibility the requested listing could occur." *Natural Resources Defense Council v. California Fish and Game Comm.* 28 Cal.App.4th at 1125, 1129.

If the petition, together with the Department's report and comments received, indicates that listing "may be warranted," then the Commission must accept the petition and designate the species as a "candidate species." Fish & G. Code § 2074.2. "Candidate species" means a "native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list." Fish & G. Code § 2068.

Once the petition is accepted by the Commission, then a more exacting level of review commences. The Department has twelve months from the date of the petition's acceptance to complete a full status review of the species and recommend whether such listing "is warranted." Following receipt of the Department's status review, the Commission holds an additional public hearing and determines whether listing of the species "is warranted." If the Commission finds that the species is faced with extinction throughout all or a significant portion of its range, it must list the species as endangered. Fish & G. Code § 2062. If the Commission finds that the species is likely to become an endangered species in the foreseeable future, it must list the species as threatened. Fish & G. Code § 2067.

Notwithstanding these listing procedures, the Commission may adopt a regulation that adds a species to the list of threatened or endangered species at any time if the Commission finds that there is any emergency posing a significant threat to the continued existence of the species. Fish & G. Code § 2076.5.

Despite the fact that the northern spotted owl has been threatened with extinction since the 1980's, and listed under the federal Endangered Species Act since 1990, the Commission has not protected the northern spotted owl under the California Endangered Species Act (CESA).

III. Biology and Ecology of the Northern Spotted Owl

A. Physical Description and Taxonomy

The northern spotted owl is a medium-sized owl and the largest of the three subspecies of spotted owls currently recognized by the American Ornithologists' Union (Gutierrez et al. 1995). It is dark brown with a barred tail and white spots on the head and breast, and has dark brown eyes that are surrounded by prominent facial disks. The taxonomic separation of these three subspecies is supported by numerous factors (Courtney et al. 2004), including genetic (Barrowclough and Gutierrez 1990, Barrowclough et al. 1999, Haig et al. 2004, Barrowclough et al. 2005) morphological (Gutierrez et al. 1995), behavioral (Van Gelder 2003), and biogeographical characteristics (Barrowclough et al. 1999).

B. Range

Historically, the northern spotted owl was found from British Columbia through western Washington, western Oregon, and northwestern California from Siskiyou County south to Marin County (American Ornithological Union 1957, Forsman 1976, Forsman et al. 1984, Gutiérrez et al. 1995). The ranges of the northern and California subspecies of spotted owls meet at the southern end of the Cascade Range, near the Pit River area in northern California (Thomas et al. 1990, USFWS 1992, Barrowclough et al. 1999, Haig et al. 2001).

Currently, the northern spotted owl is extirpated or nearly extirpated from a portion of its historic range. Populations in British Columbia are nearly extinct (COSEWIC 2008), and those in Washington have been extirpated or nearly extirpated in many areas, including most notably southwestern Washington and much of the Olympic Peninsula and Puget Sound where the owl has suffered particularly precipitous declines. Significant populations remain in southern Oregon, but in northwestern Oregon and much of the Oregon Coast Range the owl is nearly extirpated. And, in California, populations are declining in two of three long-term monitoring sites, while numerous historic territories have been lost from interior forests in California. The Revised Recovery Plan for the northern spotted owl states: "Many historical spotted owl site-centers are no longer occupied because spotted owls have been displaced by barred owls, timber harvest, or fires" (USFWS 2011). The California Department of Fish and Game maintains records of

spotted owl territories in the California Natural Diversity Database (CNDDDB). Detailed distribution maps of northern spotted owls are provided below.

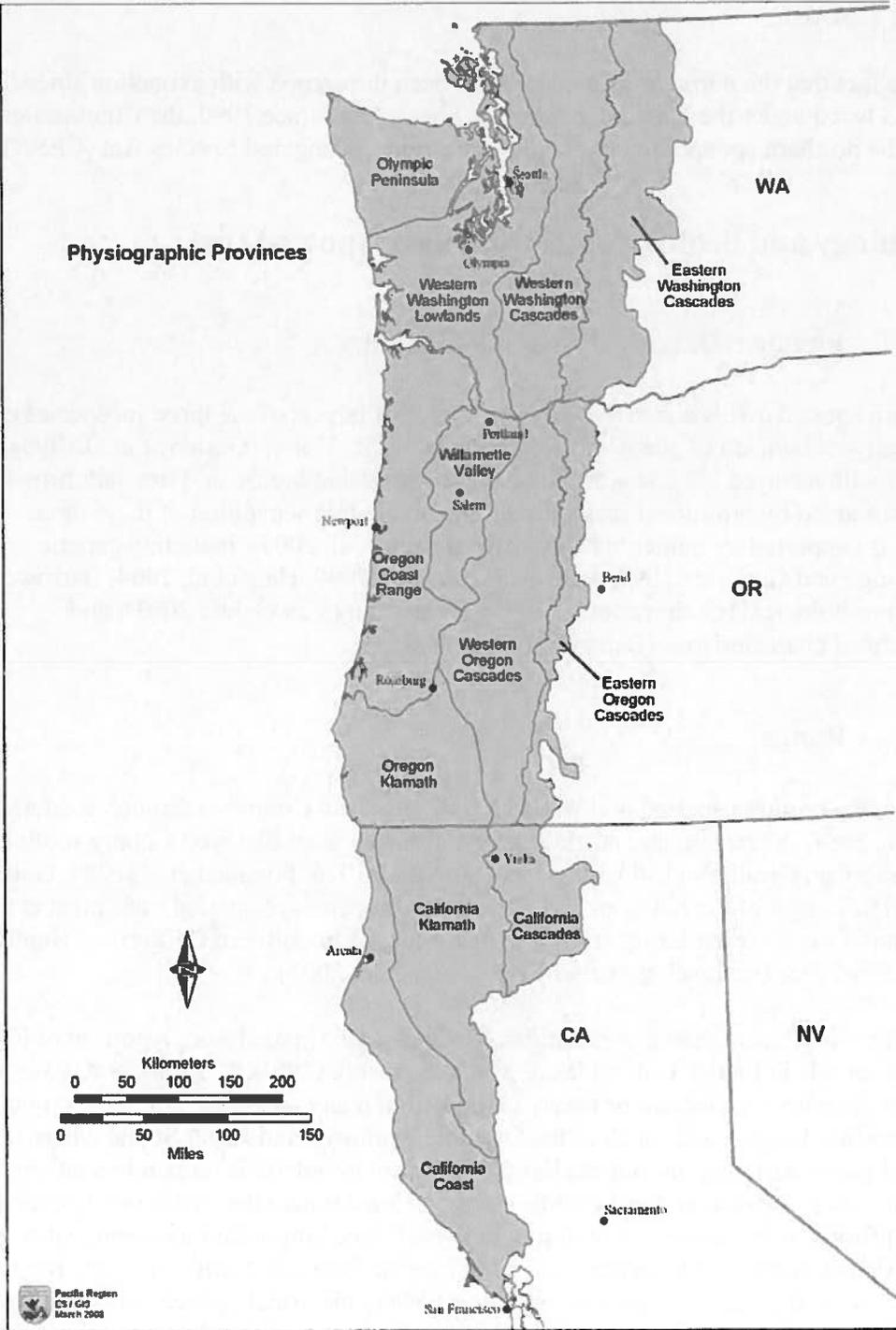


Figure 1: Overall range of the Northern Spotted Owl

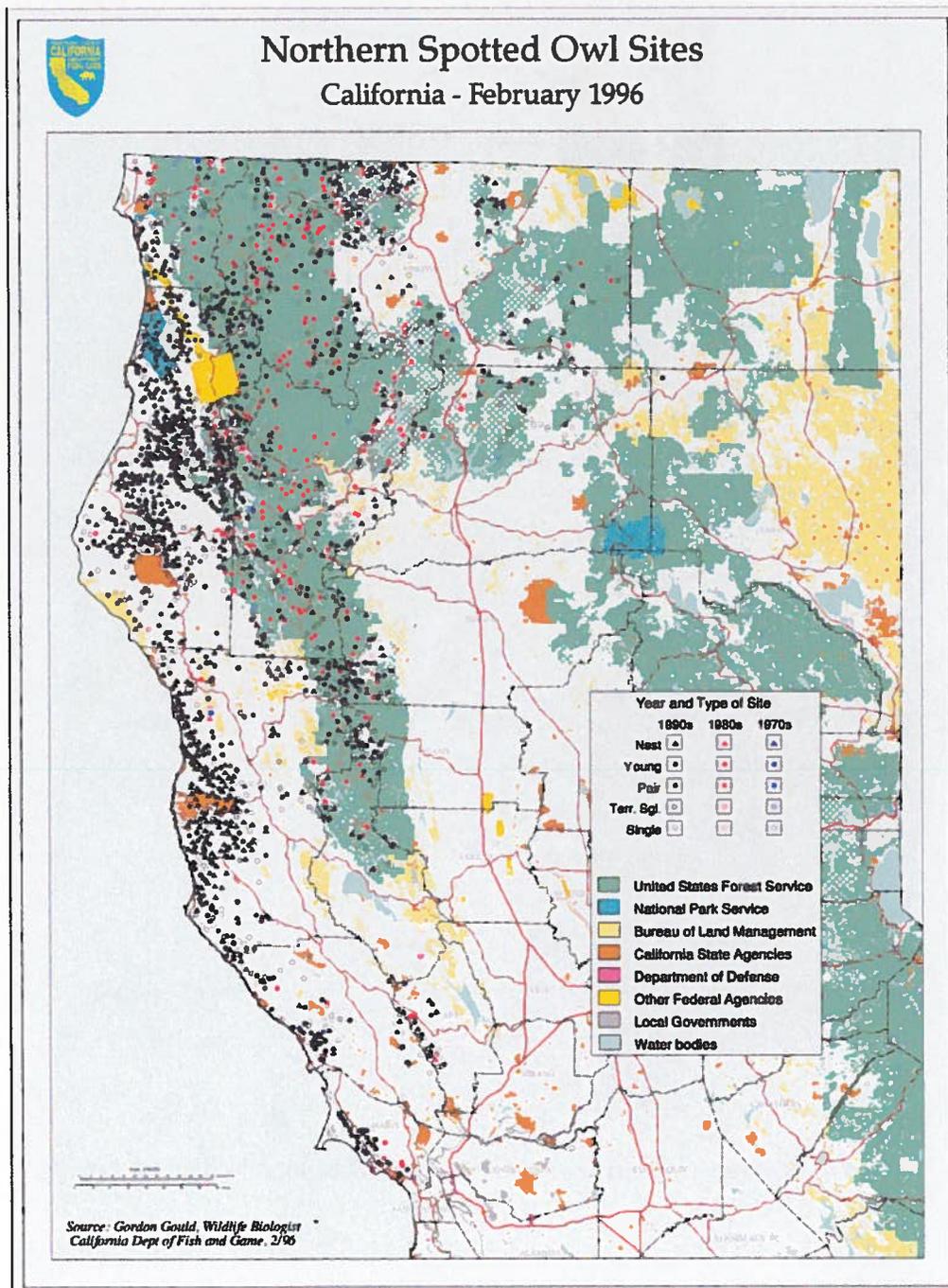


Figure 2: Northern Spotted Owl distribution in California (see legend for details).

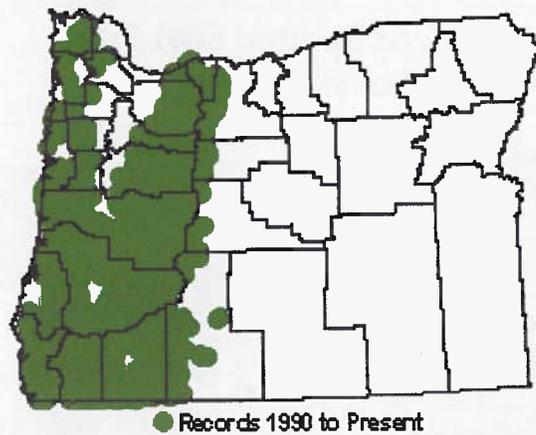


Figure 3: Northern spotted owl distribution in Oregon (green shaded area).

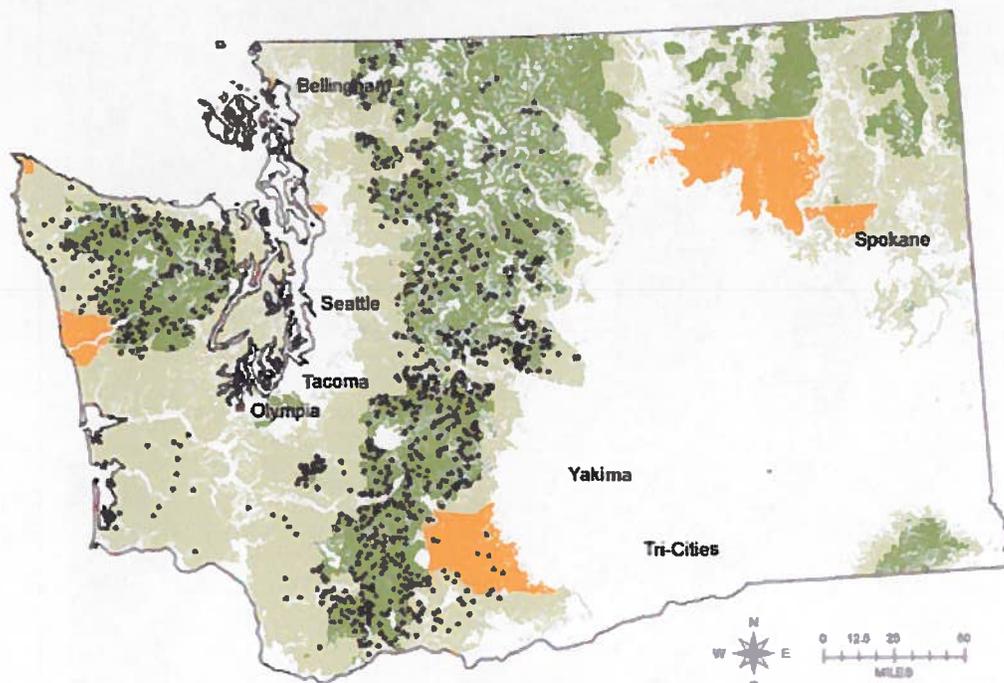


Figure 4: Northern Spotted Owl distribution in Washington (black dots).

C. Prey

Prey distribution and abundance plays a central role in the ecology of the northern spotted owl (Carey et al. 1992, Carey and Peeler 1995, Courtney et al. 2008). There is significant variation in the prey of the northern spotted owl across its range (Forsman et al. 2004, Courtney et al. 2008) and even within prey species, life history, and ecology vary geographically (Carey 2000, Lehmkuhl et al. 2006, Courtney et al. 2008). The northern portions of the owls' range lack several key prey species. For example, the red tree vole (*Aborimus longicaudus*) and dusky-footed woodrat (*Neotoma fuscipes*) are not found north of the Columbia River (Carey et al.

1992, Carey 1999). However, southern Oregon provides some of the best remaining northern spotted owl habitat. In the margins of river valleys such as those along the Umpqua River, both the number of prey species and their abundance reaches a peak. In these areas, prey biomass may be the highest in the owl's entire range (Carey et al. 1992, Carey 1999). Ecotones between areas of older hemlock and mixed conifer forests may have three abundant prey species—red tree vole, bushy-tailed wood rat (*Neotoma cinerea*), and northern flying squirrel (*Glaucomys sabrinus*). Valley margins in southern Oregon often have these three prey species plus dusky-footed wood rat in abundance.

Carey et al. (1992) estimated the effect of the number of available prey species on the area needed to support a pair of northern spotted owls. In Douglas-fir (*Pseudotsuga menziesii*) / western hemlock (*Tsuga heterophylla*) forests in the southern Oregon Coast Range, when flying squirrels and bushy-tailed woodrats were available, 1,000 ha of old growth within a 2,000-ha area was sufficient to provide a high expectation of a pair surviving for one year. In more diverse nearby mixed conifer forests, with flying squirrels, bushy-tailed wood rats, dusky-footed wood rats, and red tree voles, owls needed less than half the area reported elsewhere. Cary et al. (1992) estimated that 500 ha of old forest within a 2,000-ha range could support a pair of northern spotted owls with a high probability of surviving for one year. In northern California, dusky-footed wood rat provides a major part of the northern spotted owl's diet (Courtney et al. 2008). The red tree vole is found in northwestern most California and is replaced by the Sonoma vole (*Arborimus pomo*) farther south.

While Courtney et al. (2004, 2008) provide a more extensive review of the diet of the northern spotted owl, little is known about the abundance and variability of prey populations. Owl demographic rates and population size may be influenced by prey abundance (Korpimäki 1992, Rohner 1996, Hakkarainen et al. 1997). Much of the high variation in northern spotted owl demographic rates may be explained, at least partially, by variations in prey abundance (Courtney et al. 2004).

D. Habitat Requirements

The best available science shows that relatively large areas of structurally complex, older forests provide the habitat necessary to support viable populations of northern spotted owls (Forsman et al. 2011). Spotted owls generally rely on older forested habitats because such forests contain the structures and characteristics required for nesting, roosting, and foraging, and dispersal. Forest characteristics associated with spotted owls usually develop with increasing forest age, but their occurrence may vary by location, past forest practices, and stand type, history, and condition. Although spotted owl habitat is variable over its range, some general attributes are common to the owl's life-history requirements throughout its range. To support northern spotted owl reproduction, a home range requires appropriate amounts of nesting, roosting, and foraging habitat arrayed so that nesting pairs can survive, obtain resources, and breed successfully. In northern parts of the range where nesting, roosting, and foraging habitat have similar attributes, nesting is generally associated with increasing old forest in the core area (Swindle et al. 1999). In some southern portions of the range, northern spotted owl survival is positively associated with

the area of old forest habitat in the core, but reproductive output is positively associated with amount of edge between older forest and other habitat types in the home range (Franklin et al. 2000). This pattern suggests that where dusky-footed woodrats (*Neotoma fuscipes*) are the primary prey species, core areas that have nesting habitat stands interspersed with varied types of foraging habitat may be optimal for northern spotted owl survival and reproduction. Both the amount and spatial distribution of nesting, roosting, foraging, and dispersal habitat influence reproductive success and long-term population viability of northern spotted owls. Population growth can occur only if there is adequate habitat in an appropriate configuration to allow for the dispersal of owls across the landscape. This includes support of dispersing juveniles, as well as nonresident subadults and adults that have not yet recruited into the breeding population. The survivorship of northern spotted owls is likely greatest when dispersal habitat most closely resembles nesting, roosting, and foraging habitat, but owls may use other types of habitat for dispersal on a short term basis. Dispersal habitat, at a minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities.

Large areas of older, structurally complex forests provide the habitat necessary to support viable populations of northern spotted owls. Extensive studies have supported the strong association of northern spotted owls and older forests. Northern spotted owls select older forests for nesting (Hershey et al. 1998, Swindle et al. 1999) and roosting and foraging (Forsman et al. 1984, Bart and Forsman 1992, Thomas et al. 1990, Herter et al. 2002, Glenn et al. 2004, Forsman et al. 2005). Nest site occupancy also is related to the presence of mature and old-growth forests throughout the owls' range although the nature of this relationship varies (Carroll and Johnson 2008). On private lands in northwestern California, northern spotted owls usually occur in the oldest forests available (Diller and Thome 1999). Understory structure characteristic of late-successional habitat is also important for northern spotted owls and their prey (Carey et al. 1992, Rosenberg and Anthony 1992, Buchanan et al. 1995, LaHaye and Gutiérrez 1999, Lehmkuhl et al. 2006).

Recruitment is positively related to the proportion of older forest habitat in owl territories, and higher levels of recruitment have been observed on federal lands with high proportions of old forest habitat (Forsman et al. 2011). Other studies have documented lower reproduction in areas with less old forest habitat. For example, pairs produced fewer fledglings in areas with less than 20 percent old forest habitat (average = 0.33 fledglings/pair) than in areas with greater than 60 percent old forest habitat (average = 0.93 fledglings/pair) (Bart and Forsman 1992). Survival and fecundity are positively associated with the proportion of old forest surrounding nesting territories (Franklin et al. 2000, Dugger et al. 2005, Olson et al. 2004). In southern Oregon reproduction increased as the proportion of old forest within 730 m of activity centers increased (Dugger et al. 2005). Habitat may partially mitigate the effects of the invasive barred owl. The effects of barred owls increase with a decrease in old forest habitat (Dugger et al. 2011).

IV. Population Status

Forsman et al. (2011) determined that northern spotted owl populations declined on 7 of 11 study areas range-wide from 1985-2008. Overall population declines were documented throughout the range of the northern spotted owl at 2.9% annually, with estimates of population declines ranging from 5 to 15% in the Tyee, Klamath, Southern Cascades, and Hoopa study areas, and 40 to 60% in the Olympic, Cle Elum, Rainier, and Oregon Coast Range study areas (Forsman et al. 2011). See Table 1.

TABLE 1: Summary of trends in demographic parameters for northern spotted owls, from 11 study areas 1985-2008, adapted from Forsman et al. (2011).

Study Area	Fecundity	Apparent survival	Population trend
<i>Washington</i>			
Cle Elum	Declining	Declining	Declining
Rainier	Increasing	Declining	Declining
Olympic	Stable	Declining	Declining
<i>Oregon</i>			
Coast Range	Increasing	Declining since 1998	Declining
H.J. Andrews	Increasing	Declining since 1997	Declining
Tyee	Stable	Declining since 2000	Stationary
Klamath	Declining	Stable	Stationary
Southern Cascades	Declining	Declining since 2000	Stationary
<i>California</i>			
Northwestern California	Declining	Declining	Declining
Hoopa	Stable	Declining since 2004	Stationary
Green Diamond	Declining	Declining	Declining

Areas of primarily non-federal land support few or no owls and Forsman et al. (2011) state that too few northern spotted owls exist in these regions (i.e., southwestern Washington, the Coast Range of northwest Oregon, the California Cascades, and much of Washington's Olympic Peninsula) even to conduct a demographic study with their methods. It is likely that these declines will continue on both federal and especially on non-federal lands.

The effectiveness monitoring program of the NWFP confirms the dire trajectories reported in the studies discussed above. Analysis of data from government monitoring of owl populations on eight sites on federal lands (including sites in Washington, Oregon, and California) show a 2.8% decline per year. A 3.1% decline per year was calculated for the other three study areas (Davis et al. 2011). While these declines are dramatic, rates of decline are even more precipitous on non-federal lands (Anthony et al. 2006, Davis et al. 2011).

Funk et al. (2010) provide additional independent evidence that northern spotted owls continue to decline and document that the subspecies is experiencing a reduced effective population size. The loss of genetic variation in the spotted owl is an emerging threat not considered during the original listing. The evidence for recent genetic bottlenecks in northern spotted owls is based on a large genetic dataset. This study observes that the genetic bottleneck, in addition to field

evidence for demographic decline, highlights the increasing vulnerability of the northern spotted owl to extinction.

Demographic data from studies initiated as early as 1985 have been analyzed every 5 years to estimate northern spotted owl demographic rates and population trends (Franklin et al. 1999, Anthony et al. 2006, Davis et al. 2011, Forsman et al. 2011). The most current evaluation of population status and trends is based on data through 2008 (Forsman et al. 2011). Based on this analysis, populations on 7 of 11 study areas (Cle Elum, Rainier, Olympic Peninsula, Oregon Coast Ranges, H.J. Andrews, Northwest California, and Green Diamond) were declining (Forsman et al. 2011). Estimates of realized population change (cumulative population change across all study years) indicated that, in the more rapidly declining populations (Cle Elum, Rainier, and Olympic Peninsula), the 2006 populations were 40 to 60 percent of the population sizes observed in 1994 or 1995 (Forsman et al. 2011). Populations at the remaining areas (Tyee, Klamath, Southern Oregon Cascades, and Hoopa) showed declining population growth rates as well, although the estimated rates were not significantly different from stable populations (Forsman et al. 2011). A meta-analysis combining data from all 11 study areas indicates that rangewide the population declined at a rate of about 2.9 percent per year for the period from 1985 to 2006. Northern spotted owl populations on Federal lands had better demographic rates than elsewhere, but still declined at a mean annual rate of about 2.8 percent per year for 1985–2006 (Forsman et al. 2011). In addition to declines in population growth rates, declines in annual survival were reported for 10 of the 11 study areas (Forsman et al. 2011). Number of young produced each year showed declines at 5 areas (Cle Elum, Klamath, Southern Oregon Cascades, Northwest California, and Green Diamond), was relatively stable at 3 areas (Olympic Peninsula, Tyee, Hoopa), and was increasing at 2 areas (Oregon Coast Ranges, H. J. Andrews) (Forsman et al. 2011). The barred owl has emerged as a greater threat to the northern spotted owl than was previously recognized. The range of the barred owl has expanded in recent years and now completely overlaps that of the northern spotted owl (Crozier et al. 2006). The presence of barred owls has significant negative effects on northern spotted owl reproduction (Olson et al. 2004), survival (Anthony et al 2006), and number of territories occupied (Kelly et al. 2003; Olson et al. 2005). The determination of population trends for the northern spotted owl has become complicated by the finding that northern spotted owls are less likely to call when barred owls are also present; therefore, they are more likely to be undetected by standard survey methods (Olson et al. 2005, Crozier et al. 2006). As a result, it is difficult to determine whether northern spotted owls no longer occupy a site, or whether they may still be present but are not detected. The 2011 Revised Recovery Plan for the Northern Spotted Owl concludes that “barred owls are contributing to the population decline of spotted owls, especially in Washington, portions of Oregon, and the northern coast of California.” (USFWS 2011). British Columbia has a small population of northern spotted owls. This population has declined at least 49 percent since 1992 (Courtney et al. 2004), and by as much as 90 percent since European settlement (Chutter et al. 2004) to a 2004 breeding population estimated at about 23 birds on 15 sites (Chutter et al. 2004). Chutter et al. (2004) suggested immediate action was required to improve the likelihood of recovering the spotted owl population in British Columbia. In 2007, the Spotted Owl Population Enhancement Team recommended to remove spotted owls from the wild in British Columbia. Personnel in British Columbia captured and brought into captivity the remaining 16 known wild

spotted owls. Prior to initiating the captive-breeding program, the population of spotted owls in Canada was declining by as much as 35 percent per year (Chutter et al. 2004).

V. Nature, Degree and Immediacy of the Threat to Northern Spotted Owls in California

The following sections provide an overall summary of the threats to northern spotted owls throughout their range, including California. Taking all of the information together, it is clear that the species should be protected under CESA.

A. Present or threatened destruction, curtailment, or modification of habitat or range

The destruction of old-growth forests in the Pacific Northwest and northern California is the original reason why spotted owls are imperiled. The warning signs of extinction were first document in the 1970s, due to the heavy logging throughout the owl’s range, especially on many federal lands that had escaped logging up until that point. Lower elevation forests throughout Washington, Oregon and California were clearcut and substantial amounts of spotted owl habitat was high-graded by logging the biggest trees first (USFWS 1990). Many of these areas have never recovered to a point that they support spotted owls, particularly in southwestern Washington and the coast ranges of Oregon. The patchily distributed federal lands present in these regions are insufficient to provide sufficient habitat to recover spotted owls. Therefore, the spotted owl has been extirpated from large portion of its historic range and it is unlikely that the habitat on these predominantly private lands will be recovered in the foreseeable future. Management of federal lands, while improved from before ESA-listing, continues to allow the removal and degradation of spotted owl habitat, even areas deemed critical to their conservation. The Revised Recovery Plan even contemplates continued habitat losses with Recovery Action 32 (USFWS 2011). This action provides protections for “high quality” habitat but not for suitable owl habitat – as a result, ongoing losses are anticipated for nesting, roosting, foraging, and dispersal habitat that is not determined to be “high quality” by the action agencies or through consultation with USFWS.

According to the USFWS, spotted owl habitat losses have continued across ownerships despite the “threatened” listing (Moeur et al. 2005, Raphael 2006, Courtney et al. 2004). See Table 2.

TABLE 2. Spotted owl habitat losses across ownerships, 1994 to 2004.

Area (acres)	Time	Ownership	Cause	Description	Citation
16,900	1994 to 2003	Federal	Logging	older forest	Moeur et al. 2005
141,300	1994 to 2004	Federal and non-	Stand-replacing fire	owl habitat	Raphael 2006

		Federal			
155,999	1994 to 2003	Federal	Logging	owl habitat	Courtney et al. 2004
583,500	1994 to 2004	Non-Federal	Logging	owl habitat	Courtney et al. 2004

According to Campbell et al. 2010, over 50% of the state’s old-growth forests have been lost. From 1994 to 2003 in Oregon and Washington fragmentation of forests increased substantially, in some regions as high as five-fold (Davis and Lint 2005). Even if owl habitat has not been completely lost by clearcut logging, most other types of commercial logging remove important components of functional owl habitat. This simplification of forest ecosystems contributes the overall decline in habitat quality and the ability of owls to survive over the long-term. Within native forests with older-forest habitat, important components for owls and their prey such as standing dead trees, large down wood, multi-layered canopies, and other features have been lost throughout much of the owls’ range and are in short supply particularly on nonfederal lands mainly because of lax forest practices. In many places, it will take centuries for forests to recover their former productivity even with the Northwest Forest Plan, and other measures in place due to the extensive ecological debt in late-seral habitat (Strittholt et al. 2006).

1. Ongoing and Threatened Habitat Loss in California

Within California alone, EPIC has identified numerous logging proposals on both private and public lands that will destroy or degrade spotted owl habitat. For example, on private lands owned by Sierra Pacific Industries, EPIC has identified over 27 timber harvest plans (THPs) that are currently ongoing or proposed that will destroy over 7,000 acres of spotted owl habitat. See Table 3. We provide the supporting information for the identified Sierra Pacific THPs, including the owl and habitat survey data with this petition to the USFWS.

TABLE 3: Sierra Pacific Industries’ timber harvest plans (THPs) destroying northern spotted owl habitat in violation of the ESA Section 9 “Take” prohibition

THP number	THP Name	Spotted Owl Habitat Destroyed (acres)
1-09-054HUM	Roweisner	157
1-09-061HUM	Rerun	399
1-09-085HUM	Acer	371
1-10-025HUM	Green Mule	130
1-10-048HUM	Kragness	112
1-10-085HUM	Marvel	34
1-12-042HUM	Hiker’s Parade	724
2-09-010TRI	Hogs	83
2-09-038TRI	Wilcox	727
2-09-041TRI	Halls	227
2-09-042SHA	Derby	68

2-09-078LAS	Big Widow	123
2-09-085TRI	Bowman	91
2-09-091TRI	Lowball	64
2-10-011TRI	Dyno	403
2-10-019TRI	Ebert	321
2-10-074TRI	Ranger	189
2-10-075TRI	Hinke	22
2-11-004TRI	Llium	54
2-11-014TRI	3B's	138
2-11-035TRI	Bowtie	2
2-11-061TRI	Pappy	895
2-11-064TRI	Southern Star	271
2-11-070TRI	Thurman	426
2-11-076SHA	Tea Kettle	167
2-11-078SHA	Uncle	717
2-11-080TRI	Hay	173
		7088 acres destroyed in total

Notably, the ongoing destruction of northern spotted owl habitat by Sierra Pacific Industries is taking place without an incidental take permit as required under the ESA. Therefore, EPIC has formally notified Sierra Pacific Industries with letter of intent to sue over violations of the ESA (EPIC 2012). The Secretary and USFWS have been aware of this ongoing “take” since at least February 2012, but the federal authorities have failed to act. The overall habitat destruction on Sierra Pacific Industries and other private lands in northern California has resulted in the abandonment of dozens of historic spotted owl territories (USFWS 2009). Those that remain are mostly all severely deficient in suitable habitat, particularly nesting and roosting habitat made up of older forests.

2. Habitat Loss and the Decline of Preferred Prey Species

Northern Flying Squirrel

The northern flying squirrel northern flying squirrel (*Glaucomys sabrinus*) is an essential prey species for spotted owls, particularly in the Oregon and Washington. Carey (2003) determined that logging in forests of the Pacific Northwest and northern California has produced imbalanced mammal communities, with some species that were once common in natural forests (Carey, 1995; Carey and Johnson, 1995) no being low in abundance. In particular, northern flying squirrels are very rare in the industrial timber stands due to dense homogeneous tree plantations with simplified understory while also promoting excessively high and uniform chipmunk abundance (Carey 2003). Manning et al. (2011) determined that large-scale commercial thinning of Douglas-fir forests is detrimental northern flying squirrels, and brings into question many of the proposed thinning treatments in spotted owl habitat. A recent meta-analysis of effects of silvicultural practices on northern flying squirrels found that previous studies asserting a benefit or no effect of harvesting on squirrel populations lacked statistical power and support for those

assertions (Holloway and Smith 2011). The implication of Holloway and Smith's meta-analysis is that forest management practices that are currently widespread in the Pacific Northwest (thinning and clearcutting) have negative short-term and long-term impacts on northern flying squirrels (Manning et al 2011).

Tree Voles

Tree voles are small, mouse-sized rodents that live in conifer forests and spend almost all of their time in the tree canopy. Tree voles rarely come to the ground, and do so only to move briefly between trees. They are one of the few animals to persist on a diet of conifer needles, which is their principal food. Spotted owls in Oregon and California rely on heavily on tree voles as a main source of prey. Tree voles are endemic to the humid, coniferous forests of western Oregon and northwestern California. Recently, the USFWS has proposed listing the northwestern Oregon distinct population segment of red tree vole under the ESA. See 76 Fed. Reg. 198 (October 13, 2011). The status review found that despite federal protections afforded by the Northwest Forest Plan, that the red tree vole was threatened due to ongoing clearcutting and habitat destruction on private, state and federal lands. *Id.* The clear declines for red tree voles throughout the range of the spotted owl are another indication that the owl faces significant threats warranting an endangered listing.

B. Disease or Predation

West Nile Virus is a potential threat to the northern spotted owl (Blakesley et al. 2004). Large numbers of wild birds have been killed by West Nile Virus since its introduction in 1999 and subsequent spread across North America (McLean et al. 2001, Caffrey 2003, Marra et al. 2004, Blakesley et al. 2004). Owls are known to be susceptible to West Nile Virus (Fitzgerald et al. 2003) and a captive spotted owl has died of the virus (Gancz et al. 2004). In addition, recent examination of the rates of infection by blood parasites indicates that northern spotted owls have a high rate of infection by *Leucocytozoon* and other parasites (Ishak et al. 2008). In addition, a *Plasmodium* parasite was documented for the first time in a northern spotted owl. The observed discrepancy between prevalence of blood parasites in barred and spotted owls could be explained by a better host immune response to the parasites. This differential in blood parasite infection rates led Ishak et al. (2008) to speculate that barred owls on the West coast may have a competitive advantage over the potentially immune compromised spotted owls.

C. Predation

Northern spotted owls are subject to predation by great horned owls (*Bubo virginianus*), goshawks (*Accipiter gentilis*), and red tailed hawks (*Buteo jamaicensis*) (Forsman et al. 1984, Courtney et al. 2004). This natural predation has been severely exacerbated by the destruction and fragmentation of suitable habitat. Industrial forestry models across millions of acres of private lands that create dense tree plantations, coupled with ongoing habitat degradation on public lands has resulted in more open habitat suitable for predators of spotted owls (Courtney et

al 2004). Additionally, barred owls (*Strix varia*) physically attack (Livezey and Fleming 2007) and may prey upon spotted owls (Leskiw and Gutiérrez 1998). With the expansion of the barred owl's range (Livezey 2009) this source of predation is increasing.

D. Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms has been repeatedly cited as a primary threat to northern spotted owls for more than 20 years (USFWS 1990, Franklin and Courtney 2004, USFWS 2004, USFWS 2011). The primary inadequacies are the lack of protections for spotted owls on non federal lands, especially large swaths of industrial forestry lands controlled by a few large corporations. The regulatory inadequacies on non-federal lands were reviewed by DellaSala (2011) and categorized as follows: variable and often inadequate protection given to owls and owl habitat; lack of landscape-scale planning, especially on non-federal lands; use of survey protocols and other standards that fail to incorporate current relevant science; prevalence of discretionary guidelines and/or unclear or unsuitable direction; failure to consistently require involvement of personnel with biological expertise in evaluating/assessing ecological information. On federal lands and despite the protections afforded by the Northwest Forest Plan, insufficient protections and a lack of recovery planning outside of late-successional reserves continues to plague the agencies involved in forest management. This petition and supporting documentation clearly show that existing regulatory mechanisms have not prevented the continued decline of northern spotted owls since the 1990 ESA listing.

1. Non-federal Lands

Private and state lands managed for intensive timber production, employing clearcutting and short rotation, mono-culture and herbicide use have been largely overlooked by state regulators. Even though such practices were the primary reason for the original ESA-listing, this major cause of the spotted owl's decline and continued imperilment is simply not adequately addressed by existing laws and regulations. Most attention has focused on federal forest management, primarily because federal authorities have refused to prosecute ESA violations. Because the USFWS has abandoned its clear duties to prosecute "take" under the ESA, the lack of adequate regulations non-federal lands continues to pose a threat to northern spotted owls. Rather than issue protective regulations or prosecute violations of the ESA, the USFWS has allowed individual state agencies with conflicting missions to issue inadequate regulations in an attempt to create a façade of conservation. The following sections describe the regulatory approach and inadequacies for California, Oregon and Washington.

a) California

The California Forest Practices Rules ("CA FPRs") are the primary state regulations affecting the management of the spotted owl on private lands in California. These regulations implement the Z'berg Nejedley Forest Practices Act of 1973 (4 Pub. Res. Code Ch. 8). Unbelievably, the State of California has never listed the spotted owl under the state's own California Endangered

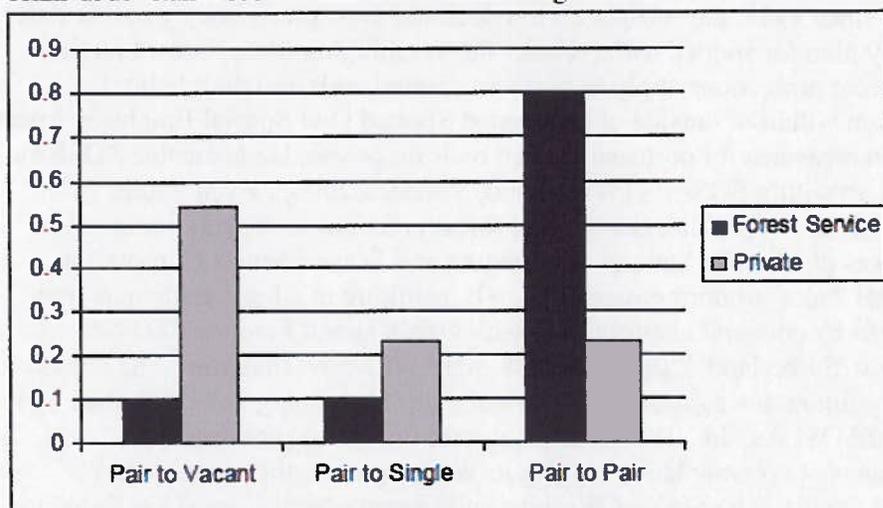
Species Act (CESA). Lacking any listing under CESA, the California Department of Fish and Game (CA DFG), the state agency charged with defending the public wildlife trust, is completely absent from conservation efforts. Therefore, the CA FPRs, as administered by the California Department of Forestry and Fire Protection (CalFire), are the state's only attempt at conserving spotted owls, and they are woefully inadequate. The CA FPRs require timber operators to prepare and submit a Timber Harvest Plan (THP) that is intended to serve as a substitute for the planning and environmental protection requirements of the California Environmental Quality Act of 1970 (Pub. Res. Code sections 21000-21177). The CA FPRs allow for the removal of spotted owl habitat below threshold guidelines for the avoidance of "take" set by the U.S. Fish and Wildlife Service (CA FPRs 2012, USFWS 2009).

The Yreka Field Office of the U.S. Fish and Wildlife Service completed an extensive analysis of the status of historical spotted owl activity centers on federal and private lands in interior northern California (USFWS 2009). The Service found that extensive losses of owl pairs occurred on private lands, which sharply contrasted with the persistence of owl pairs on federal lands. Yreka USFWS concluded:

To quantify the pattern of territory loss identified during the technical assistance process, we compared results of protocol surveys conducted at verified NSO territories supporting at least one year of occupancy by paired owls on Forest Service lands (N=196) with similar data from private timberlands (N=75) in Shasta and Trinity counties. The data set consisted of activity center status records in the California Department of Fish and Game's Spotted Owl Database (CDFG-NSO database), supplemented with territory locations and recent survey records received during technical assistance. We first evaluated the validity of activity center records in the CDFG-NSO database, and eliminated 18 sites on private lands due to lack of verification of status. The remaining 57 private-land activity centers had verified NSO status in at least one year between 1989 and 2007; 44 of these sites had supported pairs during at least one year. Of these verified pair sites, 54% declined from pair status to no response, and an additional 23% declined from pair status to a territorial single owl during subsequent protocol surveys (Figure I.B.1). On Forest Service-administered lands, 80% of pair sites did not change status during the same time periods. While we recognize that annual variation in survey effort and results at this relatively coarse scale of resolution may influence this type of analysis, the strong differences in trends observed on private versus federal lands supports the contention that management on private timberlands is creating habitat conditions that do not support sustained occupancy by NSO.

(USFWS 2009: 11-12). The Service also created the figure below to illustrate the results of their analysis. Clearly, the California Forest Practice Rules are completely inadequate to protect spotted owls on private lands.

Figure I.B.1. Status of valid historical northern spotted owl activity centers (pair sites only) when resurveyed after 5-10 years. Data are from U.S. Fish and Wildlife Service technical assistance records and USFS monitoring records



The application of the limited protections contained in the CA FPRs depends upon prior identification of areas as “activity centers.” If an activity center has not been identified, then no habitat protections nor surveys are required. In addition, the current database of activity centers is generally acknowledged to be out of date, poorly maintained, not well updated, and not reliable. Further, the definition of an “active nest site” or “pair activity center” in §919.9(g)(1-2) & 939.9(g)(1-2) (known as “Option G”) is not inclusive enough to apply to all the sites entitled to protection under the Endangered Species Act. For known activity centers, the CA FPRs “Option G” only requires that a minimum amount of general spotted owl habitat be maintained, and makes no distinction as to whether the habitat must be nesting, roosting or foraging habitat. This critical deficiency means that logging operations may result in the complete removal of nesting and roosting habitat from an activity center, and still comply with the rules so long as enough foraging habitat remains. This on-the-ground reality is why the USFWS has found most activity centers on private lands have been abandoned since the early 1990s.

b) Oregon

Only a nest site and 70 acres of adjacent habitat is protected in Oregon, and the Oregon Department of Forestry does not consider foraging habitat to be a specific resource site, and therefore it is not protected under the Oregon forest practice rules (Oregon Administrative Rules (OAR) 665, Oregon Forest Practice Act Rulebook 2010). Nothing contained within the state rules reflects the best available science regarding the habitat needs for spotted owls. Even though the species is listed under the Oregon Endangered Species Act, the state has not developed a regulatory mechanism adequate to protect, much less recover, northern spotted owl habitat and populations.

c) Washington

Although the northern spotted owl has been listed as “endangered” under the Washington State Endangered Species Act since 1988, the subspecies has declined most precipitously in this state. There is no state recovery plan for spotted owls. Under the Washington State Forest Practice Rules, significantly different protections apply to northern spotted owls and their habitat depending on their location within or outside of designated Spotted Owl Special Emphasis Areas (SOSEAs). Conservation measures for northern spotted owls on private lands outside SOSEAs are “substantially less” than within SOSEAs (Ward 2006, Sweeden 2006). Even within SOSEAs, the designation does not prohibit detrimental forest practices so long as some environmental review takes place. The State of Washington and Weyerhaeuser Corporation were prosecuted for illegal “take” of northern spotted owls, resulting in a legal settlement that created a working group to recommend changes to Washington’s Forest Practice Act. *See Seattle Audubon Society v. Sutherland*, 2:06-cv-01608-MJP, W.D. Washington. The federal court issued a preliminary injunction against further logging due to ongoing and threatened harm to spotted owls outside of SOSEAs. *Id.* The subsequent working group produced recommendations for changes to private lands logging in Washington to the state’s forest practice board (Berg et al. 2009). The State of Washington’s forest practice board has failed to act on those recommendations to the present day, and therefore spotted owls are still lacking adequate protections.

2. Federal Lands

While protections and conservation strategies are much better than on private and state lands, federal land management still poses many problems for spotted owls. All federal lands within the range of the northern spotted owl are currently managed under the provisions of the Northwest Forest Plan (“NWFP”). The NWFP was adopted in 1994, and it amended land management planning documents for nineteen National Forests and seven Bureau of Land Management districts throughout Washington, Oregon and California. The NWFP established a late-successional reserve (LSR) network and specified management standards and guidelines to further the recovery of northern spotted owls.

The 15-year report on the NWFP performance for spotted owls was recently released and it plainly shows that the plan is simply not enough to recover the species (Davis et al. 2011). The NWFP was based on overly optimistic assessments of spotted owl demographic performance (Franklin et al. 1999, Anthony et al. 2006). Demographic studies (Franklin et al. 1999, Anthony et al. 2006, Forsman et al. 2011, Davis et al. 2011) have demonstrated that the population declines are much greater rate than was anticipated across their range and particularly in Washington. In light of this decline, the Forsman et al. (2011) stressed the importance of retaining high quality owl habitat: “[i]n view of the continued decline of Spotted Owls in most study areas, it would be wise to preserve as much high quality habitat (i.e., late-successional forests) for Spotted Owls as possible, distributed over as large an area as possible.”

The NWFP protected some of the remaining high quality owl habitat, but not the entirety of remaining high quality owl habitat was protected. In addition, recent estimates have shown that

only about 36% of late-successional reserves actually include late-successional forests, with the majority of the designated reserves expected to acquire such conditions over decades (Strittholt et al. 2006). Similarly, recent scientific literature suggests that the limited, bare minimum approach taken by the NWFP is inadequate to stabilize populations. Of particular note is the omission of all remaining nesting, roosting, and foraging habitat from reserves. While qualifying as late-seral the remaining nesting, roosting, and foraging habitat may not meet the standards of high quality habitat implicit in the Revised Recovery Plan (USFWS 2011). Thus, important owl habitat on federal lands will remain vulnerable to ongoing logging at a time when owl populations are declining more rapidly than anticipated, and risks are increasing from presumed competitive pressures from barred owls.

The NWFP noted that “certain thinning and salvage activities would be allowed in the reserves,” however, thinning or other silvicultural treatments inside reserves theoretically are authorized “only if those treatments are beneficial to the creation of late-successional forest conditions” (USDA Forest Service and USDI BLM 1994). Some studies have indicated that spotted owls are somewhat resilient to low to mid-severity fire effects (Clark 2007, Bond et al. 2009). However, post-fire logging is often employed after fires, and a bigger threat to owls (Clark 2007, Bond et al. 2009, Hanson et al. 2010). Northern spotted owls remain vulnerable to post-fire logging even within late-successional reserves, as the NWFP is inadequate to protect owls from this threat. During the decades since original adoption of the NWFP, post-fire logging has become a more significant source of timber from federal lands, including late-successional reserves, and fire associated management (including thinning, suppression, and post-fire logging) has become a substantial emphasis of both the Forest Service and the Bureau of Land Management. As a result, supposedly protected owl habitat is at risk of fire-associated management (Hansen et al. 2009). This is particularly relevant on BLM lands in western Oregon, where the Secretary of Interior recently proposed a pilot process following active management guidelines in Johnson and Franklin (2009) that could extend thinning limits within reserves in dry forested regions from current 80-year limits to 120-years. Thus, active forest management designed to open forest canopies is increasing and could result in degrading additional owl habitat (Hanson et al. 2009, 2010).

E. Other natural or manmade factors affecting the continued existence of the species

1. Barred Owl

The barred owl (*Strix varia*), closely related species to spotted owls, has expanded its range from its original home in eastern North America into the Pacific Northwest, much to the detriment of spotted owls. (USFWS 2011, Campbell 1973, Hamer et al. 1994, 2001, Dark et al. 1998, Herter and Hicks 2000, Pearson and Livezey 2003, Livezey 2009a and 2009b). Recent studies report that barred owls have “increased dramatically” on the demographic study areas over the last two decades (Forsman et al. 2011). During the second half of the 20th century, barred owls expanded their range from eastern to western North America, and the range of the barred owl now completely overlaps that of the northern spotted owl (Gutierrez et al. 1995, Crozier et al. 2006).

Barred owls compete with northern spotted owls for habitat and resources for breeding, feeding, and sheltering, and the presence of barred owls has significant negative effects on northern spotted owl reproduction, survivorship, and successful occupation of territories. The loss of habitat has the potential to intensify competition with barred owls by reducing the total amount of resources available to the northern spotted owl and by increasing the likelihood and frequency of competitive interactions. Barred owls select very similar habitat to spotted owls for breeding, feeding, and sheltering, and loss of habitat has the potential to intensify competition between species. While conserving habitat will not alleviate the barred owl threat, Dugger et al. (2011) found that spotted owl occupancy and colonization rates decreased as both barred owl presence increased and available habitat decreased. These authors concluded that, similar to another case in which increased suitable habitat was required to support two potentially competing raptors, increased habitat protection for spotted owls may be necessary to provide for sustainable populations in the presence of barred owls (Dugger et al. 2011).

Maintaining high-quality habitat has been important since the northern spotted owl was initially listed as threatened in 1990, and this competitive pressure from barred owls has intensified the need to conserve and restore large areas of contiguous, high quality habitat across the range of the northern spotted owl (Dugger et al. 2011, Forsman et al. 2011, USFWS 2011). 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). Barred owls initially proliferated in Washington and Oregon much more rapidly, but barred owls are becoming increasingly common in northern California (USFWS 2012, Dark et al. 1998, Kelly 2001, Kelly et al. 2003, Forsman et al. 2011).

The USFWS has recently embarked on a barred owl removal experiment, releasing a draft environmental impact statement in March 2012 that includes an exhaustive list of research and documentation outlining the threat posed by barred owls (USFWS 2012). While it is encouraging that the USFWS will finally begin addressing the threat of barred owls, many researchers have questioned the utility of barred owl removal. Furthermore, given the landscape scale changes to Pacific Coast forests, and the rapid saturation of barred owls into these landscapes, a distinct question arises about USFWS' plans for addressing overall habitat changes in the range of the spotted owl. Regardless of whether the USFWS will address habitat loss and barred owls together, because it has taken 20 years for the USFWS to even begin addressing barred owls, whatever outcome may be too little too late for spotted owls across much of their historic range. Barred owls will likely always be present in the spotted owl's range, despite control efforts described by USFWS (2012).

Studies have clearly shown a negative impact on spotted owls due to direct displacement and occupancy of nesting sites and territories (Kelly et al. 2003, Olson et al. 2005). A negative impact on spotted owl fecundity (Olson et al. 2004). Forsman et al. (2011) found that the presence of barred owls has a negative effect on spotted owl recruitment, in turn affecting their survival and population trends. Of all the factors contributing to declines in the demographic rates of northern spotted owls, the presence of barred owls is the strongest and most consistent across study areas (Forsman et al. 2011, p. 75). Kelly et al. (2003) concluded that the presence of barred owls at historical northern spotted owl sites reduced spotted owl occupancy. Gremel (2005) determined that the presence of barred owls appeared to be reducing northern spotted owl occupancy at their historical sites and increasing the detection distance between spotted owls and their original site centers.

Crozier et al. (2006) showed that northern spotted owls have a reduced response rate in the presence of barred owls. While not the focus of the study, this provides evidence that barred owls may disrupt certain behaviors important to spotted owls. Vocalizations are an important part of the spotted owl's territorial behavior.

Barred owls will choose old or mature forests for nesting and compete for nest cavities with spotted owls (USFWS 2012, McGarigal and Fraser 1984, Mazur and James 1998, Carroll and Johnson 2008, Mazur et al. 1997, Buchanan et al. 2004). Barred owls prey upon the same species of small mammals that are the primary prey species of Spotted Owls (Forsman et al. 2001, Hamer et al. 2001). In addition, barred owls also prey upon a wider variety of prey not taken by spotted owls (Elderkin 1987, Bosakowski and Smith 1992, Hamer et al. 2001, Livezey et al. 2008). Further, annual home ranges of sympatric northern spotted owls were 3–4 times larger than those of barred owls in the western Cascade Mountains of Washington (Hamer 1988, Singleton et al. 2005), probably due to the more-varied prey base of barred owls (Hamer et al. 2001, Livezey 2007, Livezey et al. 2008). Barred owls also breed more regularly and have consistently larger broods than do spotted owls (Livezey and Fleming 2007).

Finally, barred owls are capable of exploiting younger forest stands, and semi-forested urban and suburban landscapes in the range of the northern spotted owl that are seldom used by spotted owls (Livezey and Fleming 2007) and use forests in the Pacific Northwest outside of the range of the spotted owl (Buchanan 2005). As a result, barred owls have large source populations that, with their greater dispersal capability (Gutiérrez et al. 2004, Livezey and Fleming 2007), can supplement numbers of barred owls within the range of the spotted owl. As expected, the overlap between barred and spotted owls in habitat and prey coupled with the larger size and more aggressive nature of the barred owl has resulted in significant concern for the long-term sustainability of the northern spotted owl. Livezey and Fleming (2007) concluded that barred owls have a competitive advantage over spotted owls.

VI. Recommended Management and Recovery Actions

- List the northern spotted owl as an endangered species within California under the California Endangered Species Act.
- Initiate a long-term planning process to create a northern spotted owl recovery plan based on the best available science. Such a plan should include the development of clear conservation goals for the recovery of northern spotted owls.

VII. Conclusion

Northern spotted owls are now facing extinction throughout a significant portion of their range. Continued habitat loss range-wide, the failure on non-federal lands to protect and restore spotted owl habitat, the invasion of the barred owl and additional threats listed above require that the California Fish and Game Commission immediately begin the process of listing the species as “threatened” or “endangered” under the CESA. Many populations of spotted owls have already been extirpated, and the remaining populations are reduced and declining. The best available scientific evidence is clear that the northern spotted owl is in danger of extinction throughout all or a significant portion of its range.

VIII. Literature Cited

- Anthony, R.G., E.D. Forsman, A.B. Franklin, D.R. Anderson, K.P. Burnham, G.C. White, C.J. Schwarz, J. Nichols, J.E. Hines, G.S. Olson, S.H. Ackers, S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, K.M. Dugger, K.E. Fehring, T.L. Fleming, R.P. Gerhardt, S.A. Gremel, R.J. Gutiérrez, P.J. Happe, D.R. Herter, J.M. Higley, R.B. Horn, L.L. Irwin, P.J. Loschl, J.A. Reid, and S.G. Sovern. 2006. Status and trends in demography of northern spotted owls, 1985–2003. Wildlife Monograph No. 163.
- Bailey, L.L., J.A. Reid, E.D. Forsman and J.D. Nichols. 2009. Modeling co-occurrence of northern spotted and barred owls: Accounting for detection probability differences. *Biological Conservation* 142: 2983-2989.
- Barrowclough, G.F. and R.J. Gutierrez. 1990. Genetic variation and differentiation in the spotted owl (*Strix occidentalis*). *The Auk* 107: 737-744.
- Barrowclough, G.F., R.J. Gutiérrez, and J.G. Groth. 1999. Phylogeography of spotted owl (*Strix occidentalis*) populations based on mitochondrial DNA sequences; gene flow, genetic structure, and a novel biogeographic pattern. *Evolution* 53:919–931.
- Barrowclough, G.F., J.G. Groth, and R.J. Gutiérrez RJ. 2005. Genetic structure, introgression and a narrow hybrid zone between northern and California spotted owls (*Strix occidentalis*). *Molecular Ecology* 14:1109–1120.
- Bart, J, and E.D. Forsman. 1992. Dependence of Northern Spotted Owls, *Strix occidentalis caurina*, on Old-Growth Forests in the Western United States. *Biological Conservation* 62:95-100.
- Berg, K., S.Cantrell, M. Doumit, K. Godbout, D. Halabisky, C. Lipton, R. Meier, V. Musselman, M. Perez-Gibson, T. Robinson, P. Swedeen, C. Turley, and D. Whipple. 2009. Final Report to Forest Practices Board, Northern Spotted Owl Policy Working Group. Including: November 10, 2009 Report and December 31, 2009 Report.
- Blakesley, J.A., W. LaHaye, J.M.M. Marzluff, B.R. Noon, and S. Courtney. 2004. Demography. Chapter 8 in S. Courtney (editor), Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute, Portland, Oregon.
- Blakesley, J.A., B.R. Noon, and D.R. Anderson. 2005. Site occupancy, apparent survival, and reproduction of California spotted owls in relation to forest stand characteristics. *Journal of Wildlife Management*. 69:1554-1564.
- Bond, M.L., R.J. Gutierrez, A.B. Franklin, W.S. LaHaye, C.A. May and M.E. Seamans. 2002. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity and reproductive success. *Wildlife Society Bulletin* 30 (4): 1022-1028.
- Bond, M.L., D.E. Lee, R.B. Siegel, and J.P. Ward. 2009. Habitat use and selection by California Spotted Owls in a postfire landscape. *Journal of Wildlife Management* 73: 1116-1124.
- Bosakowski and Smith 1992. Comparative diets of sympatric nesting raptors in the eastern deciduous forest biome. *Can. J. Zool.* 70:984–992.
- Boyce, M.S., L.L. Irwin, and R. Barker. 2005. Demographic meta-analysis: synthesizing vital rates for spotted owls. *Journal of Applied Ecology* 42:38.
- Buchanan, J., and P. Swedeen. 2005. Final Briefing Report to the Washington State Forest Practices Board regarding Spotted Owl Status and Forest Practice Rules. Washington Department of Fish and Wildlife. Olympia, Washington.

- Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1995. Within-stand nest site selection by spotted owls in the eastern Washington Cascades. *Journal of Wildlife Management* 59:301–310.
- Buchanan, J.B., T.L. Fleming, and L.L. Irwin. 2004. A comparison of Barred and Spotted Owl nest-site characteristics in the eastern Cascade Mountains, Washington. *J. Raptor Res.* 38:231–237.
- 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 and spotted owls. *Biol. Invasions* 9:679-691
- Caffrey C. 2003. Determining impacts of West Nile Virus on crows and other birds. *American Birds* 57:12–13.
- California Forest Practice Rules. 2012. Available at:
http://www.fire.ca.gov/resource_mgt/downloads/2012_California_Forest_Practice_Rules.pdf
- Campbell, S., K. Waddell, and A. Gray, tech. eds. 2010. Washington's forest resources, 2002–2006: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-800. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 189 p. http://www.fs.fed.us/pnw/pubs/pnw_gtr800.pdf
- Campbell, R.W. 1973. Coastal records of the barred owl for British Columbia. *The Murrelet* 54:25.
- Carey, A.B. 1999. Red Tree Vole: *Arborimus longicaudus*. Pages 620-622 in D.E. Wilson and S. Ruff, eds. The Smithsonian Institution Press, Washington, D. C.
- Carey, A.B. 2000. Ecology of northern living squirrels: implications for ecosystem management in the Pacific Northwest, USA. in R. Goldingay and J. Scheibe (eds.) *Biology of Gliding Mammals*. Filander Press: Fürth, Germany.
- Carey, A.B., S.P. Horton, and B.L. Biswell. 1992. Northern spotted owls: influence of prey base and landscape character. *Ecol. Monographs* 62:223–250.
- Carey, A.B., B.R. Lippke, and J. Sessions. 1999. Intentional ecosystem management: managing forests for biodiversity. *Journal of Sustainable Forestry* 9:83–125.
- Carey, A.B. and K.C. Peeler. 1995. Spotted owls: resource and space use in mosaic landscapes. *Journal of Raptor Research* 29:223-239.
- Carrete, M.J., J.A. Sanchez-Zapata, J.F. Calvo, and R. Lande. 2005. Demography and habitat availability in territorial occupancy of two competing species. *Oikos* 108:125-136.
- Carroll, C. and D.S. Johnson. 2008. The importance of being spatial (and reserved): assessing northern spotted owl habitat relationships with hierarchical Bayesian models. *Conservation Biology* 22: 2:1026-1036.
- Chutter, M., I. Blackburn, D. Bonin, J. Buchanan, B. Costanza, D. Cunnington, A. Harestad, T. Hayes, D. Heppner, L. Kiss, J. Surgenor, W. Wall, L. Waterhouse, & L. Williams. 2004. National recovery strategy for the Northern Spotted Owl. Report. Recovery of Nationally Endangered Wildlife Committee, Ottawa, ON.
- Clark, D.A. 2007. Demography and habitat selection of northern spotted owls in post-fire landscapes of southwestern Oregon. M.S. thesis. Oregon State University, Corvallis.
- COSEWIC. 2008. COSEWIC assessment and update status report on the Spotted Owl *Strix occidentalis caurina*, *Caurina* subspecies, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 48 pp. www.sararegistry.gc.ca/status/status_e.cfm
- 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, and L. Sztukowski. 2004. Final Report: Scientific evaluation of the status of the Northern Spotted Owl. Sustainable Ecosystems Institute, Portland, Oregon.

- Courtney, S.P., A.B. Carey, M.L. Cody, K. Engel, K.E. Fehring, J.F. Franklin, M.R. Fuller, R.J. Gutiérrez, J.F. Lehmkuhl, M.A. Hemstrom, P.F. Hessburg, S.L. Stephens, L.A. Sztukowski, and L. Young. 2008. Scientific Review of the Draft Northern Spotted Owl Recovery Plan and Reviewer Comments. Sustainable Ecosystems Institute, Portland, Oregon.
- Crozier, M.L., M.E. Seamans, R.J. Gutiérrez, P.J. Loschl, R.B. Horn, S.G. Sovern, and E.D. Forsman. 2006. Does the presence of barred owls suppress the calling behavior of Spotted Owls? *Condor* 108:760–769.
- Dark, S.J., R.J. Gutiérrez, and G.I. Gould Jr. 1998. The barred owl (*Strix varia*) invasion in California. *Auk* 115(1):50-56.
- Davis, R. and J. Lint. 2005. Habitat status and trends. Pages 21–82 in J. Lint (technical coordinator), Northwest Forest Plan—the first 10 years (1994–2003): status and trends of northern spotted owl populations and habitat. Gen. Tech. Rep. PNW-GTR-648, USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. http://www.fs.fed.us/pnw/publications/pnw_gtr648
- Davis, Raymond J.; Dugger, Katie M.; Mohoric, Shawne; Evers, Louisa; Aney, William C. 2011. Northwest Forest Plan—the first 15 years (1994–2008): status and trends of northern spotted owl populations and habitats. Gen. Tech. Rep. PNWGTR- 850. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 147 p.
- Dellasala, D. 2011. Comments on the 5-year status review for Northern Spotted Owl submitted to the U.S. Fish and Wildlife Service.
- Diller, L.V. and D.M. Thome. 1999. Population density of northern spotted owls in managed young-growth forests in coastal northern California. *Journal of Raptor Research* 33:275–286.
- Doak, D.F. 1994. Declaration of Daniel Doak in Support of SAS' Motion for Summary Judgment. Declaration in the United States District Court for the Western District of Washington. October 3, 1994. 22 pp.
- Dugger, K.M., F. Wagner, R.G. Anthony, and G.S. Olson. 2005. The relationship between habitat characteristics and demographic performance of northern spotted owls in southern Oregon. *Condor* 107:863–878.
- Dugger, K., R.G. Anthony and E.D. Forsman. 2009. Estimating northern spotted owl detection probabilities: updating the USFWS Northern Spotted Owl Survey Protocol. Final Report. Dept. of Fisheries and Wildlife, Oregon State University, Corvallis.
- Dugger, K., R.G. Anthony, L. S. Andrews. 2011. Transient dynamics of invasive competition barred owls, spotted owls, habitat, and demons of competition present. *Ecol. Applications*.
- Dunbar, D.L., B.P. Booth, E.D. Forsman, A.E. Hetherington, and D.J. Wilson. 1991. Status of the spotted owl, *Strix occidentalis*, and barred owl, *Strix varia*, in southwestern British Columbia. *Canadian Field-Naturalist* 105:464–468.
- Environmental Protection Information Center (EPIC). 2012. Notice of Intent to Sue Sierra Pacific Industries for Violations of the Endangered Species Act; Actions Threatening the Northern Spotted Owl.
- Elderkin, M.F. 1987. The breeding and feeding ecology of a Barred Owl population in Kings County, Nova Scotia. M.S. thesis, Acadia University, Wolfville, Nova Scotia, Canada.
- FEMAT (Forest Ecosystem Management Assessment Team). 1993. Forest Ecosystem Management: an ecological, economic, and social assessment. USDA Forest Service, USDI Fish and Wildlife Service, National Marine Fisheries Service, USDI National Park Service, USDI Bureau of Land Management, Environmental Protection Agency, Washington, D.C.

- Fitzgerald, S.D., J.S. Patterson, M. Kiupel, H.A. Simmons, S.D. Grimes, C.F. Sarver, R.M. Fulton, B.A. Fulton, B.A. Steficek, T.M. Cooley, J.P. Massey, and J.G. Sikarskie. 2003. Clinical and pathological features of West Nile Virus infection in native North American owls (family *Strigidae*). *Avian Diseases* 47:602–610.
- Forest Practice Notes. 1994. Oregon Department of Forestry, No. 8 (Revised), Dec. 1994. Available at: <http://www.oregon.gov/ODF/privateforests/docs/SpottedOwl.pdf>
- Forsman, E.D. 1976. A preliminary investigation of the Spotted Owl in Oregon. M.S. thesis, Oregon State University, Corvallis, OR.
- Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. *Wildlife Monographs* 87:1–64.
- Forsman, E.D., S. DeStefano, M.G. Raphael, and R.J. Gutierrez (eds). 1996. Demography of the northern spotted owl. *Studies in Avian Biology* 17:1-122.
- Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of Spotted Owls in Washington. *J. Raptor Res.* 35:141–150.
- Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. *Wildlife Monographs* 149:1–35.
- Forsman, E.D., R.G. Anthony, E.C. Meslow, and C.J. Zable. 2004. Diets and foraging behavior of owls in Oregon. *Journal of Raptor Research* 38:214-230.
- Forsman E.D., T.J. Kaminski, J.C. Lewis, K.J. Maurice, S.G. Sovern, D. Ferland, and E.M. Glenn. 2005. Home range and habitat use of Northern Spotted Owls on the Olympic Peninsula, Washington. *Journal of Raptor Research* 39:365–377.
- 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. Schabereil, T.J. Snetsinger, and S.G. Sovern. 2011. Population Demography of the northern spotted owls: 1985-2008. *Studies in Avian Biology*. In Press.
- Franklin, A.B., K.P. Burnham, G.C. White, R.G. Anthony, E.D. Forsman, C. Schwarz, J.E. Nichols, and J. Hines. 1999. Range-wide status and trends in northern spotted owl populations. Colorado Cooperative Fish and Wildlife Research Unit, USGS, Biological Resources Division, Colorado State University, Ft. Collins, CO, and Oregon Cooperative Fish and Wildlife Research Unit, USGS, Biological Resources Division, Department of Fish and Wildlife, Oregon State University, Corvallis, OR.
- Franklin, A.B., D.R. Anderson, J.R. Gutiérrez, and K.P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. *Ecological Monographs* 70:539–590.
- Franklin J. and S. Courtney. 2004. Evolution and effectiveness of strategies for conservation of northern spotted owl. Chapter 9 in S. Courtney (editor), *Scientific evaluation of the status of the northern spotted owl*. Sustainable Ecosystems Institute, Portland, Oregon.
- Funk, W.C., E.D. Forsman, T.D. Mullins, and S.M. Haig. 2008. Introgression and dispersal among spotted owl (*Strix occidentalis*) subspecies. *Evolutionary Applications* 1:161-171.
- Funk, W.C., E.D. Forsman, M. Johnson, T.D. Mullins, and S.M. Haig. 2010. Evidence for recent population bottlenecks in northern spotted owls (*Strix occidentalis caurina*). *Conservation Genetics* 11:1013-1021.

- Gancz, A., I.K. Barker, R. Lindsay, A. Dibernardo, K. McKeever, and B. Hunter. 2004. West Nile Virus outbreak in North American owls, Ontario, 2002. *Emerging Infectious Diseases* 10:2135–2142.
- Glenn, E.M. 2009. Local Weather, Regional Climate, and Population Dynamics of Northern Spotted Owls in Washington and Oregon. PhD Dissertation Oregon State University.
- Glenn, E.M., M.C. Hansen, and R.G. Anthony. 2004. Spotted owl home-range and habitat use in young forests of western Oregon. *Journal of Wildlife Management* 68:33–50.
- Glenn, E.M., R.G. Anthony, and E.D. Forsman. 2010. Population trends in northern spotted owls: Associations with climate in the Pacific Northwest. *Biological Conservation* *in press*.
- Gutiérrez, R.J., A.B. Franklin, and W.S. LaHaye. 1995. Spotted owl (*Strix occidentalis*) in A. Poole and F. Gill (editors), *The birds of North America*, No. 179. The Academy of Natural Sciences and The American Ornithologists' Union, Washington, D.C. 28 pp.
- Gutiérrez, R.J., M. Cody, S. Courtney, and D. Kennedy. 2004. Assessment of the potential threat of the northern barred owl. Pp. 7-1 – 7-51, In: S. Courtney, Ed. *Scientific evaluation of the status of the northern spotted owl*. Portland, OR. Sustainable Ecosystems Institute.
- Gutiérrez, R.J. and G.E. Barrowclough. 2005. Redefining the distributional boundaries of the Northern and California Spotted Owls: Implications for Conservation. *The Condor* 107:182-187.
- 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.
- Haig, S.M., R.S. Wagner, E.D. Forsman, and T.D. Mullins. 2001. Geographic variation and genetic structure in spotted owls. *Conservation Genetics* 2:25–40.
- Haig, S.M., T.D. Mullins, and E.D. Forsman. 2004. Subspecific relationships and genetic structure in the spotted owl. *Conservation Genetics* 5:683–705.
- Hakkarainen, H., V. Koivunen, and E. Korpimäki. 1997. Reproductive success and parental effort of Tengmalm's Owls: effects of spatial and temporal variation in habitat quality. *Ecoscience* 4:35–42.
- Hamer, T.E. 1988. Home range size of the Northern Barred Owl and Northern Spotted Owl in western Washington. M.S. thesis, Western Washington University, Bellingham, WA U.S.A.
- Hamer, T.E., E.D. Forsman, A.D. Fuchs, and M.L. Walters. 1994. Hybridization between barred and spotted owls. *Auk* 111:487–492.
- Hamer, T.E., D.L. Hays, C.M. Senger, and E.D. Forsman. 2001. Diets of Northern Barred Owls and Northern Spotted Owls in an area of sympatry. *J. Raptor Res.* 35:221–227.
- Hamer, T. E., E. D. Forsman, and E. M. Glenn. 2007. Home range attributes and habitat selection of barred owls and spotted owls in an area of sympatry. *Condor* 109:750–768.
- Hanson, C.T., D.C. Odion, D.A. DellaSala, and W.L. Baker. 2009. Overestimation of fire risk in the northern spotted owl recovery plan. *Conservation Biology* 23: 1314-1319.
- Hanson, C.T., D.C. Odion, D.A. DellaSala, and W.L. Baker. 2010. Comprehensive management of northern spotted owls in dry forest provinces: response to Spies et al. *Conservation Biology* 24: 334-337.
- Harrison, S., A. Stahl, and D. Doak. 1993. Spatial models and spotted owls: exploring some biological issues behind recent events. *Conservation biology* 7:950-953.

- Hershey, K.T., E.C. Meslow, and F.L. Ramsey. 1998. Characteristics of forests at spotted owl nest sites in the Pacific Northwest. *Journal Wildlife Management* 62:1398-1410.
- Herter, D.R. and L.L. Hicks. 2000. Barred owl and spotted owl populations and habitat in the central Cascade Range of Washington. *Journal of Raptor Research* 34:279–286.
- Herter, D.R., L.L. Hicks, H.C. Stabins, J.J. Millspaugh, A.J. Stabins, and L.D. Melampy. 2002. Roost site characteristics of northern spotted owls in the nonbreeding season in central Washington. *Forest Science* 48:437–446.
- Holloway, G.L. and W.P. Smith. 2011. A Meta-Analysis of Forest Age and Structure Effects on Northern Flying Squirrel Densities. *Journal of Wildlife Management* 75, 668-674.
- Horn, H.S. and R.H. MacArthur. 1972. Competition among fugitive species in a harlequin environment. *Ecology* 53:749-752.
- Irwin, L.L., T.L. Fleming, and J. Beebe. 2004. Are spotted owl populations sustainable in fire-prone forests? *Journal of Sustainable Forestry* 18:1-28.
- Ishak, H.D., J.P. Dumbacher, N.L. Anderson, J.J. Keane, G. Valkiūnas, S.M. Haig, L.A. Tell, and R.N.M. Sehgal. 2008. Blood Parasites in Owls with Conservation Implications for the Spotted Owl (*Strix occidentalis*). *PLoS ONE* 3(5): e2304. doi:10.1371/journal.pone.0002304
- Iverson, W.F. 1993. Is the barred owl displacing the spotted owl in western Washington? M.S. thesis, Western Washington University, Bellingham.
- Johnson, K.N. and J.F. Franklin. 2009. Restoration of federal forests in the Pacific northwest: strategies and management implications. Oregon State University, Corvallis.
- Kelly, E.G. 2001. The range expansion of the northern barred owl: an evaluation of the impact on spotted owls. M.S. thesis, Oregon State University, Corvallis, OR.
- Kelly, E.G., E.D. Forsman, and R.G. Anthony. 2003. Are barred owls displacing spotted owls? *Condor* 105:45–53.
- Korpimäki, E. 1992. Fluctuation food abundance determines the lifetime reproductive success of male Tengmalm's owls. *Journal of Applied Ecology* 61:103-111.
- LaHaye, W.S. and R.J. Gutiérrez. 1999. Nest sites and nesting habitat of the northern spotted owl in northwestern California. *Condor* 101:324-330.
- Learn C. 2010. "Northern spotted owl marks 20 years on endangered species list," *The Oregonian*, June 25, 2010.
- Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006. Demography of northern flying squirrels informs ecosystem management of western interior forests. *Ecological Applications* 16:584-600
- Leskiw, T. and R.J. Gutiérrez. 1998. Possible predation of a spotted owl by a barred owl. *Western Birds* 29:225–226.
- Levins, R. and D. Culver. 1971. Regional coexistence of species and competition between rare species. *Proceedings of the National Academy of Science* 68:1246-1248.
- Lint, J. 2005. Population status and trends. Pages 7–19 in J. Lint (technical coordinator), Northwest Forest Plan—the first 10 years (1994–2003): status and trends of northern spotted owl populations and habitat. Gen. Tech. Rep. PNW-GTR-648, USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Livezey, K.B. 2007. Barred owl habitat and prey: a review and synthesis of the literature. *J. Raptor Res.* 41(3):177–201

- Livezey, K.B. and T.L. Fleming. 2007. Effects of barred owls on spotted owls: the need for more than incidental detections and correlational analysis. *Journal of Raptor Research* 41:319–325.
- Livezey, K.B., M.F. Elderkin, P.A. Cott, J. Hobbs, and J.P. Hudson. 2008. Barred owls eating worms and slugs: the advantage in not being picky eaters. *Northwestern Naturalist* 89: 185-190.
- Livezey, K.B. 2009a. Range Expansion of Barred Owls, Part I: Chronology and Distribution. *Am. Midl. Nat.* 161:49–56
- Livezey, K.B. 2009b. Range Expansion of Barred Owls, Part II: Facilitating ecological changes. *Am. Midl. Nat.* 161:323–349.
- Manning, T., J.C. Hagar and B.C. McComb. 2011. Thinning of young Douglas-fir forests decreases density of northern flying squirrels in the Oregon Cascades. *Forest Ecology and Management* 264: 115-124
- Marks, J.S., R.J. Cannings, and H. Mikkola. 1999. Order Strigiformes: Family Strigidae (typical owls): Subfamily Striginae: Tribe Strigini: Genus *Strix*. In: del Hoyo, Josep; Elliott, Andrew; Sargatal, Jordi, eds. *Handbook of the birds of the world. Volume 5: Barn-owls to hummingbirds*. Barcelona: Lynx Edicions: 196-207
- Marra, P.P., S. Griffing, C. Caffrey, A.M. Kilpatrick, R. McLean, C. Brand, E. Saito, A.P. Dupuis, L. Kramer, and R. Novak. 2004. West Nile Virus and wildlife. *BioScience* 54:393–402.
- Mazur, K.M., P.C. James, and S.D. Frith. 1997. Barred Owl (*Strix varia*) nest site characteristics in the boreal forest of Saskatchewan, Canada. Pages 267–273 in J.R. Duncan, D.H. Johnson, and T.H. Nicholls [EDS.], *Biology and conservation of owls of the northern hemisphere: proceedings of a symposium held in Winnipeg, Manitoba*. USDA Forest Service Gen. Tech. Rpt. NC-190, North Central Forest Experiment Station.
- Mazur, K.M., Frith, S.D. and P.C. James. 1998. Barred Owl home range and habitat selection in the boreal forest of central Saskatchewan. *The Auk* 115:746–754.
- McGarigal, K. and J.D. Fraser. 1984. The effect of forest stand age on owl distribution in southwestern Virginia. *J. Wild. Manage.* 48:1393–1398.
- McLean, R.G., S.R. Ubico, S.E. Docherty, W.R. Hansen, L. Sileo, and T.S. McNamara. 2001. West Nile Virus and transmission and ecology in birds. *Annals of the New York Academy of Sciences* 951:54–57.
- Merriam, C.H. 1898. *Syrnium occidentale caurinum*, A new owl from the Puget Sound Region. *The Auk* 15:39-40.
- Moeur, M., T.A. Spies, M. Hemstrom, J.R. Martin, J. Alegria, J. Browning, J. Cissel, W.B. Cohen, T.E. Demeo, S. Healey, and R. Warbington. 2005. Northwest Forest Plan—the first 10 years (1994–2003): status and trend of late-successional and old-growth forest. Gen. Tech. Rep. PNW-GTR-646. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- Mote, P.W. and E.P. Salathé EP. 2009. Future climate in the Pacific Northwest. Chapter 1 in *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate*, Climate Impacts Group, University of Washington, Seattle, Washington.
- Noon, B.R. and J.A. Blakesley. 2006. Conservation of the northern spotted owl under the Northwest Forest Plan. *Conservation Biology* 20:288–296.
- Noss, R.F. (ed.). 2000. *The redwood forest*. Washington, D.C.: Island Press.
- Olson, G.S., E.M. Glenn, R.G. Anthony, E.D. Forsman, J.A. Reid, P.J. Loschl, and W.J. Ripple. 2004. Modeling demographic performance of northern spotted owls relative to forest habitat in Oregon. *Journal of Wildlife Management* 68:1039–1053.

- 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.
- Oregon Administrative Rules Guidance Manuals, Division 665. 2009. Available at: <http://www.oregon.gov/ODF/privateforests/docs/guidance/OARDiv665.pdf>
- Oregon Forest Practice Act Rulebook. 2010. Oregon Department of Forestry.
- Pearson, R.R. and K.B. Livezey. 2003. Distribution, numbers, and site characteristics of spotted owls and barred owls in the Cascade Mountains of Washington. *Journal of Raptor Research* 37:265–276.
- Pearson, R.R. and K.B. Livezey. 2007. Spotted owls, barred owls, and late-successional reserves. *J. Raptor Res.* 41(2): 156-161.
- Peterson, A.T. and C.R. Robins. 2003. Using ecological-niche modeling to predict barred owl invasions with implications for spotted owl conservation. *Conservation Biology* 17:1161-1165.
- Pierce, D.J., J.B. Buchanan, B.L. Cosentino, and S. Snyder. 2005. An assessment of the status of spotted owl habitat on non-federal lands in Washington between 1996 and 2004. Washington Department of Fish and Wildlife, Olympia, WA, USA.
- Raphael, M.G. 2006. Conservation of listed species: the northern spotted owl and marbled murrelet. Chapter 7 in R.W. Haynes, B.T. Bormann, D.C. Lee, and J.R. Martin (technical editors), *Northwest Forest Plan—the first 10 Years (1994–2003): synthesis of monitoring and research results*. Gen. Tech. Rep. PNW-GTR. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon. <http://www.fs.fed.us/pnw/publications/gtr651/>
- Rohner, C. 1996. The numerical response of great horned owls to the snowshoe hare cycle: consequences of non-territorial “floaters” on demography. *Journal of Animal Ecology* 65:359-370.
- Rosenberg, D.K. and R.G. Anthony. 1992. Characteristics of northern flying squirrel populations in young second- and old-growth forests in western Oregon. *Canadian Journal of Zoology* 70:161-166.
- Salathé, E.P. 2006. Influences of a shift in North Pacific storm tracks on western North American precipitation under global warming. *Geophysical Research Letters* 33, L19820, doi:10.1029/2006GL026882, 2006.
- Seamans, M.E. and R.J. Gutierrez. 2007. Habitat selection in a changing environment: the relationship between habitat alteration and Spotted Owl occupancy and breeding dispersal. *Condor* 109:566–576.
- Singleton, P.H., S. Graham, W.L. Gaines, and J.F. Lehmkuhl. 2005. The ecology of Barred Owls in fire-prone forests: 2005 progress report. Pacific Northwest Research Station, Wenatchee, WA U.S.A.
- Staus, N.L., J.R. Strittholt, D.A. DellaSala, and R. Robinson. 2002. Rate and pattern of forest disturbance in the Klamath-Siskiyou ecoregion, U.S.A. *Landscape Ecology* 17:455-470.
- Strittholt, J.R., D.A. DellaSala, and H. Jiang. 2006. Status of mature and old-growth forests in the Pacific Northwest, USA. *Conservation Biology* 20: 363:374.
- Swedeen, P. 2006. Declaration of Dr. Paula Swedeen in Case No. C06-1608 MJP. Declaration in the United States District Court for the Western District of Washington. November 7, 2006. 28 pp.
- Swindle, K.A., W.J. Ripple, E.C. Meslow, and D.J. Schafer. 1999. Old-forest distribution around spotted owl nests in the central Cascade Mountains, Oregon. *Journal Wildlife Management* 63:1212-1221.
- 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. Interagency Scientific Committee to Address the Conservation of the Northern

- Spotted Owl. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service. Portland, Oregon. 458 pp.
- Thomas, J.W., M.G. Raphael, R.G. Anthony, E.D. Forsman, A.G. Gunderson, R.S. Holthausen, B.G. Marcot, G.H. Reeves, J.R. Sedell, and D.M. Solis. 1993. Viability assessments and management considerations for species associated with late-successional and old-growth forests of the Pacific Northwest. U.S. Forest Service, Portland, Oregon.
- Thome, D.M. 1997. The influence of habitat on northern spotted owl reproductive success in northern California. M.S. thesis. Humboldt State University, Arcata, CA.
- USDA Forest Service and USDI BLM. 1994. Record of decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl. USDA Forest Service and USDI Bureau of Land Management, Washington, D.C. 74 pp + attachment.
- USFWS (U.S. Fish and Wildlife Service). 1990. Endangered and threatened wildlife and plants; determination of threatened status for the northern spotted owl. Federal Register 55:26114–26194.
- USFWS. 1992. Recovery plan for the Northern Spotted Owl. Unpublished Report. U.S. Department of Interior, Washington, DC.
- USFWS. 2004. Northern spotted owl: Five Year Review Summary and Evaluation. USDI Fish and Wildlife Service, Portland, Oregon. 73 pp.
- USFWS. 2009. Regulatory and Scientific Basis for U.S. Fish and Wildlife Service Guidance for Evaluation of Take for Northern Spotted Owls on Private Timberlands in California's Northern Interior Region..
- USFWS. 2011. Revised recovery plan for the northern spotted owl (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon.
- USFWS 2012. Experimental Removal of Barred Owls to Benefit Threatened Northern Spotted Owls. Draft Environmental Impact Statement, March 2012. U.S. Fish and Wildlife Service, Portland, Oregon.
- Van Gelder, J.J. 2003. Variation in four-note location calls of male spotted owls (*Strix occidentalis*). M.S. Thesis. Humboldt State University.
- Wagner, F.F., E.C. Meslow, G.M. Bennett, J.L. Larson, S.M. Small, and S. DeStefano. 1996. Demography of northern spotted owls in the Southern Cascades and Siskiyou Mountains, Oregon. *Studies in Avian Biology* 17:67-76.
- Ward, J.P. 2006. Declaration of Dr. James Patrick Ward, Jr. in Case No. C06-1608 MJP. Declaration in the United States District Court for the Western District of Washington. November 13, 2006. 87 pp.
- Wiens, J.D., R.G. Anthony, and E.D. Forsman. 2011. Barred owl occupancy surveys within the range of the northern spotted owl. *Journal of Wildlife Management* 75(3): 531-583.
- Washington State Forest Practice Rules. 2012.
- Zabel, C.J., M. Brown, T. Hines, D. Thome, A. Wright, J.R. Dunk, C. Organ, and L. Leeman. 2001. Habitat associations of the northern spotted owl in the Coos Bay BLM District, Oregon. Final Report. USDA For. Serv. Pac. Southwest Res. Sta., Redwood Sciences Lab, Arcata, CA.
- Zabel, C.J., J.R. Dunk, H.B. Stauffer, L.M. Roberts, B.S. Mulder, and A. Wright. 2003. Northern spotted owl habitat models for research and management application in California (USA). *Ecological Applications* 13:1027-1040.

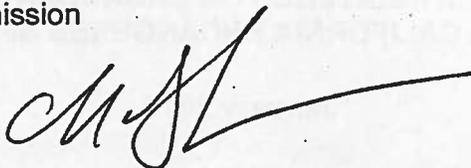
State of California
Department of Fish and Wildlife

Memorandum

Date: ^{Feb. 6} January 23, 2013

To: Sonke Mastrup
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director



Subject: Petition from the Environmental Protection Information Center (EPIC) to List the Northern Spotted Owl under the California Endangered Species Act

The Department of Fish and Wildlife (Department) prepared the attached petition evaluation report in response to a petition, dated September 4, 2012, received by the Fish and Game Commission (Commission) on September 7, 2012 (Petition), and from the Environmental Protection Information Center (EPIC), to list the northern spotted owl (*Strix occidentalis caurina*) (northern spotted owl) as a threatened or endangered species under the California Endangered Species Act (CESA). (See generally Fish and Game code §2073.5, subd. (a); Cal Code Regs., title 14, §670.1, subd. (d)(1).)

In accordance with CESA, the attached petition evaluation report delineates the categories of information required in a petition, evaluates the sufficiency of the information in the Petition, and incorporates additional relevant information that the Department possessed or received during the review period. Based upon the information contained in the Petition, the Department has determined that there is sufficient information to indicate that the petitioned action may be warranted. The Department recommends that the Petition be accepted.

If you have any questions or need additional information, please contact Dan Yparraguirre, Deputy Director, Wildlife and Fisheries Division at 916-653-4673 or Eric Loft, Chief, Wildlife Branch at 916-445-3555.

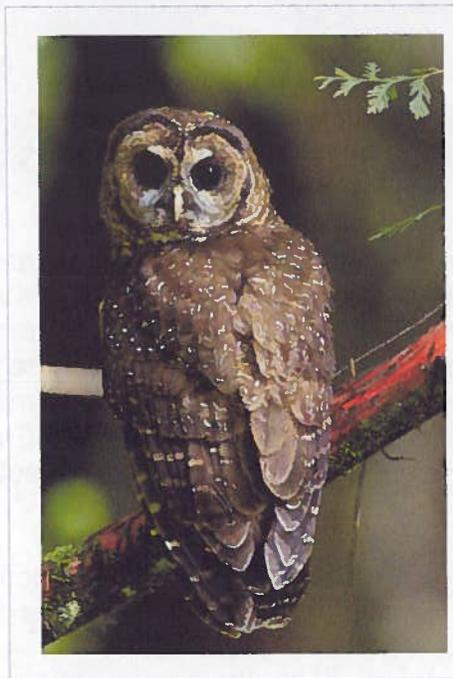
Attachment

**State of California
Natural Resources Agency
Department of Fish and Wildlife**

REPORT TO THE FISH AND GAME COMMISSION

**EVALUATION OF THE PETITION
FROM THE ENVIRONMENTAL PROTECTION INFORMATION CENTER
TO LIST NORTHERN SPOTTED OWL (*Strix occidentalis caurina*)
AS THREATENED OR ENDANGERED
UNDER THE CALIFORNIA ENDANGERED SPECIES ACT**

January 2013



**Photo courtesy of USFWS; John and Karen Hollingsworth*

**Charlton H. Bonham, Director
Department of Fish and Wildlife**



EXECUTIVE SUMMARY

The Environmental Protection Information Center (Petitioner) submitted a Petition (Petition) to the California Fish and Game Commission (Commission) dated September 4, 2012 to list the northern spotted owl (*Strix occidentalis caurina*) (northern spotted owl) as a Threatened or Endangered Species pursuant to the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.). The Commission received the Petition on September 7, 2012 and referred it to the California Department of Fish and Game (Department; CDFG) for an initial evaluation on September 10, 2012. (Cal. Reg. Notice Register 2012, No. 15-Z, p. 494.) On December 1, 2012, the Department requested an additional thirty (30) days to complete its initial evaluation of the Petition.

This report presents the Department's initial scientific evaluation of the Petition as required by Fish and Game Code section 2073.5. (See also Cal. Code Regs., tit. 14, § 670.1, subd. (d).) Consistent with that authority, this report evaluates the scientific sufficiency of the Petition on its face and in relation to other relevant information the Department possesses or that it received during its review. To support the review, the Department gathered and reviewed the information referenced in the submitted Petition to the best of its ability. Not all references were available to the Department. In addition to the face value, and the material referenced in the Petition, the Department also considered other relevant information in its possession related to California northern spotted owl populations. All sources of information considered by the Department in preparing this report, including those referenced in the Petition are identified in the References Section.

For the reasons highlighted in this evaluation, the Department recommends that the Commission accept the Petition for further consideration under CESA. Having evaluated the Petition and other relevant information, the Department finds that sufficient information exists to indicate that the petitioned action may be warranted. (Fish & G. Code, § 2073.5, subd. (a)(2).) The Department's finding and its recommendation to the Commission is based on an evaluation of the scientific information in the Department's possession at this time relevant to the topic areas enumerated in the controlling regulation [Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1)]. Likewise, in evaluating the scientific sufficiency of the available information, the geographic context for the Department's analysis and recommendation is the species' range in California. (*California Forestry Association v. California Fish and Game Commission* (2007) 156 Cal. App. 4th 1535, 1551.)

The Petition relies heavily on studies from Oregon, Washington, and British Columbia, many of which provide range-wide analyses for fecundity, population trend, survival, and associated required habitats. Although information for California is sometimes included in the range-wide summaries or is unsupported in the Petition, the Department's evaluation indicates that many of the factors influencing population trends range-wide may also be relevant to California populations of northern spotted owl.

The Department finds the Petition contained a number of inaccuracies and poorly supported conclusions. In several places, the Petition refers to the Commission and/or Department as the U.S. Fish and Wildlife Service (USFWS). Some sections of the Petition included statements and conclusions for which the supporting information was absent or poorly presented. Referenced owl and habitat survey data were not included in the Petition. In some instances, the Petitioners support conclusions with studies from

other states that may not be applicable to California due to differences in habitats, prey, climate, competitors, and other factors.

The conclusion that there is a declining northern spotted owl population trend range-wide is supported by the referenced material and scientific information that the Department has readily available, including studies that indicate substantial declines in the northern part of the species' range (British Columbia and Washington), with some declining populations in California. However, other information available to the Department indicates that some of the California populations are stable or increasing, and the total cumulative number of activity centers has increased. A more thorough assessment and evaluation is necessary to examine the information available to determine the status of the species in California. The Department can draw from its own spotted owl database for information and from other sources to assess population trend, such as annual reports received by timber companies in the owl's range in Northwestern California. The majority of the external reports indicate that California's northern spotted owl populations have experienced a steady decline over the last 5 to 15 years. Additionally, the primary threats to northern spotted owls and to their habitats are increasing. In California, the harvest of old-growth and mature forest – the primary threat to the species at the time the Fish and Wildlife Service listed the species – has declined, largely because of the imposition of take avoidance prohibitions. However, threats to northern spotted owls and to their habitats continue to increase: i.e., habitat fragmentation, wildfire, competition from barred owls, disease, pesticide poisoning, and climate change.

Although the Petition lacks summaries specific to California, it identifies two actions required for the future management of the species assumed to be relevant to associated habitats and climate for this part of its range: (1) listing the northern spotted owl as a threatened or endangered species in California under CESA and (2) the initiation of a long-term planning process to develop a recovery plan to conserve the species.

The Department, considering the Petition on its face and in relation to other relevant information referenced below, finds that sufficient scientific information exists, particularly with respect to population trend and degree of threat, to indicate that the petitioned action may be warranted. (See Fish & G. Code, § 2073.5, subd. (a)(2); Cal. Code Regs., tit. 14, § 670.1, subd. (d).)

INTRODUCTION

The subject of this evaluation report is the "Petition To List The Northern Spotted Owl As Threatened Or Endangered Under The California Endangered Species Act" submitted by the Environmental Protection Information Center (Petitioner) to the Commission on September 7, 2012. This evaluation report is intended to inform the Commission's determination as to whether the Petition, when considered along with other related information before the Commission, provides sufficient information to indicate the petitioned action may be warranted. (See generally Fish & G. Code, §§ 2073.5, 2074.2; Cal. Code Regs., tit. 14, § 670.1, subds. (d), (e).) The Department's charge and focus in its advisory capacity to the Commission is scientific. Consistent with controlling law, the Department has conducted its initial review of the Petition and focuses its recommendation to the Commission on the sufficiency of scientific information. (*Id.*, subd. (d)(1).)

GENERAL PETITION PROCESS INFORMATION

A petition to list or delist a species under CESA must include “information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The Petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and other factors the Petitioner deems relevant.” (Fish & G. Code, § 2072.3.)

OVERVIEW OF NORTHERN SPOTTED OWL ECOLOGY

The species information that follows is derived, in part, from the Revised Northern Spotted Owl Recovery Plan (USFWS 2011a).

Species Description and Taxonomy

The northern spotted owl is a medium-sized owl, dark brown, with a barred tail, white spots on its head and breast, and dark brown eyes surrounded by prominent facial disks (Gutiérrez et al. 1995). Males average about 13 percent smaller than females (USFWS 2008b). The northern spotted owl is one of three recognized subspecies of spotted owls (American Ornithologists' Union 2011). The taxonomic separation of these three subspecies is supported by genetic (Barrowclough and Gutiérrez 1990, Haig et al. 2004), morphological (Gutiérrez et al. 1995), and biogeographic information (Barrowclough and Gutiérrez 1990). The distribution of the Mexican subspecies (*S. o. lucida*) is separate from those of the northern and California (*S. o. occidentalis*) subspecies (Gutiérrez et al. 1995). There is a narrow, apparently stable zone where hybridization occurs between the northern and California spotted owl in the Southern Cascades and Northern Sierra Nevada Mountains near the Pit River in California (Barrowclough et al. 2005).

Population Trends, Distribution and Range

The size of the northern spotted owl population prior to settlement by Europeans has not been estimated. Population trend data for northern spotted owl populations in California are not available, although there are localized study-specific analyses of population trend. The Department maintains a spotted owl occurrence database that consists of occurrences for both northern and California spotted owls but until recently the database had not been regularly updated. However, annual reports from Humboldt Redwood Company (HRC 2012), Mendocino Redwood Company (MRC 2010), and Green Diamond Resource Company (Green Diamond 2011), summarize survey results over at least a 10-year span and show a steady decline in population for these regions. The annual progress report for federal lands in Northwestern California shows a fairly stable to slightly declining population over the last 15 years.

Some literature indicates that population trends on public land declined at a slightly lower rate than those on privately owned and managed lands (Anthony 2006, Davis et al. 2011, Forsman et al. 2011). For 8 sites located on federal lands in portions of California, Oregon and Washington from 1985 to 2008, the northern spotted owl population trend shows a 2.8% decline each year. The annual decline for just the

Northwestern California NSO study area during this period was 1.7% (Davis et al. 2011).

The current distribution of the northern spotted owl in California includes three provinces described as: California Coast, California Klamath, California Cascades (Appendix A) (Thomas et al. 1993).

Reproduction

The northern spotted owl is relatively long-lived, has a long reproductive life span, invests significantly in parental care, and exhibits high adult survivorship relative to other North American owls (Forsman et al. 1984, Gutiérrez et al. 1995). Northern spotted owls sexually mature at 1 year of age, but rarely breed until they are 2 to 5 years of age (Forsman et al. 2002, USFWS 2011a). Breeding females lay one to four eggs per clutch, with the average being two eggs. Most northern spotted owl pairs do not nest every year, nor are nesting pairs successful every year (Forsman et al. 1984, USFWS 1990, Anthony et al. 2006).

Diet

Northern spotted owls are mostly nocturnal, although they also forage opportunistically during the day (Forsman et al. 1984). Generally, flying squirrels are the most prominent prey for northern spotted owls in Douglas-fir and western hemlock forests (Forsman et al. 1984) in Washington and Oregon, while dusky-footed wood rats are a major part of the diet in the Oregon Klamath, California Klamath, and California Coastal Provinces (Forsman et al. 1984, 2001, 2004, Ward et al. 1998, Hamer et al. 2001).

EVALUATION OF THE PETITION

The discussion below presents the Department's topic-area specific evaluation of the Petition, as well as other relevant information the Department possesses or received. (See generally Cal. Code Regs., tit. 14, § 670.1, subd. (d).)

Population Trend ("Executive Summary" [page 3] and "Population Status" [pages 12-15] in the Petition)

The Petition (page 3 and pages 12-15) summarizes the population trend of northern spotted owls in the Executive Summary and elaborates on it under "Population Status" (pages 12-15). The Petition does not assess the species' current population trend in California specifically. The Petition describes declining population trends over the entire northern spotted owl's range. The discussion and range-wide analysis includes California, Oregon, and Washington in the United States (U.S.), and British Columbia, Canada. The Petition primarily cites a recent study (Forsman et al. 2011) that analyzed eleven study areas spanning Washington, Oregon and northern California. Cumulatively, the eleven study areas compose approximately 9% of the northern spotted owl's range. This study indicates an average annual decline of 2.9% for the entire population from 1985 to 2006. For California, two of the three study areas identified declining annual population trends over the analysis period; 1.7% for owls in Northwest California (1988-2006) and 2.8% for owls within Green Diamond (1990-2006) land ownership. The third California study area (Hoopa: 1992-2006) is apparently stable, but the point estimate of decline (1.1%) was not statistically significant.

Population trend data for northern spotted owl populations in California are not available, although there are localized study specific analyses of population trend. As accurately described in the Petition, the Department maintains a spotted owl occurrence database that consists of occurrences for both northern and California spotted owls. Until recently the database had not been regularly updated. Annual reports from Humboldt Redwood Company (HRC 2012), Mendocino Redwood Company (MRC 2010), and Green Diamond Resource Company (Green Diamond 2011), summarize survey results over at least a 10-year span and show a steady decline in population for these regions. The annual progress report for federal lands in Northwestern California shows a fairly stable population over the last 15 years, however, a body of recent research indicates that increasing threats from barred owls and other factors may negatively influence this trend in the future (Franklin et al. 2012).

The Petition also discusses and cites literature that indicates population trends on public land declined at a slightly lower rate than those on privately owned and managed lands (Anthony 2006, Davis et al. 2011, Forsman et al. 2011). These studies consider the difference to be largely due to the management guidelines developed in the Northwest Forest Plan including the retention of late seral forest stands and other high quality owl habitats required in the plan. For 8 sites located on federal lands in portions of California, Oregon and Washington from 1985 to 2008, the northern spotted owl population trend shows a 2.8% decline each year. The annual decline for just the Northwestern California NSO study area during this period was 1.7% (Davis et al. 2011).

Based on information in the Petition and other data that is readily available to the Department for California, there is sufficient evidence to conclude that population trends are declining and warrant further evaluation to determine the extent of the decline in terms of the population's threat of extinction.

Range ("Biology and Ecology of the Northern Spotted Owl: Range" [discussed on pages 7 through 10] in the Petition)

The Petition (pages 7-10) discusses an historic and current northern spotted owl range that extends from California, through Oregon and Washington in the United States (U.S.), and into British Columbia, Canada. The Petition accurately indicates the species' range in California runs south from Siskiyou to Marin County in Northwestern California. It also discusses that the ranges of the northern and California subspecies of spotted owls meet at the southern end of the Cascade Range, near the Pit River area (Gutiérrez and Barrowclough 2005). The Petition (Figure 1 on page 8) identifies all the occupied physiographic provinces in the U.S. occupied by the northern spotted owl, including three in California: California Coast, California Klamath, and California Cascades (USFWS 2008b).

The consideration of relevant information outside of California supports a substantial decline of populations in the northern part of the owl's range, which corresponds to declining numbers in parts of Northern Oregon, Washington and most of British Columbia (Forsman 2011). The Petition accurately describes the Canadian Wildlife Service's view (COSEWIC 2008) that in British Columbia, the populations (and

therefore range) could be extirpated in the near future, with owls now being absent in most Southern British Columbia habitats that were occupied historically.

The Petition does not discuss a recent restriction or contraction of the species range, or any changes or stability of the range in California; however, the factors identified as contributors to range reduction in the northern part of the species' range could potentially affect the range in California. However, the Department does not believe there is sufficient evidence to conclude that the range of northern spotted owl in California has changed substantially.

Distribution ("Biology and Ecology of the Northern Spotted Owl: Range" [starting on page 9] in the Petition)

The Petition (pages 9-10) includes limited information addressing northern spotted owl distribution. The Petition includes general distribution maps for Oregon and California. The California map is not current and shows northern spotted owl distribution based on CDFG data dated February, 1996 (Gould 1996). A current distribution map is included in Appendix B of the petition evaluation based on the most up-to-date information available in the Department's spotted owl database. Besides an increase in the total number of known records, the more current map does not readily impart any new information about change in the distribution of the northern spotted owl in California.

Based on information in the Petition and other data that is readily available to the Department for California, there is not evidence to indicate that the distribution of northern spotted owl has changed during the time period of years for which surveying/monitoring of the species distribution has occurred.

Abundance ("IV. Population Status" [discussed on 12 through 15] in the Petition)

The Petition (pages 12-15) does not include direct information on the abundance of northern spotted owl populations in California, nor does it discuss abundance range-wide. The relevant information found in the literature cited in the Petition and other scientific documents that the Department has available is inconclusive to determine the abundance of northern spotted owls range-wide or in California. Further survey and monitoring would be required to determine the abundance of northern spotted owl populations in California.

Based on information in the Petition and other data that is readily available to the Department for California, there is uncertainty about whether the declining population trends from specific study areas has translated into an overall decrease in abundance of northern spotted owls in California. However, based on the studies and the potential threats, the Department acknowledges that abundance may have declined.

Life History ("Biology and Ecology of the Northern Spotted Owl: Physical Description and Taxonomy, and Prey" [discussed on pages 7, 10 and 11] in the Petition)

The Petition (page 7) includes a brief physical description of the northern spotted owl and includes references to support the taxonomic separation of the three subspecies based on genetic, behavioral and biogeographical characteristics (Gutiérrez et al 1995,

Courtney et al. 2004, Barrowclough et al. 2005). The Petition does not provide details regarding these characteristics, nor does it include any information regarding breeding ecology.

Regarding diet, prey species utilized by northern spotted owls are briefly described in the Petition, although much of the information was derived from study areas with habitats and prey communities outside of California. The Petition recognizes that prey distribution and abundance play a central role in the species' ecology, and that significant variation in prey across the range of northern spotted owl may drive eco-regional differences in its life history. However, the Petition fails to address the influence these prey items may have on northern spotted owl populations in California compared to other geographical areas.

The Petition further discusses that much of the high variation in northern spotted owl demographics may be explained, at least partially, by variations in prey abundance (Carey 1992, Courtney et al. 2004) and associates declining populations in Washington with low prey abundance, lack of particular prey species, and declining areas of old-growth habitat. A review of literature cited in the Petition and relevant information available to the Department found limited support for a definitive conclusion for any of these statements (Rosenberg et al. 1992, Carey et al. 1992, Ward et al. 1998).

In this petition evaluation, several factors that influence and impact habitat use, foraging, and reproductive success in the variety of habitats and climates within the owl's range (Ward et al. 1998, Anthony et al. 2006, USFWS 2011a) were identified. Studies support a preliminary conclusion that the owl is resourceful and adaptable to a variety of conditions, changes in habitat, and prey availability. However, based on information in the Petition and other data that is readily available to the Department for California, there remains uncertainty in our understanding of all life history requirements of northern spotted owl populations in California (Gutiérrez et al. 1996, Ward et al. 1998, Thome et al. 1999, Franklin et al. 2000, Courtney et al. 2004).

Habitat Necessary for Survival ("Biology and Ecology of the Northern Spotted Owl: Habitat Requirements" pages 11 and 12 in the Petition).

The Petition (pages 11-12) discusses the habitat necessary for survival and refers to general, range-wide habitat characteristics for northern spotted owl; relatively large areas of complex, older forests provide for breeding, forage, roosting and dispersal life history functions (Forsman et al. 2011). The Petition does not specifically describe habitats that exist in California, nor how available habitat types influence northern spotted owl populations found here. The only habitat information related to California in the Petition attributed to Franklin et al. (2000) is nonspecific to habitat types.

The Petition states that both the amount and the spatial distribution of nesting, roosting, foraging, and dispersal habitat influences reproductive success and long-term population viability of northern spotted owls, which is supported by the research referenced within the Petition. However, habitat types found in California, which may be considerably different than those found in other portions of the owl's range (Davis and Lint 2005, Davis et al. 2011), are not specified.

The Department agrees, as the Petition indicates, that there have been extensive studies supporting a strong association of northern spotted owls with older forests throughout its range. For the most part, these studies refer to research that analyzed associations range-wide or in other states rather than in California.

Citing Diller and Thome (1999), the Petition states that breeding occupancy is related to the presence of mature and old-growth forests in Northwestern California, as northern spotted owls usually occur in the oldest forests available on private lands. Then, citing several studies (Carey et al. 1992, Rosenberg and Anthony 1992, Buchanan et al. 1995, LaHaye and Gutiérrez 1999, Lehmkuhl et al. 2006) the Petition identifies understory structural characteristics of late-successional forest habitats as important for northern spotted owls and their prey, but does not describe those characteristics. The conclusions however, are supported by the referenced studies and the information the Department has in its possession.

The Petition states that northern spotted owl fecundity, production, survival, and recruitment are positively correlated to a larger proportion of older forest habitats in a pair's home range (Forsman et al. 2011, Bart and Forsman 1992, Franklin et al. 2000, Dugger et al. 2005, Olson et al. 2004). Additionally, the effects of barred owls have been found to increase with a decrease in the proportion of old forest habitat in a home range (Dugger et al. 2011); however, most of these studies cited are associated with habitats in Southern Oregon and would need California work to determine whether the relationship holds in habitats found in this state.

The Petition includes a discussion focusing on the importance and characteristics of dispersal habitat (page 12), and reasonably describes it as forested stands with adequate tree size and canopy closure to provide for foraging opportunities and protection from avian predators. Additionally, the Petition states that population growth can occur only if there is adequate habitat in an appropriate configuration to allow for the dispersal of owls across the landscape; including dispersing juveniles, nonresident sub-adults, and adults that have not yet recruited into the breeding population. However, no literature was cited in the Petition to support these conclusions related to dispersal habitat.

Outside of the Petition, information that the Department has available (e.g., Davis and Lint 2005) shows a distinct lack of dispersal habitat connectivity within two of the three California Provinces (California Coast and Cascades Provinces). However, this and other studies show that a variety of habitats are used for dispersal, and more information is needed to determine what key elements of dispersal habitat structure is required for a sustainable population range-wide and in California (LaHaye and Gutiérrez 1999, Thome et al. 1999, Franklin et al. 2000, Gonzales 2005, Phillips et al. 2010).

The Department concludes that the existing science that is readily available for California is varied and complex for specific characteristics of breeding, foraging, roosting, and dispersal habitats that are required for the northern spotted owl and requires further evaluation, thus contributing to uncertainty regarding the specifics of habitats necessary for survival.

Factors Affecting Ability of Population to Survive and Reproduce (“Biology and Ecology of Northern Spotted Owl” [starting on page 10] and “Northern Spotted Owl in California: Prey, Habitat Requirements in California” [starting on page 15] in the Petition)

The Petition does not specifically summarize the factors affecting the ability of northern spotted owl populations to survive and reproduce in California or range-wide. These factors were found interspersed throughout the Petition within the following two sections: “Biology and Ecology of Northern Spotted Owl” and “Nature, Degree, and Immediacy of the Threat to Northern Spotted Owls in California.”

Primary factors described in the Petition affecting the ability of the population to survive and reproduce included prey availability, and the amount of suitable nesting, foraging, roosting, and dispersal habitat available (i.e., old growth and mature forest habitats). Additionally, direct and indirect threats of habitat loss and fragmentation by timber harvest, catastrophic fire, human development, barred owls, sudden oak death and West Nile Virus were cited as influencing the ability of the northern spotted owl populations to survive and reproduce in California (Courtney et al. 2008, Forsman et al. 2011, USFWS 2011a).

The Petition states, “Large areas of older, structurally complex forests provide the habitat necessary to support viable populations of northern spotted owls (Forsman et al. 2011).” However, the literature cited to support this conclusion is based on a meta-analysis of studies across the species full range. One California study cited in the Petition states that northern spotted owl survival was positively associated with area of old forest habitat in the core, but reproductive output was positively associated with the amount of edge between older forest and other habitat types in the home range (Franklin et al. 2000).

Extracting California-specific information from the relevant scientific information that the Department has readily available (Forsman et al. 2011, Davis et al. 2005, Anthony 2006), the Department believes that there has been a decline in the northern spotted owl population in the state and that factors, such as those listed in the Petition are likely to have influenced this decline. The Department acknowledges a likely increase of potential threats (e.g., Diller et al. 2010). Factors affecting this decline in California include the range of items described in the Petition under “needs and threats”; but, the Petition does not make a strong link of these to California populations of northern spotted owl. The Petition identifies these factors as availability of prey; loss and fragmentation of suitable nesting, foraging, roosting, and dispersal habitats (i.e. old growth and mature forest habitats) in the face of timber harvest, catastrophic fire, and human development; and biological threats from the barred owl, predation, and disease.

While the Petition suggests certain hypotheses, the Department believes, due to the absence of comprehensive analysis and criteria specific to California, that there remains uncertainty at this time regarding the extent in any given northern spotted owl population that these factors, or some combination of them, affect the ability of northern spotted owls to survive and reproduce.

Degree and Immediacy of Threat (“Executive Summary” [starting on page 3] and “Nature, Degree and Immediacy of Threat to Northern Spotted Owl in California” [starting on page 15] in the Petition)

The Petition (page 3 and pages 15-25) discusses the degree and immediacy of threat to northern spotted owls relying on sources ranging from USFWS federal listing documents to specific focused studies.

The Petition provides information that spans potential or documented threats to northern spotted owls range-wide. These include impacts to the owl populations and prey base, loss of critical habitats from fire, logging and urban development, and other potential impacts of barred owls, predation, and disease. The potential impact and degree of threat from climate change was not discussed, although the research available suggests it poses a threat that warrants evaluation (Franklin et al. 2000, Spies et al. 2010, Glenn et al. 2011).

Loss of late-seral forest and other required habitat elements across the northern spotted owl’s range are well-documented (USFWS 2011a, Moeur et al. 2005, Raphael 2006, Courtney et al. 2004). The Petition describes extensive habitat loss in Washington and Oregon over the last 20 years (Courtney et al. 2004, Davis and Lint 2005, Campbell et al. 2010).

The Petition does not discuss historic or recent habitat loss for California. It does tabulate twenty-seven of Sierra Pacific Industries THPs (Table 3 in the Petition) that the Petitioner identified as activities “destroying northern spotted owl habitat in violation of the ESA Section 9 ‘Take’ prohibition”. The table concludes that over 2833 ha (7000 ac) of northern spotted owl habitat that have been or will be destroyed by these plans. However, the Department analysis was unable to confirm the number of acres of owl habitat alleged as subject to destruction.

In some cases, silviculture/habitat crosswalks in Table 3 were apparently inconsistently applied. For example, Hogs THP (2-09-010-TRI) was identified as destroying 83 acres of northern spotted owl habitat of the 116 acres included in the plan, but the silviculture numbers of 37 acres (clear-cut), 13 acres (selection), 22 acres (commercial thinning), 15 acres (alternative) and 29 acres (sanitation salvage) do not combine together in any combination that totals 83 acres. The most expected combination based on potential impacts to habitat would be to add the clear-cut, alternative and sanitation salvage which totals 81 (37+15+29).

In other cases, estimated destroyed acreage in Table 3 was inaccurate because the area of the entire plan was smaller than the amount destroyed. For example, the Petition identifies the Wilcox THP (2-09-038TRI) as destroying 293 ha (724 ac) of owl habitat, but the entire plan only totals 226 ha (559 ac). Additionally, the Petition states that it will “provide the supporting information for the identified Sierra Pacific THPs, including the owl and habitat data”. The supporting information however, was not provided. To assess the impacts of timber harvest activities in California for direct, indirect and cumulative effects to northern spotted owl populations, and the degree and immediacy of any threat identified, a more in-depth evaluation would be needed.

The Petition describes habitat loss and decline of preferred prey species range-wide, but does not focus on California habitats or prey species, nor does it present how habitat loss within California may impact prey abundance. Information related to prey species in California is mentioned briefly but presents no conclusions or supporting scientific evidence identifying the degree, immediacy, or magnitude of these threats.

The Petition accurately states that one of the greatest threats to the northern spotted owl both in California and across its range is the increasing competition by the barred owl. This owl species has been expanding its range from eastern North America over the last half century to the point that it now completely overlaps the range of the northern spotted owl. The barred owl is known to prey upon, hybridize with, displace and out-compete northern spotted owls (USFWS 2011a). The Petition accurately identifies the increasing threat that barred owls pose to northern spotted owls due to competition for breeding and foraging habitats, and the associated significant negative effects on northern spotted owl reproduction and survivorship.

The relevant information readily available to the Department shows a north to southward trend in the expansion of the barred owl range, with this threat recently moving into California. The barred owl may be the primary reason for the near-extirpation of northern spotted owls in Canada, as well as the marked declines in Washington and Oregon (Forsman 2011, USFWS 2011a, USFWS 2012b, Dark et al. 1998, Kelly et al. 2003). After a period of initial invasion, barred owl populations increase as do their potential impacts to northern spotted owl populations. Currently, the California portion of the northern spotted owl's range is experiencing the post-invasion increase in barred owls. As in other parts of the northern spotted owls range, the barred owl may be the primary reason for recent declines in California. Recent scientific information (Diller et al. 2010) suggests a strong negative link between barred and northern spotted owls. The related research cited above on Green Diamond Resource Company land found in most cases that northern spotted owls reoccupied areas where barred owls were removed.

The Petition identifies predation and West Nile Virus as potential threats that may have a negative impact on the northern spotted owl populations in the future. A more thorough evaluation is needed to determine the extent to which these factors may influence owl population viability in California. Trichomoniasis is another disease that has been recently identified in northern spotted owl carcasses (CDFG 2012b) but for which the Petition contains no information about the disease or the disease's impact on the species. Impacts due to predation on northern spotted owls also needs more investigation. While the Petition and other information suggests certain hypotheses regarding predation and disease impacts to northern spotted owls, the Department finds that in the absence of specific research findings on disease and predation effects in California, the scientific uncertainty at this time limits conclusions regarding the importance of these factors in affecting northern spotted owl populations.

Much of the information included in the Petition supporting the degree and immediacy of threat was derived from studies conducted outside of California. However, the Department believes that while the magnitude and mechanisms of the threats may differ between California and other portions of the northern spotted owls range, the non-California studies do provide useful information regarding potential in-state threats.

Impact of Existing Management Efforts (“Inadequacy of Existing Regulatory Mechanisms” [starting on page 19] in the Petition)

The Petition (pages 19-23) describes the overall regulatory and management inadequacies believed to exist between federal lands, non-federal lands, and then by each U.S. state within the northern spotted owl’s range.

The information directly related to California discusses the inadequacy of federal protections to stop declines, noting that the owl population has not stabilized since the 1990 Federal Endangered Species Act listing in spite of the protections afforded by the Northwest Forest Plan (NWFP) (Davis et al. 2011, USFWS 2011a). The Petition concludes that this is due to insufficient protections and a lack of recovery planning outside of late-successional reserves established on federal lands by the NWFP.

The Petition further discusses the lack of protection on private lands by citing a review (DellaSala 2011) that specifies the areas of management deficiencies as follows:

- (a) *variable and often inadequate protection given to owls and owl habitat;*
- (b) *lack of landscape-scale planning, especially on non-federal lands;*
- (c) *use of survey protocols and other standards that fail to incorporate current relevant science;*
- (d) *prevalence of discretionary guidelines and/or unclear or unsuitable direction;*
- (e) *failure to consistently require involvement of personnel with biological expertise in evaluating/assessing ecological information.*

The Department involvement in biological assessment and evaluation for the species in THP review has been limited in the last few years. Beginning January 1, 2013, the Department will resume full participation in the THP review process. The Department conducted “Take” consultations of all THPs until June 1999. USFWS picked up the work until about spring 2008, when the California Department of Forestry and Fire Protection (CALFIRE) began reviewing THPs following guidelines from USFWS supported by technical assistance from USFWS of specific plans and issues. Consequently, as it relates to this portion, existing/future management efforts will be expanding compared to the recent past.

The Petition states that protection under the federal ESA is not sufficient to ensure the long-term survival of northern spotted owls in California. The northern spotted owl is currently protected as a threatened species under the federal ESA, which prohibits all non-permit take as defined under the federal ESA. The USFWS has issued survey guidance, including updates (most recently, USFWS 2011b) to identify situations where a development project may take a northern spotted owl.

The Department currently has no special status classification assigned to the northern spotted owl in California. However, governmental entities and land managers are required to evaluate any potential impacts to native biological resources during CEQA review. Projects that have the potential to impact northern spotted owls are required to

comply with the California Environmental Quality Act (CEQA) or an equivalent Certified Regulatory Program such as the Forest Practices Act. Not only do projects need to avoid “take” under the federal ESA, CEQA dictates they must be developed to identify and mitigate significant direct and cumulative significant impacts. The California Department of Forestry and Fire Prevention (CALFIRE) has also developed guidance specific to California to avoid take to northern spotted owls by timber harvest (CALFIRE 2012).

The Department concludes that the existing science that is readily available for California is varied and complex for the spotted owl as it relates to management efforts. The Department acknowledges and understands there have been efforts and locations where management occurred that was either beneficial or detrimental to the northern spotted owl; or in some cases perhaps benign. Whether the existing management efforts will successfully address factors that could otherwise limit the species remains uncertain in the present.

Suggestions for Future Management (“Recommended Management and Recovery Actions” [starting on page 25] in the Petition)

The Petition (page 27) recommends two management and recovery actions. First is that the Commission list the northern spotted owl in California under CESA. Second is the initiation of a long-term planning process to develop a recovery plan using the best science available. CESA does not require recovery plans be prepared for species listed under the act. The Department is aware the USFWS recently adopted an updated Recovery Plan (USFWS 2011a) intended to apply across the species' full range.

The Petition does not provide support for its assertion that these two recommended management and recovery actions are needed to sustain northern spotted owl populations in California. The contents of a California-specific Recovery Plan are unknown. While proposed actions in such a Recovery Plan could be extensive and rigorous, the successful implementation of such plans is often accomplished through voluntary action, and are thus of unknown application and efficacy. An increased level of conservation and management action through a Northern Spotted Owl Conservation Strategy could improve conditions for this species in the State.

Management elements are suggested throughout the Petition but are not identified under “Suggestions for Future Management”. Additionally, the Petition supports a possible management strategy of protecting more late-seral and mature forest habitats as a potential solution to minimize the increasing threats to northern spotted owl posed by the barred owl. The Department finds that the lack of existing science specific to California regarding what particular actions may be necessary for future management and conservation of the northern spotted owl make drawing conclusions difficult, and the topic therefore requires further evaluation.

Distribution Map (“Northern Spotted Owl Distribution in California” [page 9] in the Petition)

The Petition (page 9) includes a distribution map for northern spotted owls in California; however, the distribution map is outdated (Gould 1996). The Petition accurately stated that the Department maintains records of northern spotted owl territories for California. An up-

to-date distribution map prepared from the Department spotted owl database based on northern spotted owl records is included in Appendix B.

Availability and Sources of Information ("Literature Cited" [starting on page 27] in the Petition)

The Petition (pages 27-35) included a list of literature cited references in the document. The information content of this literature was not accessible when originally submitted on a CD to the Commission with the Petition.

Preparers

This report was drafted by Department of Fish and Wildlife staff: R. Lee, C. Battistone, D. Applebee, and K. Rogers of the Wildlife Branch; B. Valentine of the Northern Region; and L. Bauer of the Office of General Counsel.

REFERENCES

American Ornithologists' Union. 2011. Fifty-second supplement to the American Ornithologists' Union Check-List of North American Birds (2011). *The Auk* 128(3):600-613.

Anthony, R.G., E.D. Forsman, A.B. Franklin, D.R. Anderson, K.P. Burnham, G.C. White, C.J. Schwarz, J. Nichols, J.E. Hines, G.S. Olson, S.H. Ackers, S. Andrews, B.L. Biswell, P.C. Carlson, L.V. Diller, K.M. Dugger, K.E. Fehring, T.L. Fleming, R.P. Gerhardt, S.A. Gremel, R.J. Gutiérrez, P.J. Happe, D.R. Herter, J.M. Higley, R.B. Horn, L.L. Irwin, P.J. Loschl, J.A. Reid, and S.G. Sovern. 2006. Status and trends in demography of northern spotted owls, 1985–2003. *Wildlife Monographs* No. 163.

Barrowclough, G.F. and R.J. Gutiérrez. 1990. Genetic variation and differentiation in the spotted owl (*Strix occidentalis*). *The Auk* 107: 737-744.

Barrowclough, G.F., J.G. Groth, and R.J. Gutiérrez R.J. 2005. Genetic structure, introgression and a narrow hybrid zone between northern and California spotted owls (*Strix occidentalis*). *Molecular Ecology* 14:1109–1120.

Bart, J, and E.D. Forsman. 1992. Dependence of northern spotted owls, *Strix occidentalis caurina*, on old-Growth growth forests in the Western United States. *Biological Conservation* 62:95-100.

Bigger, D., K. Sullivan, and S. Chinnici. 2009. Modeling reproductive performance of northern spotted owls relative to forest habitat in coastal California.

*Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1995. Within-stand nest site selection by spotted owls in the eastern Washington Cascades. *J. Wildlife Management* 59:301–310.

CDFG. 2012b. Personal communication with Krysta Rogers, October 31, 2012, Wildlife Investigations Lab, California Department of Fish and Game.

CALFIRE. 2012. Guidance memorandums for THP impact assessment and evaluation. http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_pubsmemos_memos.php

Campbell, S., K. Waddell, and A. Gray, tech. eds. 2010. Washington's forest resources, 2002–2006: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-800. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 189 p. http://www.fs.fed.us/pnw/pubs/pnw_gtr800.pdf

Carey, A.B, S.P. Horton, and B.L. Biswell. 1992. Northern spotted owls: influence of prey base and landscape character. *Ecol. Monographs* 62:223–250.

Carroll, C., and D.S. Johnson. 2008. The importance of being spatial (and reserved): assessing northern spotted owl habitat relationships with hierarchical Bayesian models. *Conservation Biology* 22:1026–1036.

COSEWIC. 2008. COSEWIC assessment and update status report on the spotted owl *Strix occidentalis caurina*, *Caurina* subspecies, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 48 pp.

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, and L. Sztukowski. 2004. Final report: scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute, Portland, Oregon.

Courtney, S.P., A.B. Carey, M.L. Cody, K. Engel, K.E. Fehring, J.F. Franklin, M.R. Fuller, R.J. Gutiérrez, J.F. Lehmkuhl, M.A. Hemstrom, P.F. Hessburg, S.L. Stephens, L.A. Sztukowski, and L. Young. 2008. Scientific Review review of the draft northern spotted owl recovery plan and reviewer comments. Sustainable Ecosystems Institute, Portland, Oregon.

Dark, S.J., R.J. Gutiérrez, and G.I. Gould Jr. 1998. The barred owl (*Strix varia*) invasion in California. *The Auk* 115(1):50-56.

Davis, R. and J. Lint. 2005. Habitat status and trends. Pages 21–82 in J. Lint (technical coordinator), Northwest Forest Plan—the first 10 years (1994–2003): status and trends of northern spotted owl populations and habitat. Gen. Tech. Rep. PNW-GTR-648, USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Davis, Raymond J.; Dugger, Katie M.; Mohoric, Shawne; Evers, Louisa; Aney, William C. 2011. Northwest Forest Plan—the first 15 years (1994–2008): status and trends of northern spotted owl populations and habitats. Gen. Tech. Rep. PNWGTR- 850. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 147 p.

*Dellasala, D. 2011. Comments on the 5-year status review for northern spotted owl submitted to the U.S. Fish and Wildlife Service. USDA, Forest Service.

*Diller, L.V. and D.M. Thome. 1999. Population density of northern spotted owls in managed young-growth forests in coastal northern California. *Journal of Raptor Research* 33:275–286.

Diller, L.; Hamm, K.; Lamphear, D.; McDonald T. 2010. Green Diamond Resource Company, northern spotted owl habitat conservation plan, ten-year review report. Report available from U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata, California. 193 p.

Diller, L, K. Hamm, D. Lamphear, and T. McDonald. 2012. Two decades of research and monitoring of the northern spotted owl on private timberlands in the redwood region: what do we know and what challenges remain? In *Proceedings of Coast Redwood Forests in a Changing California: a Symposium for Scientists and Managers*. USDA, Forest Service, Pacific Southwest Research Station, General Technical Report - 238, Albany, CA, pp. 399-407

Dugger, K.M., F. Wagner, R.G. Anthony, and G.S. Olson. 2005. The relationship between habitat characteristics and demographic performance of northern spotted owls in southern Oregon. *Condor* 107:863–878.

Dugger, K., R.G. Anthony, L. S. Andrews. 2011. Transient dynamics of invasive competition barred owls, spotted owls, habitat, and demons of competition present. *Ecol. Applications*. 21(7):2459-2468.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. *Wildlife Monographs* 87:1–64.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of Spotted Owls in Washington. *J. Raptor Res.* 35:141–150.

Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. *Wildlife Monographs* 149:1–35.

Forsman, E.D., R.G. Anthony, E.C. Meslow and C.J. Zabel. 2004. Diets and foraging behavior of northern spotted owls in Oregon. *J. Raptor Research* 38:214–230.

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. Schaberel, T.J. Snetsinger, and S.G. Sovern. 2011. Population Demography of the northern spotted owls: 1985-2008. *Studies in Avian Biology*. In Press. Draft

Franklin, A.B., D.R. Anderson, J.R. Gutiérrez, and K.P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. *Ecological Monographs* 70:539–590.

Franklin, A. B., P.C. Carlson, J.T. Rockweit, W. Lanier, B.R. Barry, A. Rex, T. Zaffarano, J. Shrum and K. Wilson. 2012. Monitoring the population ecology of spotted owls, *Strix occidentalis caurina*, in Northwestern California: annual results, 2011. Annual progress report to Region 5, USDA Forest Service, Colorado State University.

Funk, C.W., E.D. Forsman, M. Johnson, T. D. Mullins, and S. M. Haig. 2010. Evidence for recent population bottlenecks in northern spotted owls: *Strix occidentalis caurina*. *Conserv. Genet.* (2010) 11:1013-1021.

Gabriel M.W., L.W. Woods, R. Poppenga, R.A. Sweitzer, C. Thompson, et al. 2012. Anticoagulant Rodenticides on our public and community lands: spatial distribution of exposure and poisoning of a rare forest carnivore. *PLoS ONE* 7(7): e40163.

Glenn, E.M., R.G. Anthony, E.D. Forsman, and G.S. Olson. 2011. Reproduction of northern spotted owls: the role of local weather and climate. *J. Wildlife Management*, 75(6):1279-1294.

Gonzales, A. G. 2005. Northern spotted owl nesting habitat on private timber lands in Northwest California. Thesis, California State University, Humboldt, 68 pages.

Gould, G.I. 1975. Habitat requirements of the spotted owl in California. CAL-NEVA Wildlife Transactions, California Department of Fish and Game, Blythe, CA.

Gould, G. 1996. Northern spotted owl sites: California – February 1996, California Department of Fish and Game.

Green Diamond Resource Company. 2008. Status of northern spotted owls in managed young growth timberlands in Northern California 1990-2008. Annual report submitted to the Office of Management Authority and the U.S. Fish and Wildlife Service in fulfillment of the requirements of Endangered Species permit, TE057043-3, issued to Green Diamond Resource Company, Korb, California.

Green Diamond Resource Company. 2011. Status of northern spotted owls in managed young growth timberlands in Northern California 1990-2011. Annual report submitted to the Office of Management Authority and the U.S. Fish and Wildlife Service in fulfillment of the requirements of Endangered Species permit, TE057043-3, issued to Green Diamond Resource Company, Korb, California.

Gutiérrez, R.J. 1996. Biology and distribution of the northern spotted owl. *Studies in Avian Biology* 17:2-5.

Gutiérrez, R. J. and A. B. Carey. 1985. Ecology and management of the spotted owl in the Pacific Northwest. US Forest Service, Pacific Northwest Region, Portland Oregon.

Gutiérrez, R.J. and G.E. Barrowclough. 2005. Redefining the distributional boundaries of the northern and California spotted owls: implications for conservation. *The Condor* 107:182-187.

- Gutiérrez, R.J., A.B. Franklin, and W.S. LaHaye. 1995. Spotted owl (*Strix occidentalis*) in A. Poole and F. Gill (editors), *The Birds of North America*, No. 179. The Academy of Natural Sciences and the American Ornithologists' Union, Washington, D.C. 28 pp.
- Haig, S.M., R.S. Wagner, E.D. Forsman, and T.D. Mullins. 2001. Geographic variation and genetic structure in spotted owls. *Conservation Genetics* 2:25–40.
- Haig, S.M., T.D. Mullins, and E.D. Forsman. 2004. Subspecific relationships and genetic structure in the spotted owl. *Conservation Genetics* 5:683–705.
- Hamer, T.E., D.L. Hays, C.M. Senger, and E.D. Forsman. 2001. Diets of northern barred owls and northern spotted owls in an area of sympatry. *J. Raptor Res.* 35:221–227.
- HRC (Humbolt Redwood Company). 2012. Northern spotted owl annual report, 2011. Scotia, California, 34 pages.
- Kelly, E.G., E.D. Forsman, and R.G. Anthony. 2003. Are barred owls displacing spotted owls? *Condor* 105:45–53.
- LaHaye, W.S. and R.J. Gutiérrez. 1999. Nest sites and nesting habitat of the northern spotted owl in northwestern California. *Condor* 101:324-330.
- Lehmkuhl, J.F., K.D. Kistler, J.S. Begley and J. Boulanger. 2006. Demography of northern flying squirrels informs ecosystem management of western interior forests. *Ecological Applications* 16:584–600.
- Leskiw, T. and R.J. Gutierrez. 1998. Possible predation of a spotted owl by a barred owl. *Western Birds* 29:225-226.
- 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. General Technical Report PNW-GTR-440. USDA Forest Service, Pacific Northwest Research Station, Portland, OR.
- Moeur, M., T.A. Spies, M. Hemstrom, J.R. Martin, J. Alegria, J. Browning, J. Cissel, W.B. Cohen, T.E. Demeo, S. Healey, and R. Warbington. 2005. Northwest Forest Plan—the first 10 years (1994–2003): status and trend of late-successional and old-growth forest. Gen. Tech. Rep. PNW-GTR-646. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.
- MRC (Mendocino Redwood Company). 2011. Powerpoint of Mendocino Redwood Company annual survey report up to 2010, 11 pages.
- Olson, G.S., E.M. Glenn, R.G. Anthony, E.D. Forsman, J.A. Reid, P.J. Loschl, and W.J. Ripple. 2004. Modeling demographic performance of northern spotted owls relative to forest habitat in Oregon. *J. Wildlife Management* 68:1039–1053.

Phillips et al. 2010. Do California spotted owls select nest trees close to forest edges? *J. Raptor Research* 44(4):311-314.

Press, D., W. Merkle, H. Jensen, F. Taroc, and T. Ellis. 2012. Monitoring northern spotted owls on federal lands in Marin County, California: 2010-2011 Report. Natural Resources Technical Report NPS/SFAN/NRTR – 2012/606. USDI, National Park Service, Natural Resource Stewardship and Science, Fort Collins, Colorado.

Raphael, M.G. 2006. Conservation of listed species: the northern spotted owl and marbled murrelet. Chapter 7 in R.W. Haynes, B.T. Bormann, D.C. Lee, and J.R. Martin (technical editors), *Northwest Forest Plan—the first 10 Years (1994–2003): synthesis of monitoring and research results*. Gen. Tech. Rep. PNW-GTR. USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon.
<http://www.fs.fed.us/pnw/publications/gtr651/>

Rosenberg, D.K. and R.G. Anthony. 1992. Characteristics of northern flying squirrel populations in young second and old-growth forests in western Oregon. *Canadian J. Zoology* 70:161-166.

Sekercioglu 2006. Increasing awareness of avian function. *Trends in Ecology and Evolution*. Stanford University Center for Conservation Biology, Department of Biological Sciences, Stanford, CA. Vol 21, No. 6, pp 454-471.

Spies, T.A., T.W. Geisen, F.J. Swanson, J.F. Franklin, D. Lach and K.N. Johnson. 2010. Climate change adaptation strategies for federal forests of the Pacific Northwest, USA: ecological, policy, and socio-economic perspectives. *Landscape Ecology* 25:1185–1199.

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. Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service. Portland, Oregon. 458 pp.

Thomas, J.W., M.G. Raphael, R.G. Anthony, E.D. Forsman, A.G. Gunderson, R.S. Holthausen, B.G. Marcot, G.H. Reeves, J.R. Sedell, and D.M. Solis. 1993. Viability assessments and management considerations for species associated with late-successional and old-growth forests of the Pacific Northwest. U.S. Forest Service, Portland, Oregon.

Thome, D.M. C.J. Zabel, and L.V. Diller. 1999. Forest stand characteristics and reproduction of northern spotted owls in managed north-coastal California forests. *J. Wildlife Mngt.* 63(1):44-59.

USDA (U.S. Department of Agriculture). 1988. Final supplement to the environmental impact statement for an amendment to the Pacific Northwest regional guide: spotted owl guidelines, vols. 1 and 2. U.S. Forest Service, Pacific Northwest Region, Portland, Oregon.

USDA (U.S. Department of Agriculture), and USDI (U.S. Department of the Interior). 1994. Final supplemental environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. U.S. Forest Service and U.S. Bureau of Land Management, Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 1990. Endangered and threatened wildlife and plants; determination of threatened status for the northern spotted owl. Federal Register 55:26114–26194.

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

USFWS (U.S. Fish and Wildlife Service). 2011a. Revised recovery plan for the northern spotted owl (*Strix occidentalis caurina*). Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 2011b. Protocol for surveying proposed management activities that may impact northern spotted owls. Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service). 2012b. Experimental removal of barred owls to benefit threatened northern spotted owls. Draft Environmental Impact Statement, March 2012. U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS (U.S. Fish and Wildlife Service) and California Department of Fish and Game (CDFG). 1991. Cooperative agreement between CDFG and the USFWS: endangered and threatened fish, wildlife and plants. 6 pages.

Ward, J.W. Jr., R.J. Gutiérrez and B.R. Noon. 1998. Habitat selection by northern spotted owls: the consequences of prey selection and distribution. *Condor* 100:79–92.

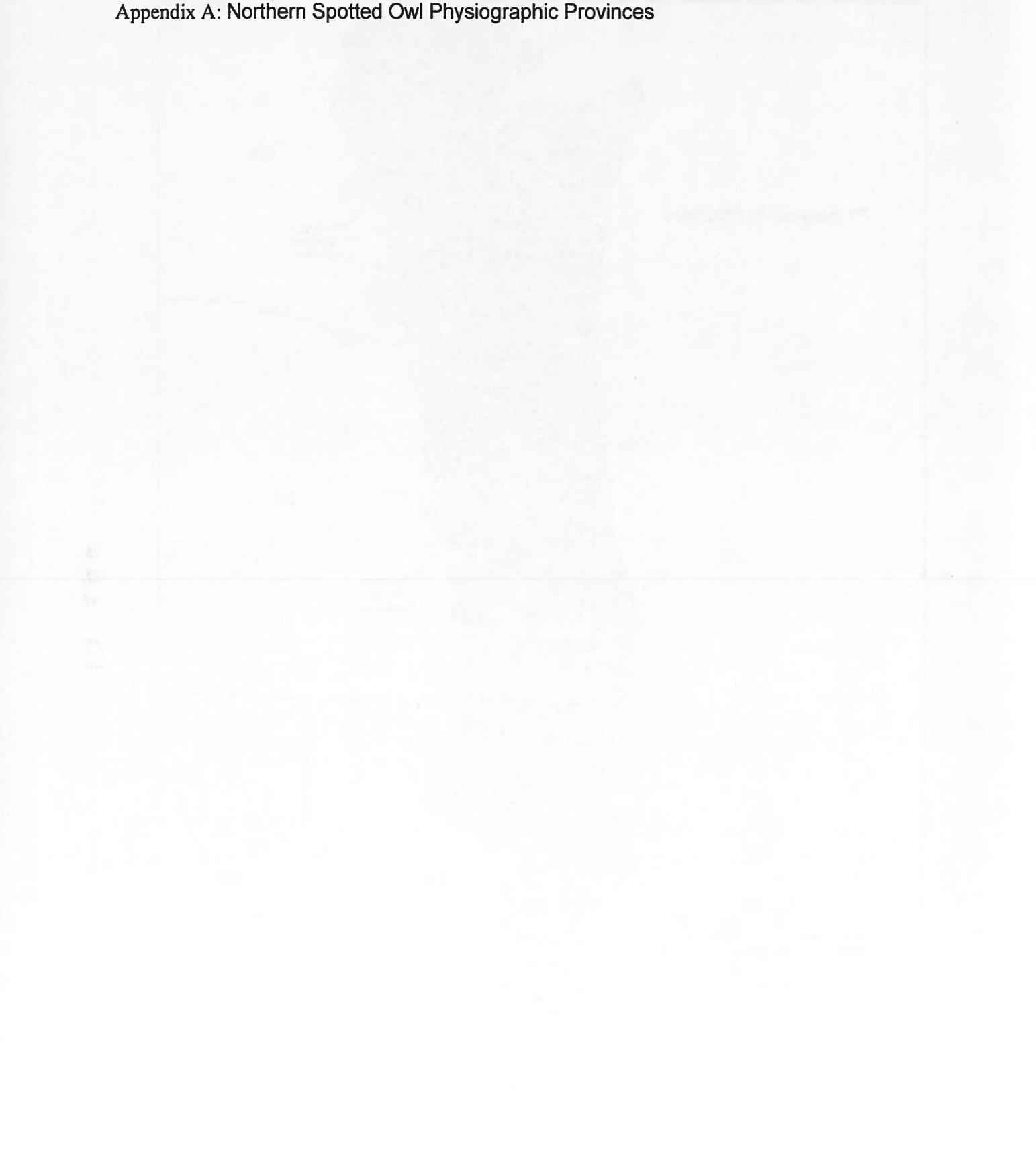
Zabel, C.J., K.M. McKelvey and J.P. Ward, Jr. 1995. Influence of primary prey on home-range size and habitat-use patterns of northern spotted owls (*Strix occidentalis caurina*). *Canadian J. Zoology* 73:433–439.

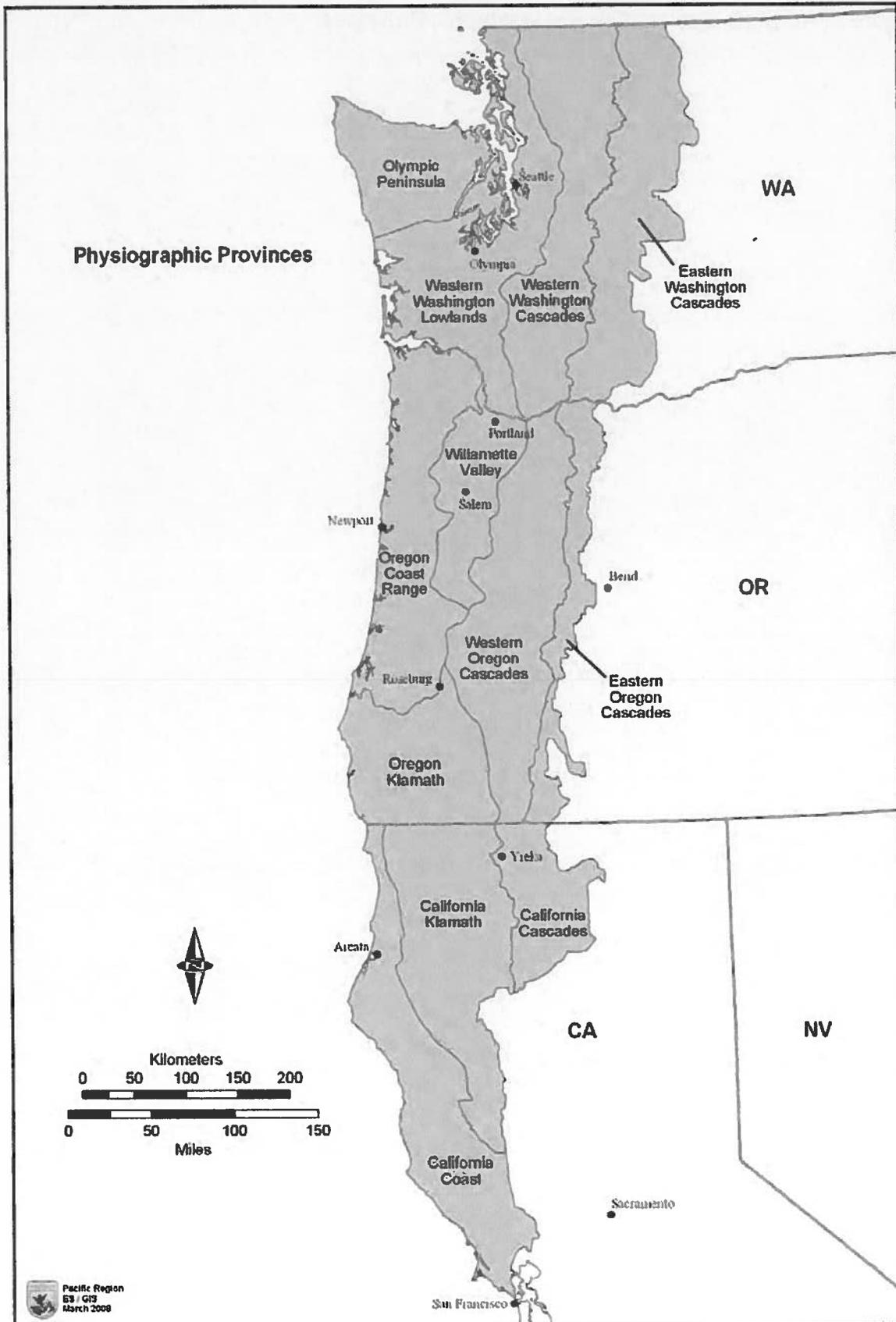
*Literature cited from the Petition referenced in petition evaluation but was not available for review by Department staff.

APPENDICES

Appendix A – Northern Spotted Owl Physiographic Provinces
Appendix B – Northern Spotted Owl Distribution in California

Appendix A: Northern Spotted Owl Physiographic Provinces





Appendix B: Northern Spotted Owl Distribution in California

Northern Spotted Owl Distribution in California

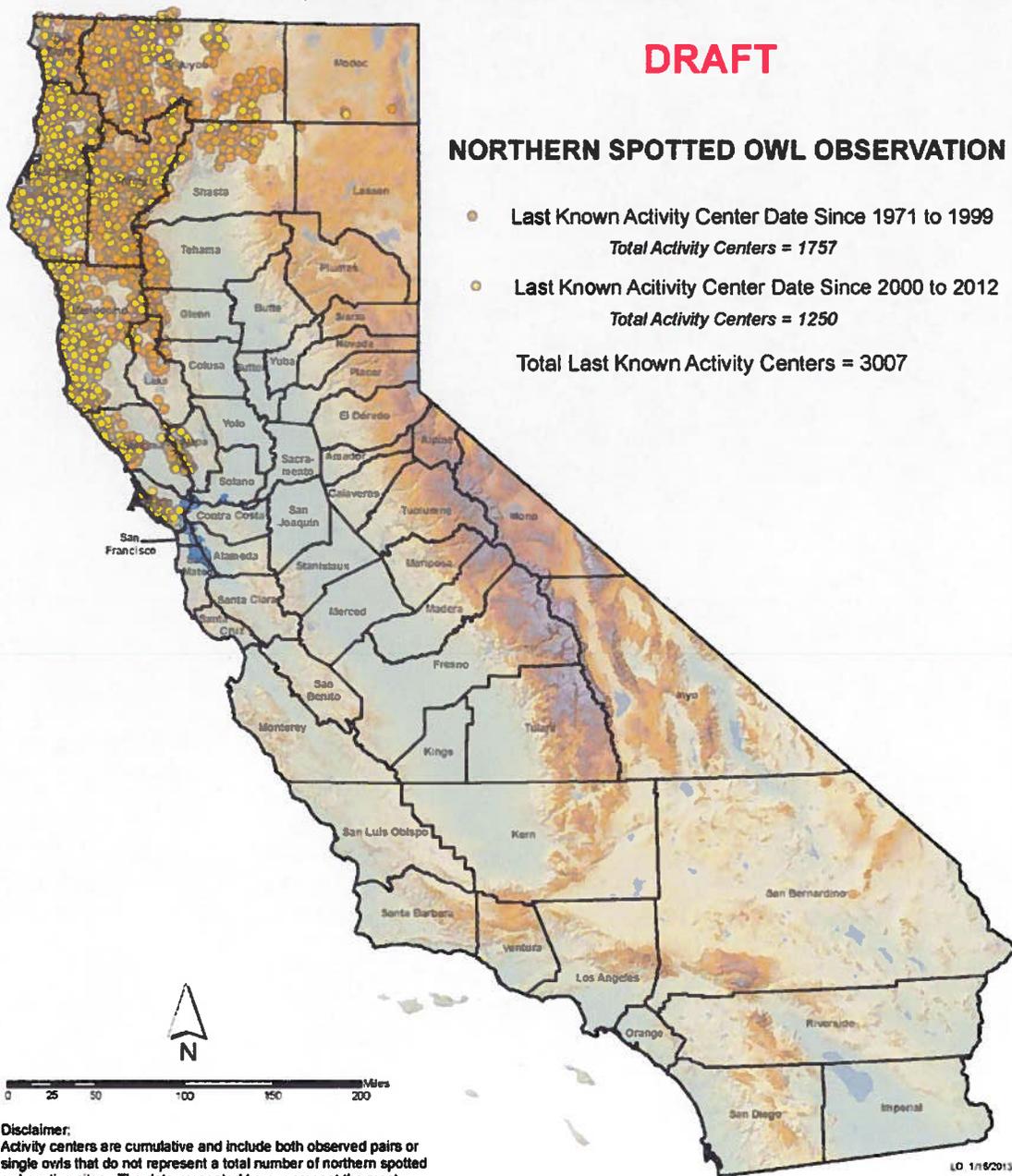
Based on California Department of Fish and Wildlife's
Spotted Owl Observation Database



DRAFT

NORTHERN SPOTTED OWL OBSERVATION

- Last Known Activity Center Date Since 1971 to 1999
Total Activity Centers = 1757
 - Last Known Activity Center Date Since 2000 to 2012
Total Activity Centers = 1250
- Total Last Known Activity Centers = 3007



Disclaimer:
Activity centers are cumulative and include both observed pairs or single owls that do not represent a total number of northern spotted owl nesting sites. The data presented here represent the most current survey information that CDFW has analyzed. Not all sites are surveyed each year and CDFW does not have current data for some historic NSO sites.

LO 1/16/2013
Data Source
Spotted Owl Observations dataset, December 2012.
California Department of Fish and Wildlife,
Biogeographic Data Branch, Sacramento, CA.

