STAFF SUMMARY FOR JUNE 21-22, 2017

12. NORTHERN SPOTTED OWL

Today's Item **Information ☐** **Action ☒**

Adopt findings on the petition to list northern spotted owl (*Strix occidentalis caurina*) as a threatened or endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

• Received petition	Sept 7, 2012
• FGC transmits petition to DFW	Sept 10, 2012
• Published notice of receipt of petition	Oct 5, 2012
• Approved DFW request for 30-day extension	Dec 12, 2012; San Diego
• Received DFW's evaluation and recommendation	Mar 6, 2013; Mount Shasta
• Deferred decision whether listing may be warranted	Apr 17, 2013; Santa Rosa
• FGC determined listing may be warranted	Aug 7, 2013; San Luis Obispo
• Approved DFW request for six month extension	Dec 3, 2014; Van Nuys
• Received DFW status review report	Feb 10-11, 2016; Sacramento
• Discussion; deferred action to Jun 2016 meeting	April 13-14, 2016; Santa Rosa
• Discussion; deferred action to Aug 2016 meeting	Jun 22-23, 2016; Bakersfield
• Determination that listing is warranted	Aug 24-25, 2016; Folsom
• Considered draft findings	Feb 8-9, 2017; Rohnert Park
• Deferred taking action on draft findings	April 26-27, 2017; Van Nuys
• **Today adopt findings**	**Jun 21-22, 2017; Smith River**

Background

On Aug 25, 2016, FGC made a finding pursuant to Fish and Game Code Section 2075.5, that the petitioned action to list northern spotted owl as threatened under CESA is warranted.

On Feb 8, 2017, FGC considered draft findings supporting the Aug 2016 determination. FGC received several comments suggesting revisions to the draft findings and, in light of those comments, FGC directed staff to review the comments and findings to allow FGC consideration at the Apr meeting. The Environmental Protection Information Center, the sole entity that filed the petition to list the northern spotted owl, requested that FGC delay consideration of findings until the Jun 21-22, 2017 FGC meeting in Smith River.

FGC staff evaluated the comments received in Feb and revised the draft findings to reflect discussions FGC has had over the last several meetings.

Significant Public Comments (N/A)

Recommendation

FGC staff: Adopt FGC staff's revised proposed notice of findings that listing northern spotted owl as threatened is warranted pursuant to Section 2075.5 of the Fish and Game Code.

Exhibits

1. *Draft Notice of Findings, Northern Spotted Owl (revised June 2017)*

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts staff's revised proposed notice of findings that listing northern spotted owl as threatened is warranted pursuant to Section 2075.5 of the Fish and Game Code.

NOTICE OF FINDINGS

Northern Spotted Owl

(*Strix occidentalis caurina*)

NOTICE IS HEREBY GIVEN that the California Fish and Game Commission (Commission), at its meeting in Folsom, California on August 25, 2016, made a finding pursuant to Fish and Game Code section 2075.5, that the petitioned action to add the northern spotted owl (*Strix occidentalis caurina*) to the list of threatened species under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.) is warranted. (See also Cal. Code Regs., tit. 14, § 670.1, subd. (i).)

NOTICE IS ALSO GIVEN that, at its February 8, 2017 meeting in Rohnert Park, California, the Commission adopted the following findings outlining the reasons for its determination.

I. Background and Procedural History

On September 7, 2012, the Commission received the "Petition to List the Northern Spotted Owl as 'Threatened' or 'Endangered' Under the California Endangered Species Act" (September 4, 2012; hereafter, the Petition), as submitted by the Environmental Protection Information Center (Petitioner). Commission staff transmitted the Petition to the California Department of Fish and Wildlife (Department) pursuant to Fish and Game Code section 2073 on September 10, 2012, and the Commission published formal notice of receipt of the Petition on October 5, 2012 (Cal. Reg. Notice Register 2012, No. 40-Z, p. 1490).

The Department requested a 30-day extension on November 19, 2012, and the Commission approved the extension on December 12, 2012. After evaluating the Petition and other relevant information the Department possessed or received, the Department determined that based on the information in the Petition, there was sufficient scientific information to indicate that the petitioned action may be warranted, and recommended the Commission accept the Petition in an evaluation dated February 6, 2013. At its meeting on March 6, 2013, the Commission formally received the Department's petition evaluation. At its meeting on April 17, 2013 the Commission considered the petition evaluation as well as an errata and corrections document filed by the Department on April 15, 2013, and postponed further deliberations concerning the petition to receive further information on questions raised during the April meeting. At its August 7, 2013 meeting, the Commission received further comments, deliberated, and voted to accept the Petition and initiate a review of the species' status in California, finding that it contained sufficient information to indicate the petitioned action may be warranted. Upon publication of the Commission's notice of determination as required by

Fish and Game Code Section 2074.2, subdivisions (e)(2) and (f), the northern spotted owl was designated a candidate species on December 11, 2013 (Cal. Reg. Notice Register 2013, No. 52-Z, pp. 2085-2092).

Following the Commission's designation of the northern spotted owl as a candidate species, the Department notified affected and interested parties and solicited data and comments on the petitioned action pursuant to Fish and Game Code section 2074.4. (see also Cal. Code Regs., tit. 14, § 670.1(f)(2).) Subsequently, the Department commenced its review of the status of the species. On February 10, 2016 the Department Director delivered a status review to the Commission pursuant to Fish and Game Code section 2074.6, including a recommendation that, based upon the best scientific information available to the Department, the petitioned action is warranted.

Final consideration of the petition, with receipt of the Department's status review report and public comment, was scheduled for the Commission's April 14, 2016 meeting in Santa Rosa, California, but the Commission continued the matter to its June meeting to allow written comments from the public, to be submitted to the Department no later than May 2, 2016. Notice of final consideration of the petition was published on May 27, 2016 for the Commission's meeting on June 23, 2016 in Bakersfield, California (Cal. Reg. Notice Register 2016, No. 22-Z, p. 907) and again on August 12, 2016 for the Commission's meeting on August 25, 2016 in Folsom, California (Cal. Reg. Notice Register 2016, No. 33-Z, p. 1464). On August 25, 2016, at its meeting in Folsom, California, the Commission received additional public and Department testimony, and voted that designating northern spotted owl as a threatened species under CESA is warranted.

Species Description

The northern spotted owl is a medium-sized dark brown owl, with a barred tail, round, elliptical, or irregular white spots on head, neck, back, and underparts, yellowish green bill, and dark brown, almost black eyes surrounded by prominent facial disks (Gutiérrez et al. 1995). Overall, its length is approximately 46 to 48 centimeters (18 to 19 inches) (Forsman et al. 1996). Males and females are dimorphic in size, with males averaging about 13 percent smaller than females (USFWS 2011). Males weigh between 430 and 690 grams (0.95 to 1.52 pounds), and females weigh between 490 and 885 grams (1.1 to 1.95 pounds) (Gutiérrez et al. 1995, P. Loschl and E. Forsman pers. comm. 2006 in USFWS 2011).

Federal Status

The United States Fish and Wildlife Service listed northern spotted owl as a threatened species under the Endangered Species Act in 1990. In 1994, the Northwest Forest Plan

provided protections for the northern spotted owl and other species inhabiting late-successional forests in Washington, Oregon, and California. The northern spotted owl's first critical habitat designation occurred in 1992 and was revised in 2008. A new final rule designating critical habitat was published in December of 2012. The USFWS first issued a recovery plan for the northern spotted owl in 2008 and revised it in 2011.

II. Statutory and Legal Framework

The Commission, as established by the California Constitution, has exclusive statutory authority under California law to designate endangered, threatened, and candidate species under CESA. (Cal. Const., art. IV, § 20, subd. (b); Fish & G. Code, § 2070.) The CESA listing process for northern spotted owl began in the present case with the Petitioners' submittal of the Petition to the Commission on September 7, 2012. Pursuant to Fish and Game Code Section 2073, on September 10, 2012 the Commission transmitted the petition to the Department for review pursuant to Fish and Game Code Section 2073.5. The regulatory and legal process that ensued is described in some detail in the preceding section above, along with related references to the Fish and Game Code and controlling regulation. The CESA listing process generally is also described in some detail in published appellate case law in California, including:

- *Mountain Lion Foundation v. California Fish and Game Commission* (1997) 16 Cal.4th 105, 114-116;
- *California Forestry Association v. California Fish and Game Commission* (2007) 156 Cal.App.4th 1535, 1541-1542;
- *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, 600; and
- *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104, 1111-1116.

The "is warranted" determination at issue here for northern spotted owl stems from Commission obligations established by Fish and Game Code section 2075.5. Under this provision, the Commission is required to make one of two findings for a candidate species at the end of the CESA listing process; namely, whether the petitioned action is warranted or is not warranted. Here, with respect to the northern spotted owl, the Commission made the finding under section 2075.5(e)(2) that the petitioned action is warranted.

The Commission was guided in making these determinations by statutory provisions and other controlling law. The Fish and Game Code, for example, defines an endangered species under CESA as "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, over exploitation, predation, competition, or disease." (Fish & G. Code, § 2062.) Similarly, the Fish and Game Code defines a threatened species under CESA as "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 the special protection and management efforts required by this chapter." (*Id*., § 2067.)

The Commission also considered Title 14, section 670.1, subdivision (i)(1)(A), of the California Code of Regulations in making its determination regarding northern spotted owl. This provision provides, in pertinent part, that a species shall be listed as endangered or threatened under CESA if the Commission determines that the species' continued existence is in serious danger or is threatened by any one or any combination of the following factors:

1. Present or threatened modification or destruction of its habitat;

2. Overexploitation;

3. Predation;

4. Competition;

5. Disease; or

6. Other natural occurrences or human-related activities.

Fish and Game Code section 2070 provides similar guidance. This section provides that the Commission shall add or remove species from the list of endangered and threatened species under CESA only upon receipt of sufficient scientific information that the action is warranted. Similarly, CESA provides policy direction not specific to the Commission per se, indicating that all state agencies, boards, and commissions shall seek to conserve endangered and threatened species and shall utilize their authority in furtherance of the purposes of CESA. (Fish & G. Code, § 2055.) This policy direction does not compel a particular determination by the Commission in the CESA listing context. Nevertheless, "'[l]aws providing for the conservation of natural resources' such as the CESA 'are of great remedial and public importance and thus should be construed liberally." (*California Forestry Association v. California Fish and Game Commission*, supra, 156 Cal. App.4th at pp. 1545-1546, citing *San Bernardino Valley Audubon Society v. City of Moreno Valley* (1996) 44 Cal.App.4th 593, 601; Fish & G. Code, §§ 2051, 2052.)

Finally in considering these factors, CESA and controlling regulations require the Commission to actively seek and consider related input from the public and any

interested party. (See, e.g., Id., §§ 2071, 2074.4, 2078; Cal. Code Regs., tit. 14, § 670.1, subd. (h).) The related notice obligations and public hearing opportunities before the Commission are also considerable. (Fish & G. Code, §§ 2073.3, 2074, 2074.2, 2075, 2075.5, 2078; Cal. Code Regs., tit. 14, § 670.1, subds. (c), (e), (g), (i); see also Gov. Code, § 11120 et seq.) All of these obligations are in addition to the requirements prescribed for the Department in the CESA listing process, including an initial evaluation of the petition and a related recommendation regarding candidacy, and a review of the candidate species' status culminating with a report and recommendation to the Commission as to whether listing is warranted based on the best available science. (Fish & G. Code, §§ 2073.4, 2073.5, 2074.4, 2074.6; Cal. Code Regs., tit. 14, § 670.1, subds. (d), (f), (h).)

III. Factual and Scientific Bases for the Commission's Final Determination

The factual and scientific bases for the Commission's determination that designating the northern spotted owl as a threatened species under CESA is warranted are set forth in detail in the Commission's record of proceedings including the Petition, the Department's Petition Evaluation Report, the Department's status review, the Department's supplemental report to respond to public comments, written and oral comments received from members of the public, the regulated community, tribal entities, the scientific community and other evidence included in the Commission's record of proceedings.

The Commission determines that the continued existence of the northern spotted owl in the State of California is in serious danger or threatened by one or a combination of the following factors as required by the California Code of Regulations Title 14, section 670.1, subdivision (i)(1)(A):

1. Present or threatened modification or destruction of its habitat;
2. Overexploitation;
3. Predation;
4. Competition;
5. Disease; or
6. Other natural occurrences or human-related activities.

The Commission also determines that the information in the Commission's record constitutes the best scientific information available and establishes that designating the northern spotted owl as a threatened species under CESA is warranted. Similarly, the Commission determines that the northern spotted owl, while not presently threatened

with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by CESA.

The items highlighted here and detailed in the following section represent only a portion of the complex issues aired and considered by the Commission during the CESA listing process for the northern spotted owl. Similarly, the issues addressed in these findings represent some, but not all of the evidence, issues, and considerations affecting the Commission's final determination. Other issues aired before and considered by the Commission are addressed in detail in the record before the Commission, which record is incorporated herein by reference.

Background

The Commission bases its "is warranted" finding for the northern spotted owl most fundamentally on the current population trend influenced by a combination of threat factors, including competition from barred owls and present or threatened modification or loss of its habitat which pose a risk to the continued existence of the species in California.

Threats

Barred Owls

Historically, barred owls were residents of the eastern United States and southern Canada, east of the Great Plains and south of the boreal forest, and also in disjunct regions of south-central Mexico (Mazur and James 2000). The recent range expansion into the western United States has resulted in the barred owl range completely overlapping with that of the northern spotted owl. Barred owls were first detected in California in 1976 (B. Marcot in Livezey 2009a) with the first breeding record in 1991 (T. Hacking in Dark et al. 1998). The rate of detections in California accelerated during the mid-1990s (Dark et al. 1998), and today 1,970 barred owl records exist in the Department's species database throughout the entire range of the northern spotted owl, and even further south within the California spotted owl range in the Sierra Nevada.

There is a high degree of similarity in barred owl and northern spotted owl habitat and prey base preferences. Both species have a preference for old forests with closed canopy and a high degree of structural complexity for nesting and roosting activities (Hamer et al. 2007, Singleton et al. 2010, Weins et al. 2014, Singleton 2015, Weisel 2015). northern spotted owl diet in California consists primarily of small mammals (mainly dusky-footed woodrats in California), though other prey (e.g. birds, bats) is also taken (Forsman et al. 1984, 2001, 2004, Zabel et al. 1995, Ward et al. 1998, Franklin et al. 2000, Hamer et al. 2001). The barred owl diet consists of a wide array of prey, including small mammals ranging from rabbits to bats, small to medium sized birds,

amphibians, reptiles, fish, and invertebrates; however, mammals make up a majority of prey items (Hamer et al. 2001, Mazur and James 2000, Mazur et al. 2000). The broader range of prey selected by barred owls contributes to the smaller home ranges in comparison to northern spotted owls, which may result in higher densities of barred owls within the spotted owl range (Livezey et al. 2008).

Barred owls will negatively impact northern spotted owls at several levels. Barred owls are aggressive toward spotted owls (Van Lanen et al. 2011), and have attacked spotted owls on occasion (Leskiw and Gutiérrez 1998, Courtney et al. 2004). Spotted owls will reduce their calls or not call at all if barred owls are in the vicinity (Cozier et al. 2006, Kroll et al. 2010, Dugger et al. 2011, Diller 2014, Sovern at al. 2014), making them more difficult to detect. Barred owls will displace northern spotted owls from their territories, forcing them out of their long-held territory (Olson et al. 2004, Kroll et al. 2010, Dugger et al. 2011, Diller 2014, Sovern et al. 2014, GDRC 2015, Weisel 2015, Dugger et al. 2016). Northern spotted owl activity centers will shift away from areas where barred owls are present even if they do not entirely abandon their territory (Kelly 2001, Gremel 2005, Diller 2014, Weins et al. 2014).

Competition between the two species has dramatically impacted northern spotted owl site occupancy in California. A recent analysis (Dugger et al. 2016) determined territory occupancy rates declined in all 11 demographic study areas across the entire northern spotted owl range, with a strong positive relationship between the presence of barred owls and territory extinction rates (Dugger et al. 2016). The primary cause of northern spotted owl population declines are competition with barred owl, largely as a result of a strong negative effect of barred owl on northern spotted owl apparent survival rates and a positive effect of barred owl on northern spotted owl territory extinction rates.

When analyzing northern spotted owl data through 2013, Dugger et al. (2016) indicated the primary cause of declines across the range are strong negative effect of barred owl on apparent survival rates and a positive effect of barred owl on territory extinction rates. Apparent survival and the rate population change rates declined on all 3 demographic study areas in California, with the exception of the Green Diamond Resource treatment area (i.e., the area where barred owls were removed). The Green Diamond Resource treatment area survival rate was 0.857 (SE=0.009) before removal, and 0.870 (SE=0.021) after removal (the highest across the entire range; Dugger et al. 2016). The rate of population change at the Green Diamond Resource treatment area was positive (λ=1.030, SE=0.040) after barred owls were removed (Dugger et al. 2016). When barred owls were removed from historical northern spotted owl territories on the Green Diamond Resource Company land, northern spotted owls were detected relatively soon afterward, and sometimes were the same spotted owls that held the territory previously (Diller 2014), suggesting these owls were displaced from their territory but remained in the vicinity to quickly reoccupy.

The literature is clear that barred owls are having a severe negative impact on northern spotted owl at a range-wide level (Dugger et al. 2016), including reduced survival and occupancy, reduced detection rates, increased territory extinction rates, displacement, and predation. Ecological similarities between barred owl and northern spotted owl gives little evidence that nesting, roosting, or foraging habitat or food resources can be adequately partitioned to prevent competition; therefore, coexistence of both species is uncertain into the future, even with habitat management actions (Gutiérrez et al. 2007, Dugger et al. 2011, Wiens et al. 2014, Singleton 2015, Weisel 2015, Dugger et al. 2016). Barred owl removal experiments seem to be successful at positively impacting northern spotted owl demographics and are feasible at a local-scale (Diller et al. 2014), but broader long-term use of removal as a management tool needs further consideration (USFWS 2013). Protecting high-quality habitat (e.g., older structurally complex forests) on the landscape may provide some amount of refugia for spotted owls from competitive interactions with barred owls, and may allow managers and others time to further evaluate the feasibility of barred owl control measures (USFWS 2011, USFWS 2013).

Given the quick southerly expansion of barred owls into northern spotted owl habitat and the documented negative impacts of barred owl on spotted owl demographic rates, there is urgency on deciding a course of action to take regarding barred owl removal or other management actions. Without management actions, the northern spotted owl faces an uncertain future and declines will presumably continue to be severe and steep into the near future, much like has been documented in more northerly portions of the range in Washington and Oregon where barred owl have been established longer. Solutions that promote the coexistence of the northern spotted owl and the barred owl are needed.

Present or Threatened Modification or Destruction of Habitat

Although the rate of nesting and roosting habitat loss has declined since the northern spotted owl was listed under the federal endangered species act in 1990, assessments performed range-wide since the implementation of the Northwest Forest Plan (NWFP) show that habitat loss on federal and private lands is ongoing. Wildfire has been the leading cause of habitat loss on federal land, with the fire-prone California Klamath Province experiencing the largest losses due to wildfire (10.7%; 199,800 acres since 1993). Since the development of a reserve system under the NWFP, timber harvest on federal land has declined, with only 1.3% of nesting and roosting habitat lost to harvest in the last two decades (Davis et al. 2015). Conversely, timber harvest has been the primary cause of habitat loss on nonfederal lands since 1993 (Davis et al. 2015). Northern spotted owl densities in California forests have not plummeted to the extent they have for the species in Oregon and Washington in large part to protective regulations governing timber harvest on nonfederal lands in California (i.e., Forest

Practice Rules). In addition, there has been some amount of forest habitat recruitment since implementation of the Forest Practice Rules and NWFP, though the level and extent of succession is unknown (DFW, 2016 Status Review). Regardless of these protections, losses of nesting and roosting habitat due to timber harvest in California have continued. From 1994-2007, 5.8% of nesting and roosting habitat on nonfederal lands in California was removed by timber harvest (Davis et al. 2011). Regionally, the California Klamath and Cascades provinces have experienced net losses of nesting and roosting habitat since 1994 (Davis et al. 2011). However, due to habitat recruitment in the California Coast Province where habitat development through forest succession can occur relatively quickly (Thome et al. 1999, Diller et al. 2010), estimates for net change of nesting and roosting habitat in this province are positive (Davis et al. 2011).

At the scale of individual owl territories, the amount and spatial configuration of different habitat types are strongly linked to northern spotted owl site occupancy and demographic rates, and rates are generally positively associated with a greater amount of older forest, and in the case of the coastal redwoods, young-growth forests where key structural elements (snags, large decadent trees and hardwoods) are retained (see the Habitat Effects on Demographics section; Dugger et al. 2016). The amount of older forest in northern spotted owl territories is positively associated with occupancy rates (Dugger et al. 2011, Yackulic et al. 2012, Dugger et al. 2016), survival (Franklin et al. 2000, Olson et al. 2004, Dugger et al. 2005, Diller et al. 2010), and in some cases with fecundity (Dugger et al. 2005, Diller et al. 2010, Dugger et al. 2016). Although study design has varied across the major research studies in California and southern Oregon, some consistent patterns have arisen. In order to support productive spotted owl territories, a minimum amount of older forest must be retained in the core area. The definition of ‘older forest’ evaluated in studies has varied, but consistently has included late-seral forests with large trees and high canopy cover. Territories with the highest habitat fitness potential contain at least about 50% older forest in the core area, intermixed with other forest and nonforest cover types (Franklin et al. 2000, Dugger et al. 2005, Diller et al. 2010). Large amounts of nonhabitat (defined as nonforest or sapling cover types) in a northern spotted owl home range leads to declines in demographic rates. Results indicate that in order to support a northern spotted owl territory with high habitat fitness potential, no more than about 50% of a home range should consist of nonhabitat (Olson et al. 2004, Dugger et al. 2005). Spotted owl demographic rates also benefit from a mosaic of older forest interspersed with younger forests or other vegetation types. Work done by Franklin and Gutierrez (2012) suggests that some amount of fragmentation or habitat heterogeneity may be beneficial for dispersing owls, depending on the matrix of habitat types, by providing opportunities in more open habitat or along edges, while at the same time providing protection from predators in older forest components. (DFW, 2016 Status Review).

Habitat retention requirements and definitions in the Forest Practice Rules were developed in the early 1990s and were established to protect a combination of nesting, roosting, and foraging habitat in the area immediately surrounding the activity center (500 and 1,000 foot radii), the core use area (0.7 mile radius), and the broader home range (1.3 mile radius). After implementation and further analysis, the USFWS found that the cumulative effects of repeated harvest entries within many northern spotted owl home ranges in the northern interior region had reduced habitat quality to a degree that caused reduced occupancy rates and frequent site abandonment, and concluded that existing habitat guidelines in the Forest Practice Rules are not sufficient for avoiding take (USFWS 2009). Due to these concerns and based on the growing body of literature linking habitat characteristics to owl fitness, the USFWS provided revised guidance for avoiding take of northern spotted owl, including changes to definitions of nesting, roosting, and foraging habitat, and to the amount of each habitat type to be retained (USFWS 2008b, 2009). The current Forest Practice Rules allow for the use of northern spotted owl habitat descriptions provided by the USFWS and the habitat protection measures recommended by the USFWS (DFW Eval. of Supplemental Information 2016).

Depending on how the Forest Practice Rules and the USFWS 2008 Guidance are implemented, management could result in a reduction in habitat quality around northern spotted owl sites and could lead to declines in survival, productivity, and overall fitness (DFW Eval. of Supplemental Information 2016). However, implementation of the Forest Practice Rules has generally resulted in the protection of northern spotted owl habitat at known owl territories throughout the range in California and has not resulted in any known take of individual northern spotted owls. Despite these protections, timber harvest may be a threat to northern spotted owl habitat in some cases due to inconsistent implementation and interpretation. Conversely, timber harvest may play a role in enhancing owl habitat when applied at appropriate scales and with retention of sufficient nesting and roosting habitat (DFW, 2016 Status Review; DFW Eval. of Supplemental Information 2016).

Wildfire and Salvage Logging

Wildfire and other natural disturbances have been the leading cause of habitat loss on federal land in the Northwest Forest Plan area and the leading cause of nesting and roosting habitat loss in California from 1993-2012. The majority of the nesting and roosting habitat lost from the California portion of the Northwest Forest Plan area has been attributed to wildfire, and most of that loss has occurred in the Klamath Province (DFW, 2016 Status Review).

The response of spotted owls to fire has been mixed. Occupancy by California spotted owls across a wide area in the Sierra Nevada has been observed to be similar in burned

and unburned areas, at least in burn areas that experienced mixed-severity burns (DFW, 2016 Status Review). For high severity burn areas, there is some evidence of declines in occupancy (DFW, 2016 Status Review). Conversely, occupancy rates for northern spotted owls in southern Oregon declined following both mixed-severity and high severity fire events (DFW, 2016 Status Review). These occupancy declines resulted from both high territory extinction rates in burned areas and low colonization rates (DFW, 2016 Status Review). Northern spotted owls displaced by fire or occupying burned areas have also been shown to experience declines in survival rates (DFW, 2016 Status Review). Food limitation in burned areas may have been a contributing factor in these declines. Northern spotted owls in southern Oregon were also shown to avoid large areas of high severity burn or areas experiencing extensive salvage logging post-fire (DFW, 2016 Status Review).

Several variables complicate the interpretation of these studies, including variation in fire severity, fire size, fire history and pre-fire forest composition, post-fire salvage logging, and the timing and duration of research post-fire. Additionally, the key studies of northern spotted owl response to wildfires in southern Oregon were unable to separate the effects of severe burns from salvage logging, but observational studies and occupancy modeling conducted to date suggest that post-fire landscapes that are salvage logged experience declines in spotted owl occupancy (DFW, 2016 Status Review). The presence of snags has been suggested as an important component of prey habitat and as perch sites for foraging spotted owls (DFW, 2016 Status Review). Conditions that lead to increased prey availability, including increased shrub and herbaceous cover and number of snags, may be impacted by salvage logging (DFW, 2016 Status Review). The available information suggests that fires that burn at mixed severities or at small scales such that they create habitat heterogeneity without removing important nesting and roosting habitat components at the territory scale may benefit owls (DFW, 2016 Status Review). However, uncharacteristically severe fires that burn at large scales are likely to have negative effects by eliminating required nesting and roosting habitat or reducing prey populations in northern spotted owl territories (DFW, 2016 Status Review).

In recent decades, fires have become more frequent and average fire size has increased (DFW, 2016 Status Review). In some cases, fires have also burned at uncharacteristically high severities, especially during dry and hot conditions that support fire (DFW, 2016 Status Review). Because climate change will likely increase the likelihood of conditions that support more frequent, large, and severe fires which are destructive to northern spotted owl habitat, habitat loss due to wildfires will likely continue to present a risk to owls in the future (DFW, 2016 Status Review).

Climate Change Impacts to Forest Composition and Structure

Most climate projection models indicate elevational and latitudinal shifts in forest habitats in the coming century (DFW, 2016 Status Review). In climate projection scenarios specific to California, the most notable response to increased temperatures was a shift from conifer-dominated forests (e.g., Douglas fir-white fir) to mixed conifer-hardwood forests (e.g., Douglas fir-tan oak) in the northern half of the state. The models show an expansion of conifer forests into the northeast portion of the state (e.g., Modoc Plateau), and an increase in dominance of oak forest at the expense of pine forest, a general decrease in large trees and basal area, shifts of redwood forests inland into Douglas-fir-tan oak forests, and advancement of conifer-dominated forests (e.g., redwood and closed-cone pine forests) along the north-central coast (DFW, 2016 Status Review).

Climate change variables will likely increase the severity and frequency of wildfires within the northern spotted owl range, which would convert older, complex forests to young uniform stands of less suitable habitat (DFW, 2016 Status Review).

Although climate projection models have uncertainties built-in, it is apparent that forests within California will likely experience some level of elevational and latitudinal shifts, changes in species composition, and alterations in fire regimes (DFW, 2016 Status Review). The northern spotted owl relies heavily on specific forest structure components and tree species composition, and on associated prey habitat and abundance (DFW, 2016 Status Review). Implications of forest shifts and fire regime changes on owl habitat and demographic rates remains uncertain, and more research is needed to elucidate whether these patterns will lead to negative impacts to northern spotted owls.

Sudden Oak Death

Sudden oak death is an emerging plant disease caused by a non-native, fungus-like pathogen particularly impacting hardwoods (Davidson et al. 2003, Garbelotto et al. 2003, Goheen et al. 2006). The disease is expanding its distribution through a substantial portion of the northern spotted owl range in California (California Oak Mortality Task Force 2015). Its impact to northern spotted owl habitat includes large scale die-off of tanoaks and other affected hardwood species (e.g., live oak, California bay laurel), reduction of hardwood canopy closure, simplified canopy structure, and reduced primary prey species (i.e., woodrat) abundance (Rizzo and Garbelotto 2003, McPherson et al. 2006, Goheen et al. 2006, Tietje et al. 2006, Cobb et al. 2010, 2012).

The impact of sudden oak death on oak-tanoak forests within northern spotted owl habitat will not likely subside in the future (Brown and Allen-Diaz 2006, Meentemeyer et al. 2010, 2011), with high risk areas noted in coastal forests of Santa Barbara County north through Humboldt County (Koch and Smith 2012). Ultimately, spread of sudden

oak death will likely result in reduced nesting, roosting and foraging opportunities for northern spotted owls in most cases.

Marijuana Cultivation

Illegal and legal marijuana cultivation sites in remote forests on public and private land throughout California has been steadily increasing. Within the range of the northern spotted owl, Shasta, Tehama, Humboldt, Mendocino, and Trinity counties comprise the areas known for the most marijuana cultivation in California due to the remote and rugged nature of the land (making illegal cultivation difficult to detect), and habitat conditions favorable for growing marijuana (e.g., wetter climate, rich soils) (Gabriel et al. 2013, Thompson et al. 2013, National Drug Intelligence Center 2007, Bauer et al. 2015). Given the difficulties in detecting illegal marijuana cultivation sites and the lack of reporting for all legal cultivation sites, actual distribution and density of marijuana cultivation is likely larger and higher than current data suggests.

Activities associated with cultivation (e.g., removal of large trees, degradation of riparian habitat, use of rodenticides) may negatively impact northern spotted owl habitat, and in turn, owl fitness (e.g., survival, fecundity), although there is little data assessing this impact. Areas with higher prevalence of marijuana cultivation sites may also contain high numbers of northern spotted owl activity centers (National Drug Intelligence Center 2007). The level of impact likely depends on several factors, including the density of cultivation sites in proximity to owl activity centers and how much owl habitat is affected and to what extent.

IV. Final Determination by the Commission

The Commission has weighed and evaluated the information for and against designating the northern spotted owl as a threatened species under CESA. This information includes scientific and other general evidence in the Petition; the Department's Petition Evaluation Report; the Department's status review; the Department's supplemental report to respond to public comments, the Department's related recommendations; written and oral comments received from members of the public, the regulated community, various public agencies, and the scientific community; and other evidence included in the Commission's record of proceedings.

Based upon the evidence in the record the Commission has determined that the best scientific information available indicates that the continued existence of the northern spotted owl is in serious danger or threatened by predation, competition, present or threatened modifications or destruction of the species' habitat, , or other natural occurrences or human-related activities, where such factors are considered individually or in combination. (See generally Cal. Code Regs., tit. 14, § 670.1, subd. (i)(1)(A); Fish & G. Code, §§ 2062, 2067.) The Commission determines that there is sufficient

scientific information to indicate that designating the northern spotted owl as a threatened species under CESA is warranted at this time and that with adoption and publication of these findings the northern spotted owl for purposes of its legal status under CESA and further proceedings under the California Administrative Procedure Act, shall be listed as threatened.

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