State of California
Department of Fish and Wildlife

Memorandum

Date: May ~~1~~ 6, 2013

To: Sonke Mastrup
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: Black-backed Woodpecker Status Evaluation

The Department of Fish and Wildlife (Department) prepared the attached status evaluation report for receipt by the Fish and Game Commission (Commission) at the upcoming meeting scheduled on April 17, 2013. The Department is providing the status evaluation pursuant to Fish and Game Code section 2074.6, and in connection with the Commission's scheduled consideration and possible action regarding the petition to list the Black-backed Woodpecker (*Picoides arcticus*) under the California Endangered Species Act (CESA), a petition the Commission received on September 29, 2010. At a future meeting, the Commission will consider the status evaluation and other relevant information it receives to determine whether there is sufficient information to indicate the petitioned action is warranted (Fish & G. Code §2075.5).

On December 15, 2011, the Commission published notice of its decision to accept the petition to list the black-backed woodpecker under CESA for further consideration. Following the Commission's determination, the Department notified affected and interested parties and solicited data and comments on the petitioned action per Fish & G. Code §2074.4 (see also Cal. Code Regs, Title 14 § 670.1(f)(2)). In addition, the Department commenced its review of the status of the species as required by Fish & G. Code §2074.4. The attached status evaluation represents the Department's final written review of the status of the black-backed woodpecker and is based upon the best scientific information available to the Department at the time of preparation. The status evaluation contains the Department's recommendation to not list the black-backed woodpecker as threatened or endangered.

The Department received from petitioners new information dated March 27, 2013, that reports on field studies of black-backed woodpeckers in 2011 and 2012. Although not specifically cited in the report at the authors' request, a draft version of the field study was reviewed by the Department staff who prepared the report. The final report does include some new genetic information about black-backed woodpeckers in California which was not included in the draft report. After reviewing the new information and speaking to researchers who prepared the genetic study, the Department's conclusion regarding the potential threat posed to black-backed woodpeckers in California from the inherent effects of small, isolated populations has not changed, i.e. the degree of threat posed to the species from this factor is potentially significant, but currently unknown. When considering the new information along with all other information available, the Department confirms that its recommendation should remain the same: to not list the black-backed woodpecker as threatened or endangered.

I. Based upon the best scientific information available to the Department, listing the black-backed woodpecker as threatened or endangered is not warranted.

Important to the Department's recommendation is that the black-backed woodpecker was historically and continues to be uncommon, the species' range has not retracted nor has its distribution shifted, and although forest fires can create the type of habitat in which higher densities of black-backed woodpeckers occur, green, unburnt forest appears to have some role in maintaining or supporting the species. Despite the lack of information concerning the role of green forest as it pertains to the long term viability of black-backed woodpeckers, there is likely a population cycle of black backed woodpecker as follows: forest fire (or to a lesser extent bark-beetle outbreak); invasion of wood-boring insects; a period of high black-backed woodpecker productivity; declining numbers of wood-boring insects; black-backed woodpecker dispersal throughout green, unburnt forest; then continuation of cycle with the next forest fire.

Nevertheless, the best available science doesn't answer several questions about the species, including two critical questions: 1) are the episodic cycles of fire, prey invasion, high woodpecker productivity, prey decline, and woodpecker dispersal essential to the species' long term viability?, and 2) if so, how long can the periods between fires (i.e. high productivity) extend before the population's viability is threatened?

The questions can be rephrased in the form of two scenarios related to green forest: either the population is stable in green forest but dispersed over a much larger area in lower densities, or the population declines at some rate in green forest until the next fire in which the birds can colonize the burnt habitat in higher densities and regenerate the population. The ephemeral nature of burnt forest habitat suggests that individual black-backed woodpeckers disperse from the burned habitat within their lifetime (the black-backed woodpecker's average lifespan is unknown, but related species live up to eight years). This fact of dispersal combined with evidence that black-backed woodpeckers are known to occur in green forests supports the notion that green forests support woodpeckers between fire occurrences. Moreover, the black-backed woodpecker's preferred prey, wood-boring beetles, appear to persist, albeit at lesser densities, in unburnt forest. For both wood-boring beetles and black-backed woodpeckers that prey on them, one would have expected the ranges to contract if the populations declined during extended periods between fires, especially given the unpredictable nature of forest fires. In light of the fact that black-backed woodpecker range in California does not appear to have contracted, it seems likely that green forests sustain populations at relatively low, but stable levels, but populations may occasionally rapidly expand when fires or insect outbreaks create opportunities.

Factors affecting black-backed woodpeckers

Turning to the possible factors that could negatively affect black-backed woodpeckers, there is a lack of information concerning whether overexploitation, predation, competition, disease, or the species' small population size affect the woodpecker in any significant way. There is information concerning forest thinning or forest pre-fire fuels management treatment, but this activity affects such a small percentage of the forest that it is unlikely to have any meaningful effect on the species' long term viability. Within United States Forest Service forests, fuels treatment since 2004 has been averaging 12,950 ha (32,000 ac) per year. At that rate less than 5% of the USFS land base would be treated over 20 years.

Creation of burnt forest habitat

The bulk of scientific information concerning impacts to black-backed woodpeckers is on factors that affect burnt forest habitat. There are two major factors affecting burnt forest habitat: one is creation and the other is modification. Turning first to burnt forest creation, fire suppression during the 20^{th} century appears to have reduced the incidence of fire as compared to the 1800s. Accordingly, one can reasonably infer that there was less opportunity for high density occurrences of black-backed woodpecker during the 1900s as compared to the 1800s (i.e. less chance for the cycle of fire, prey invasion, high woodpecker productivity, prey decline, and woodpecker dispersal). However, there appears to be a reverse in this trend. Since the 1970s there has been an increase in the area burned within the Sierra Nevada. Furthermore, there is currently an unsustainable fire deficit in the western United States. Increased fire activity in the late 20^{th} and early 21^{st} centuries has begun to address this deficit, but it continues to grow. Importantly, studies largely agree that climate change is likely to lead to an increase in fire frequency, size, and severity over the next several decades. So without discounting the backdrop of a fire deficit, the influence of climate change on future wildfire activity is likely to, by itself, increase the amount of burned forest foraging and nesting habitat available to black-backed woodpeckers. Therefore, relatively more burnt forest habitat is likely to be created over the next several decades as compared to the early and mid 20^{th} century.

The Department is however cognizant of the fact that climate change could have varying effects on black backed woodpecker and its habitat. For example, although there is likely to be an increase in fire, modeling predicted a vegetation shift from conifer forest (commonly used by black-backed woodpeckers under current conditions) to mixed evergreen forest (used infrequently by black-backed woodpeckers under current conditions) in the Sierra Nevada by the end of the century. Nevertheless, the increase in forest fire could result in relatively more burnt habitat than currently, so the overall effect on black-backed woodpecker populations is unknown. Another example in which there is little data involves the species' food source. Research related to bark beetle populations tends to indicate that they may benefit from climate change, but bark beetle's importance as a prey resource to black-backed woodpecker in California is not clearly understood. Projections pertaining to wood-boring beetles (the preferred food source in burnt forests of California) and climate change are lacking, but short-term increases in frequency and severity of fires may benefit wood-boring beetles, and by relation black-backed woodpeckers. However, long-term changes in vegetation types and distribution could have various effects on wood-boring beetles (i.e. reproduction, survivorship, abundance, etc.) but there are currently no data available. Overall, predictions can be made concerning the impacts of climate change, but as one looks farther in to the future numerous variables can complicate any conclusions based on such predictions.

Modification of burnt forest habitat

Turning next to modification of burnt forest habitat, this occurs primarily from post-fire salvage logging, however there is uncertainty regarding the magnitude of the threat posed to the viability of the California population of black-backed woodpeckers from such activity. It is clear that post-fire salvage logging does degrade black-backed woodpecker habitat, what is uncertain is the extent that such activity could significantly impact the population. Nesting and foraging density are reduced in burnt forests which are salvage logged compared to similar stands which are not salvage logged. However, the degree or intensity of post-fire salvage can vary by land manager and prescription. And in at least one instance, light salvage logging did not appear to impact black-backed woodpecker nesting activity or nest survival. Nevertheless, on private lands, it is believed that nearly all burned timber is salvage logged following fires. But on United State Forest Service (USFS) land, the largest manager and owner of forestland in California, only 20% of high severity burns have been salvage logged since 2003. Specifically, since 2003, approximately 44,111 ha (109,000 acre) of coniferous forest was subject to high severity forest fires and approximately 8,822 ha (21,800 acres) have been salvaged, leaving about 35,289 ha (87,200 acres) of severely burnt forest available for black-backed woodpeckers.

When describing post fire salvage logging, it is worth noting that the federal government owns the vast majority of forestland in California: USFS 4,355,231 ha (10,762,000 acres); and the National Parks Service 447,583 ha (1,106,000 acres), none of the NPS forest is salvage logged after fires except in extremely limited circumstances for public safety. In contrast, the non-federal forest land comprises 2,692,376 ha (6,653,000 acres). The non-federal forest land is mostly privately held with ownership also in State Parks, California Department of Forestry and Fire Protection, and other public agencies.

In light of the fact that the vast majority of California forest is owned and managed by the federal government, (and 10% of that is NPS which will not be logged), and the federal government has maintained approximately 80% of severely burnt forest habitat, the magnitude of post-fire salvage logging's threat to the long term viability of black-backed woodpecker is uncertain. Moreover, as a management indicator species (MIS), long-term annual monitoring of black-backed woodpecker has occurred since 2009 on National Forest land. As monitoring continues and more data is gathered about the species, monitors hope to evaluate the likely effects of forest plan implementation on black-backed woodpecker populations; to better understand black-backed woodpecker abundance, distribution, and habitat associations across the Sierra Nevada; and to develop information that can inform effective conservation of black-backed woodpecker in the Sierra Nevada.

II. <u>Conclusion</u>

In summary, factors influencing the Department's conclusion include:

- the lack of an apparent range retraction or changes in distribution within the range
- the episodic cycles of high density occurrences (i.e. fire, prey invasion, high woodpecker productivity, prey decline, and woodpecker dispersal) and the lack of current data on the cycle's impact on the long-term viability of California's black-backed woodpecker population
- the lack of data concerning the role of green forest on the species but its apparent use as habitat
- California's fire deficit
- the trending increase in fire frequency, size, and severity as compared to the early and mid 20^{th} century
- uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging
- lack of logging on approximately 80% of severely burnt USFS forest habitat since 2003 (i.e. 87,200 acres)

- the ongoing long-term monitoring of the species as an MIS
- black-backed woodpecker populations in California are not geographically isolated from populations in adjacent states.

Having considered these factors, the Department concluded that the best scientific information available to the Department does not indicate that the black-backed woodpecker's continued existence is in serious danger or is threatened by any one or any combination of the following factors found in relevant regulation: present or threatened modification or destruction of black-backed woodpecker habitat, overexploitation, predation, competition, disease, or other natural occurrences or human-related activities. (Cal. Code Regs., tit. 14, § 670.1 (i)(1)(A)). Therefore, based upon the best scientific information available to the Department, listing the black-backed woodpecker as threatened or endangered is not warranted.

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

Attachments

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STATE OF CALIFORNIA
NATURAL RESOURCES AGENCY
DEPARTMENT OF FISH AND WILDLIFE

REPORT TO THE FISH AND GAME COMMISSION

A STATUS REVIEW OF THE **BLACK-BACKED WOODPECKER** (*Picoides arcticus*) IN CALIFORNIA

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CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
March 13, 2013

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Report to the Fish and Game Commission
A Status Review of the Black-backed Woodpecker in California
March 13, 2013

Executive Summary

Pursuant to CESA, the Department has prepared this status review report and recommendation to the Fish and Game Commission to inform its decision whether to designate the black-backed woodpecker (*Picoides arcticus*) as an endangered or threatened species under CESA. The primary threats to the continued existence of the species in California are related to forest management practices, wildfire frequency and intensity, and current and projected effects of climate change on wildfire patterns and forest vegetation distribution.

The black-backed woodpecker is a medium-sized woodpecker distributed from southwestern Alaska through the forests of Canada to Newfoundland and Labrador, south into the northern Rocky Mountains as well as south through the Cascades of Oregon and Washington into California and the Sierra Nevada mountains. Within California black-backed woodpeckers have been found in the Cascades, Warner Mountains, Siskiyou Mountains, and through the Sierra Nevada as far south as Tulare County. There has been no significant change in the range occupied by the species in California from the earliest records to the present day, nor in the distribution of individuals within the range over the same period. The non-migratory species is typically found in mid to high elevation coniferous forests and is strongly associated with recently burned coniferous forest; with densities and nest densities several times higher in burned forests than in unburned forest. However, the relative importance of burned and unburned forests in sustaining the California population over time is currently unknown. Nests are excavated from the trunks of living, dying, or dead trees (snags). The species produces one clutch per year of two to six eggs. Black-backed woodpecker nest densities have been found to increase with increasing snag densities.

Large wood-boring beetle larvae, ecologically linked to burned forests, are the preferred prey of black-backed woodpeckers. Wood-boring beetle numbers rapidly expand in recently burned forests as adult beetles lay eggs within the stems of recently burned dead or dying trees. Beetle numbers decline over the years following a fire as snag numbers and quality decline. Black-backed woodpecker densities mirror their prey, peaking in burned forest one to two years after a fire and rapidly declining until eight to ten years post-fire, when densities return to pre-fire levels. Forest stands with higher snag densities appear to be favored by foraging woodpeckers. Smaller bark beetles are also known to be eaten, however their importance as prey is unknown.

The size of the population of black-backed woodpeckers in California is currently unknown, but it appears to be small (estimates range from 722 - 6,300 individuals). However; there is no evidence that the population size is substantially different than it was in historical times. Additionally, the population trend in California is unknown, although preliminary data suggest relative stability during 2009-2011.

The primary threats to the continued existence of black-backed woodpeckers in California are related to the abundance, distribution, and management of suitable habitat. Salvage logging (the removal of recently burned trees) can degrade the quality of, or remove burned forest black-backed woodpecker habitat. Removing snags and decreasing snag density impacts nesting and foraging habitat. Salvage logging occurs over most of the species' range, although the extent of the practice varies by land manager. Substantial acreage of federally-managed lands are not subject to salvage logging (e.g., wilderness areas, roadless areas, and National Parks), and recent United States Forest Service (USFS) management direction emphasizes the ecological importance of burned forest habitat. Additionally, many acres of USFS burned forests potentially available for salvage logging are not logged due to logistical limitations. However, the USFS lands targeted for salvage logging often coincide with the best available black-backed woodpecker habitat. On private lands, it is believed that the majority of burned timber is salvage logged shortly following fires.

Fire suppression and fuels management can also degrade black-backed woodpecker habitat or prevent its creation. The practices have been, and continue to be the dominant management goals on most California forests resulting in reduced area of burned forest compared to historical times. However, in recent decades, fire frequency, intensity, and extent have increased despite fire prevention and suppression efforts.

Black-backed woodpeckers may be vulnerable to predicted climate change in California. Models predict the future loss of coniferous forest habitat in California from the effects of changing temperature and precipitations patterns. Climate change is also predicted to increase the frequency of fires in California's coniferous forests which would likely benefit black-backed woodpeckers, at least in the short term; however any change in burnt forest habitat available will be influenced by the extent to which post-fire salvage logging occurs.

Other identified potential threats to the species include the environmental and genetic risks inherent to small populations, such as the unpredictable potential for several successive years without significant wildfire activity and random genetic drift. The degree of threat posed by these threats is uncertain. Additionally, the degree to which the California population is genetically connected to the larger population of black-backed woodpeckers in Oregon, Washington, and the boreal forests of the north is unknown. Consequently, it is impossible to assess whether there exists any genetic differences of significance to the species. Disease, exploitation, and competition do not appear to pose significant threats to this species in California.

The Department provides this report to the Commission based upon the best scientific information available pursuant to Fish and Game Code section 2074.6. The best scientific information available indicates to the Department that the petitioned action is not warranted. Also included in this report is the Department's preliminary identification of habitat that may be essential to the continued existence of the species, and suggestions regarding management activities and other recovery actions that may benefit the species.

Regulatory Framework

PETITION EVALUATION PROCESS

On October 1, 2010, the Office of the California Fish and Game Commission (Commission) received the "Petition to the State of California Fish and Game Commission to list the black-backed woodpecker (*Picoides arcticus*) as threatened or endangered under the California Endangered Species Act" (September 29, 2010; hereafter, the Petition), as submitted by the John Muir Project of Earth Island Institute and Center for Biological Diversity (Petitioners). Commission staff transmitted the Petition to the Department of Fish and Wildlife (Department) pursuant to Fish and Game Code (FGC) section 2073 on October 11, 2010, and the Commission published formal notice of receipt of the Petition on October 29, 2010 (Cal. Reg. Notice Register 2010, No. 44-Z, p. 1851.). 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 not sufficient scientific information to indicate that the petitioned action may be warranted and recommended the Commission reject the Petition (Comrack and Applebee 2011). However, after considering the Petition, the Department's written report, and comments received, the Commission at its December 15, 2011 meeting accepted the Petition based on its determination that the Petition contained sufficient information to indicate that the petitioned action may be warranted. The Commission published notice of its determination and designated the black-backed woodpecker as a candidate species on January 6, 2012 (Cal. Reg. Notice Register 2012, No. 1-Z, p. 18.).

DEPARTMENT STATUS REVIEW

Following the Commission's action designating the black-backed woodpecker as a candidate species, and as per FGC section 2074.4, the Department solicited the scientific community, land managers, state, federal and local governments, forest products industry, conservation organizations and the public for information and undertook a status review of the species using the best scientific information available. This report contains the results of the Department's status review, including peer review by scientists with expertise relevant to the status of the black-backed woodpecker (Appendix 4).

Biology of the Black-backed Woodpecker

LIFE HISTORY

Species Description

The black-backed woodpecker is a medium-sized woodpecker, black above and white below, with black and white barring on the sides and a broad white stripe on the side of the head. Males exhibit yellow crowns; female crowns are black. Juvenile crown patch, if present, is reduced. Generally, woodpecker feet are "zygodactyl" (two toes pointing forward, two toes pointing rearward), an adaptation resulting in efficient climbing and clinging ability on tree trunks and limbs (Leahy 2004). The black-backed woodpecker, and the closely related American three-toed woodpecker (*Picoides dorsalis*) plus several other species, however, possess only three toes. This arrangement, along with other morphological modifications, allows these species to deliver hard blows with the bill when "drilling" for food at the expense of graceful vertical climbing ability (Spring 1965). Black-backed woodpecker drilling capacity is also enhanced by a relatively thick and moderately long bill (Ridgeway 1914 in Jackman 1975). Male black-backed woodpeckers average heavier, slightly longer winged and tailed, and longer billed than females (Dixon and Saab 2000).

The species is generally quiet throughout much of the year, and therefore difficult to detect. They are most vocal during the early breeding season when both sexes drum to establish a territory and attract a mate, during excavation of the nest, and when chicks are begging for food at the nest (Dixon and Saab 2000).

Systematics

Classification: The black-backed woodpecker is a bird, a member of the Woodpecker Family (Picidae) and the genus *Picoides* (of which twelve species are recognized globally, six of these occur in California; AOU 1998, Clements et al. 2011). The black-backed woodpecker is most closely related to the American three-toed woodpecker and the Eurasian three-toed woodpecker (*Picoides tridactylus*), species not known to occur in California.

Synonyms: Black-backed three-toed woodpecker, arctic three-toed woodpecker, arctic woodpecker, Sierra three-toed woodpecker, *Picoides arcticus tenuirostris,* and *Picoides tenuirostris* are synonyms for the black-backed woodpecker, but are no longer in common usage (Grinnell and Miller 1944, Winkler et al.1995).

Genetics: Black-backed woodpecker is monotypic. Although Bangs (1900) postulated that morphological distinctiveness noted in specimens obtained from Oregon merited subspecies designation, no subspecies has been recognized for the species (Grinnell et al. 1930, AOU 1957). Pierson et al. (2010) found three population clusters of black-backed woodpecker: 1) a continuous population extending from the Rocky Mountains to Quebec; 2) a western population (sampled in Oregon); and, 3) South Dakota. These population clusters suggested barriers to gene flow. Although California black-backed woodpecker populations are likely aligned with populations in Oregon, they were not sampled in the study so the degree of connectivity to Oregon's black-backed woodpecker population is unknown. The genetic variation and population structure within California is also unknown.

Demography

Life Span: The average life span of the black-backed woodpecker is unknown. The U.S. Geological Survey Bird Banding Lab (USGS BBL 2012) reported a single banded black-backed woodpecker was recaptured at four years 11 months. The closely related American three-toed woodpecker (and white-headed woodpecker (*Picoides albolarvatus*)) life span is six to eight years (Dixon and Saab 2000); the white-headed woodpecker (*Picoides albolarvatus*) life span is ≥9 years (R. Dixon personal communication).

Reproduction

Breeding Phenology: The establishment and maintenance of the pair bond has not been described for the black-backed woodpecker (Dixon and Saab 2000) although Jackman (1975) suggested mate selection was more a product of site tenacity. In Oregon, black-backed woodpeckers were observed to excavate nests during the period spanning April 27 through mid-June (Dixon and Saab 2000). Egg dates vary with location; the earliest reported date was April 25 in Idaho (Dixon and Saab 2000) and the latest reported date was June 30 from New Brunswick (Bent 1939). Clutch size ranges from two to six eggs (three to four on average; Bent 1939, Short 1982 *in* Dixon and Saab 2000). The species lays a single clutch per season but will re-lay if the nest is destroyed. Both sexes incubate during the day; only the male incubates at night (Lawrence 1966 in Jackman 1975). The incubation period is probably 12-14 days; the fledging period is probably 21.5-25 days (Ehrlich et al. 1988, Dixon and Saab 2000 Forristal 2009). Siegel et al. (2012c) reported initiation of incubation occurring as early as May 7 at a study site on Lassen National Forest. Additionally, unpublished observations from 2012 document incubation at a study site on Plumas National Forest beginning as early as April 28 (Siegel, unpublished data). Siegel et al. (2012c) reported fledging as late as the end of July from Lassen National Forest (<1525m [5000 ft]).

Nests: As is typical for all woodpeckers, the black-backed woodpecker excavates its own nest cavity, typically building a new nest each year (Dixon and Saab 2000, Forristal 2009, Seavy et al. 2012). Nests are constructed in living, dying and dead trees, although snags are preferred, in sound or decayed wood, often excavated in sapwood. Occasionally, other structures (e.g., telephone poles) are used as nesting substrate (Dixon and Saab 2000, Seavy et al. 2012). When the nest is excavated in a living tree, the bark may be removed from around the entrance hole, leaving sappy, bare areas (Bent 1939, Gaines 1992). Siegel (unpublished data *in* Bond et al. 2012) observed black-backed woodpeckers excavating multiple nests during the breeding season prior to selecting the actual nest cavity.

Food Habits

The species feeds by drilling into the trunks of trees to obtain insect larvae, by flaking bark to expose insect prey, and to a lesser degree, by gleaning from the surface of the tree trunk (Harris 1982, Powell 2000). Snags, and downed logs are the most frequently used foraging sites (Murphy and Lehnhausen 1998, Hanson 2007) but they also forage on live trees, particularly trees that appear to be in poor health and have been colonized by beetle larvae (Bull et al. 1986, Siegel et al. 2012c). Primarily, black-backed woodpeckers feed on the larvae of wood-boring beetles (Families Cerambycidae and Buprestidae) with other insects, spiders, and vegetable matter forming a small part of the diet (Dixon and Saab 2000). Beal (1911) reported on the stomach contents of black-backed woodpeckers (n = 28) as consisting of wood-boring beetle larvae (64.25%), caterpillars (which in most cases were wood-boring species; 12.88%), ants (6.35%), other beetle species (many of which were bark beetles; 3.41%), other insects and spiders (<1%); vegetable matter including cambium, mast (n=1), and "rubbish" (rotten wood probably taken incidentally to grub extraction) totaled 11.31% of the stomach contents. Black-backed woodpeckers fed on bark beetles (Order Coleoptera; Goggans et al. 1989) and mountain pine beetles (*Dendroctonus ponderosae*) in unburned forests in South Dakota (Bonnot et al. 2008).

Powell (2000) found that black-backed woodpeckers foraged primarily on large wood-boring beetle larvae within the trunks of dead trees in western Montana and hypothesized that, at least in burned forests, wood-borers were the primary prey, and that it may be wrong to consider bark and wood-boring beetles of equal value as prey items. Marshall et al. (2003) noted that wood-borers and bark beetles were "two groups of insects [which] differ markedly in size, colonization abilities, population dynamics, etc., so they should not be considered equivalent food types, and by extension burned forests and bark-beetle outbreaks should not be considered equivalent habitats."

<u>Forest Beetle Ecology</u>: The life cycles of fire-associated, saproxylic (pertaining to dead or decaying wood) wood-boring beetles and bark beetles (Scolytinae) are ecologically important in nutrient cycling, deadwood decomposition, and woodpecker food web dynamics of coniferous forest ecosystems (Farris et al. 2002, 2004, Costello et al. 2008, 2011, Cobb et al. 2010a). Dying and standing dead trees (snags) provide a food source for the larvae of these wood-eating beetles. Snags are created from disturbances such as wildfire, wind, drought, bark beetle infestation, disease, flooding, landslides, lightning, senescence, and competitive suppression (Hanks 1999, Farris and Zach 2005). While host-selection may be similar between bark beetles and wood borers, larval host colonization and reproduction is quite different (Powell et al. 2002).

Bark beetle larvae mature in the phloem (living tissue) for about one year before emerging as adults, and are generally less than 6mm in length and numerous (Powell 2000, Farris et al. 2002). They are able to overcome the defenses of living trees (Stark 1982), may create snag habitat for wood-boring larvae (Bonnot et al. 2009), and may even provide a food source for wood-boring larvae (Dodds et al. 2001, Costello et al. 2008). The degree of reliance by black-backed woodpeckers on bark beetles and bark beetle-killed forest in California is unknown, and requires further study, particularly in relation to patterns of occupancy in unburned forest (Bond et al. 2012).

Wood-boring beetle larvae (mainly Cerambycidae, also Buprestidae) are likely the preferred prey item of black-backed woodpeckers in California, and throughout the species' range (Wickman 1965, Murphy and Lenhausen 1998, Powell 2000, Bunnell et al. 2002, Nappi and Drapeau 2009, Costello et al. 2011, Saracco et al. 2011, Bond et al. 2012, Dudley et al. 2012, Fogg et al. 2012, Siegel et al. 2012b, 2012c). Wood-boring beetle larvae can be much larger in size (up to 50 mm in length), but are less numerous when compared to bark beetles (Powell 2000). Adult wood-borers of both sexes may sense volatile chemical cues from dying or dead trees (such as ethanol, bark beetle pheromones, smoke, and other monoterpenes), indicating a stressed food source (Hanks 1999, Allison et al. 2004, Costello et al. 2011). Some species of metallic wood borers (Buprestidae) even possess infrared radiation sensors, special organs that can detect the specific wavelengths emitted from a forest fire, up to 130 km (80 mi) from the source (Schmitz et al. 2000, Evans 2010, Schmitz and Bousak 2012).

In the relatively short adult stage of Cerambycid beetles, there is a strong attraction to a larval host (dead or dying trees), brief copulation, female oviposition of eggs in the host bark, and quick incubation of eggs; all these life history traits facilitate exploitation of ephemeral sources of highly nutritious subcortical tissue from dying or recently dead larval hosts (Hanks 1999, Allison et al. 2004). The phloem is usually the first food source of the larvae and subsequent instar stages move deep into the xylem (heartwood and sapwood), where wood-borer larval galleries are formed (Linsley 1961, Hanks 1999, Allison et al. 2004). Wood-borer larvae generally take one to three years to mature and emerge as adults from deadwood; some species may take even longer (Linsley 1961, Murphy and Lenhausen 1998, Hanks 1999, Farris et al. 2002, Allison et al. 2004, Farris and Zack 2005, Hutto 2006, Farris and Zack 2008). Saproxylic insect activity persists in deadwood up to ten years after fires (Nappi et al. 2010).

Movements

Migration: The black-backed woodpecker is nonmigratory throughout its range including California. Individuals may shift to lower elevations in winter (Small 1994, Dixon and Saab 2000) but the species generally occupies the same range year-round. Gaines (1977) noted records of black-backed woodpeckers during the winter in Yosemite National Park at Peregoy Meadow (2134 m; 7,000 ft) and Tuolumne Meadows (2621m; 8600 ft), suggesting the species does not abandon the higher elevations during winter.

Dispersal: Hoyt and Hannon (2002) inferred dispersal distance (based on the minimum distance between habitat patches in which they detected the species) to a newly burned site in a Canadian boreal forest at 50 km (31 miles). Generally, burned forest occupancy by black-backed woodpeckers declines rapidly after five to six years (Saab et al. 2007, Saracco et al. 2011) as the food resource diminishes. The ephemeral nature of the habitat suggests that individual black-backed woodpeckers must disperse from the burned habitat within their lifetime (Huot and Ibarzabal 2006).

Pierson et al. (2010) found evidence of male sex-biased dispersal (male dispersal at a higher rate than female) in populations of black-backed woodpeckers in Oregon and South Dakota. Type of vegetative cover also affected dispersal of the species. Extensive gaps in forest cover apparently served as a barrier to dispersal by female black-backed woodpeckers and impeded dispersal by male black-backed woodpeckers, hence the three population clusters: boreal forest (Rocky Mountains to Quebec), Cascade region (sampled in Oregon), and the Black Hills of South Dakota.

Irruptions: Black-backed woodpeckers are known to periodically “irrupt”; that is, they move into areas beyond their usual range. Irruptions occur at irregular intervals and locations; these irruptions appear to correspond to insect outbreaks following fires, windthrows, and other forest mortality factors (Yunick 1985). Irruptions have been documented in northeastern and midwestern United States in 1860-61 (Massachusetts), 1923, 1956-57, mid-1960s, and the early 1970s (Van Tyne 1926, West and Speirs 1959, Yunick 1985). In almost all cases, documented irruptions occurred outside the breeding season (Yunick 1985). Irruptions of black-backed woodpeckers in California or into the state from elsewhere are not reported in the literature.

RANGE AND DISTRIBUTION

Endemic to North America, black-backed woodpecker range encompasses southwestern Alaska east through Canada (southern Yukon, west and central Northwest Territories, northern Saskatchewan, northern Alberta, northern and central Manitoba, Ontario, central Quebec, central Labrador, and Newfoundland), northern New York and Maine, south to central and eastern British Columbia through western Montana, northwestern Wyoming, Idaho, central and eastern Washington, central and eastern Oregon and north-central and eastern California through the Sierra Nevada to Tulare County, and northern parts of Minnesota, Wisconsin and Michigan. A disjunct population is found in the Black Hills of southwestern South Dakota (Dixon and Saab 2000). The southernmost range is in California's southern Sierra Nevada (Tulare County). The species is resident within its range but is known to move southward at irregular times, varying from scattered individuals to large irruptions (see *Movements* in this report).

In California, black-backed woodpeckers are found from 1219 m to 3200 m (4,000 ft - 10,500 ft) above sea level; most detections have been made at elevations between 1,461m to 2743 m [4,793 ft to 9,000 ft] (Grinnell and Miller 1944, Sumner and Dixon 1953, Gaines 1992, Saracco et al. 2011, Bond et al. 2012, Fogg et al. 2012). For example, 95% of black-backed woodpecker detections in broadcast surveys in 2009 and 2010 in the Sierra Nevada, southern Cascade Range, and Warner Mountains were between 1,461-2,596 m (4,793-8,517 ft), with a mean elevation of 1,997 m ([6,552 ft; SD=379 m], R. Siegel unpublished data *in* Bond et al. 2012). A late November 2004 record of two birds at 1015 m (3,330 ft) in Shasta County probably represented wanderers (NAB). The elevational distribution of the species likely varies with latitude.

Historic Range and Distribution in California

For the purposes of the status review, the Department defined the historic period as being up to, and including, the year 1949. This approach generally conforms to the methods outlined in Shuford and Gardali (2008) which used the publication of Grinnell and Miller (1944) as the separation date between the historic and recent periods. Grinnell and Miller (1944) described the range of the black-backed woodpecker in California as "of small extent and interrupted nature; chiefly Cascade Range and high northern and central Sierra Nevada, south to about latitude 37º 30'; peripherally west through the Siskiyou Mountains, east to Warner Mountains, Modoc County, and south to Tulare County." Specific locations with known occurrences included: Poker Flat, Siskiyou Mountains, Mount Shasta near Red Cone and Gray Butte, and Wagon Camp, Siskiyou County; Warner Mountains and Red's Camp, 19 km (12 miles) SW of Eagleville, Modoc County; Lassen Peak section, Battle Creek Meadows and Mineral, Tehama County; Manzanita Lake, Merrillville, and Eagle Lake, Lassen County; Gold Lake, Sierra County; Light's Canyon and unnamed sites, Plumas County; unnamed sites, Butte County; Truckee River, Soda Springs, and Blue Canyon, Placer County; Silver Creek, Pyramid Peak, Upper and Lower Velma Lakes, Glen Alpine and many other locations around Lake Tahoe, Placer and El Dorado counties; Big Trees, Calaveras County; Yosemite region (many locations), Mariposa County; Tuolumne Meadows, Tuolumne County; East of Tharp's Rock, Sequoia National Park, Mt. Whitney Ranger Station and Reflection Lake, Tulare County (Cooper 1870, Belding 1879, 1890, Merriam 1899, Barlow and Price 1901,Grinnell 1915, Dawson 1923, Mailliard 1927, Grinnell et al. 1930, Grinnell and Miller 1944 Sumner and Dixon 1953, California Academy of Sciences (CAS) online collections, Museum of Vertebrate Zoology (MVZ) online collections; see Figure 1).

Current Range and Distribution in California

The current distribution of the black-backed woodpecker in California is based on literature review, recent field studies including Institute for Bird Populations (IBP), PRBO Conservation Science (PRBO), USDA Forest Service (USFS), National Park Service, California Partners in Flight (CPIF) monitoring sites and "eBird" (a citizen science online initiative hosted by the Cornell Laboratory of Ornithology and National Audubon Society) as well as other sources (Figure 2). The current range of the black-backed woodpecker in California is similar to the historic range and includes the Sierra Nevada, the Cascade Range, the Warner Mountains and, peripherally, the Siskiyou Mountains; however, recent locality records extend the range southward to the southern Sierra Nevada (Figure 3).

<u>Range Isolation</u>: California's black-backed woodpeckers do not appear to be geographically isolated from populations of black-backed woodpeckers in adjacent states. According to Marshall et al. (2003), the species is resident in Oregon on the east and west sides of the Cascade Range, Blue Mountains, the Clackamas River drainage, and the Siskiyou Mountains. In Washington, black-backed woodpeckers range on the east slope of the Cascade Range and the coniferous forests to the east (Rodrick and Milner 1991). The Nevada range of the black-backed woodpecker is limited to the coniferous forests in and around the Lake Tahoe Basin (Alcorn 1988).

California Range Trend

The current range of the black-backed woodpecker in California is greater than the documented historic range but likely does not represent range expansion, but rather is the result of better observer coverage and the species' known ability to respond to favorable habitat conditions (wildfire and/or beetle infestations). Range trend is considered stable based on comparison of available data.

HABITAT ESSENTIAL FOR THE CONTINUED EXISTENCE OF THE SPECIES

Black-backed woodpeckers occur in a variety of montane and boreal coniferous forest types throughout their range (Dixon and Saab 2000). In a survey of recently burned sites in the Sierra Nevada and southern Cascade Range, Saracco et al. (2011) detected black-backed woodpeckers most frequently in Sierra mixed conifer forest, Jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*Pinus ponderosa*), and red fir (*Abies magnifica*). White fir (*Abies concolor*) yielded few black-backed woodpecker detections and in pinyon pine (*Pinus monophylla*) and juniper (*Juniperus* sp.) habitats, no black-backed woodpeckers were detected. Lodgepole pine (*Pinus contorta*) forest plot sample size was small but showed some evidence of a disproportionate number of detections in that habitat type. Fogg et al. (2012) documented black-backed woodpecker selection for red fir and lodgepole pine forest types (CWHR) in the Sierra Nevada. Others have also found lodgepole pine to be important to black-backed woodpeckers as unburned habitat (Bull et al. 1986, Goggans et al. 1988, Bond et al. 2012). Although black-backed woodpeckers occur in green forests, the highest densities are found in recently burned forests (Hutto 1995, Hoyt and Hannon 2002, Hanson and North 2008, Fogg et al. 2012). Black-backed woodpeckers reach their greatest densities in burned forests within the first five to eight years following the fire. By the end of this brief period, the combination of decreasing snag densities, declining numbers of beetle larvae prey, and increasing numbers of nest predators recolonizing the burn area results in habitat that is no longer optimal for the species (Hanson and North 2008). Additionally, black-backed woodpeckers apparently prefer intensively burned forests (i.e., forests that burned in hot fires resulting in near total tree mortality) over unburned forests and forests that burned at lower intensities (Hutto 1995, Smucker et al. 2005). There is evidence that black-backed woodpeckers favor recently burned forests which had high levels of canopy cover and high densities of larger trees prior to burning (Russell et al. 2007, Hanson and North 2008). For example, Russell et al. (2007), in northern Idaho, found that one of the best predictors of high post-fire black-backed woodpecker nesting density was high pre-fire canopy cover, and that nest densities increased with increasing snag densities and diameters. In California, the mean occupancy probability for black-backed woodpeckers on recently burned study plots was 0.097 or 10% (Saracco et al. 2011). By comparison, studies in unburned habitat in Plumas, Stanislaus, and Sequoia National Forests in California yielded a detection rate of 1.7% (R. Burnett unpublished data *in* Bond et al. 2012).

Nesting Habitat

Black-backed woodpeckers excavate cavity nests in live and dead conifers and, less frequently, broadleaf trees (e.g., quaking aspen (*Populus tremuloides)*, favoring relatively hard, recently dead snags (Raphael and White 1984). Snags used for nesting were slightly larger than the average available snags (Ibid, Saab and Dudley 1998). According to Raphael and White (1984), the average diameter of trees used for nesting by black-backed woodpeckers in the Sierra Nevada was 44.5 cm (17.5 in, n=7) while the average diameter of available trees was 32 cm (12.6 in). However, among the five species of woodpeckers studied by Saab et al. (2002), black-backed woodpeckers used the smallest diameter snags for nesting. Seavy et al. (2012), in a study in burned forest in the northern Sierra Nevada, found little evidence of selection by black-backed woodpeckers for specific nest tree species or for trees with broken tops. They found evidence of preference for low to moderately decayed snags for nest trees. Black-backed woodpeckers used nest trees of the smallest size class (15–28 cm diameter at breast height (dbh); 5.9-11.0 in) in proportion to their availability, showed the strongest preference for the moderate size class (29–61 cm dbh; 11.4-24.0 in), and were never found in trees >61 cm (24 in) dbh (n=31). Similarly, R. Siegel (unpublished data *in* Bond et al. 2012) measured 21 nests in the southern Cascade Range and Sierra Nevada and found they ranged from 22-90 cm (8.7-35.4 in) dbh and averaged 36 cm (14.2 in) dbh.

Large patches of suitable habitat appear to be required for nesting. In burned forests in Idaho, black-backed woodpecker nests were absent from stands (burned areas of uniform tree species and canopy crown closure) of less than 12 ha (29.7 ac), and nest stands averaged 37.16 ha (91.8 ac) (Saab et al. 2002). Russell et al. (2007), also working in Idaho, found the average black-backed woodpecker nest stand to be 112.47 ha (277.92 ac). Several studies showed that black-backed woodpecker nest densities were highest in areas with the highest snag densities (Ibid, Russell et al. 2007, Vierling et al. 2008, Seavy et al. 2012). Russell et al. (2007) determined the best model for predicting black-backed woodpecker nesting included high pre-fire canopy closure, high average tree diameter, and high large snag densities. When post-fire snag densities were reduced by salvage logging, black-backed woodpecker nesting densities were greatly reduced (Saab and Dudley 1998, Dixon and Saab 2000, Hutto and Gallo 2006, Cahall and Hayes 2009). Nesting densities were nearly four times greater in unlogged burned areas than in salvage-logged burned areas, even when substantial numbers of snags (32-52% of small snags and approximately 40% of large snags) were retained in the salvaged areas (Saab and Dudley 1998).

Although their data were limited, Bock and Lynch (1970) noticed black-backed woodpecker breeding densities in burned Sierra Nevada forests appeared to be greater than in unburned forests. Studies outside of California also concluded black-backed woodpecker nest success was higher in burned forest compared to beetle-killed forests (Bonnot et al. 2008, Veirling et al. 2008, Forristal 2009). Forty percent of the black-backed woodpecker nests found in an Oregon study were in live trees (Bull et al.1986). Goggans et al (1989) studied a pine beetle infested forest in Oregon and determined that 22 of 35 black-backed woodpecker nests were in live trees, and all nests were in lodgepole pine. Sixty-six percent of the nests were in stands with mountain pine beetle outbreaks and 34% occurred in stands not significantly impacted by beetles. The mean nest tree measured 27.9 cm (11 in) dbh; canopy cover averaged 24% in unharvested stands and 11% in harvested stands.

Nest site selection may be influenced by distance to unburned forest with black-backed woodpeckers selecting sites farther from the edge habitat (Vierling et al. 2008). Black-backed woodpecker nests in habitat farther from the unburned areas were more successful in Idaho (Saab et al. 2011) although other researchers found more nestlings produced near edges in recently burned forest in Quebec, Canada (Nappi and Drapeau 2009). Edge habitat, at least in dry forests such as ponderosa pine forest in Idaho, may support greater numbers of nest predators (e.g, tree squirrels (*Tamiasciurus* spp.) and thus negatively affect black-backed woodpecker nest success (Saab et al. 2011).

Foraging Habitat

Black-backed woodpeckers forage chiefly on the trunks of larger snags and logs within dense stands of intensively burned conifer trees (Murphy and Lehnhausen 1998, Kreisel and Stein 1999, Russell et al. 2007, Hanson and North 2008). They appear to require higher densities of snags for foraging than they do for nesting (Hutto and Gallo 2006). Hanson (2007) found black-backed woodpeckers foraging on large (>50 cm [19.7 in]) snags more than expected based on availability, which is likely explained by the fact that their primary food, wood-boring insect larvae, are found in greater numbers in larger diameter snags (Nappi et al. 2003). Bull et al. (1986) found black-backed woodpeckers in Oregon foraged for insects on live and dead trees in equal proportion. When using snags, black-backed woodpeckers preferred recently dead trees averaging 34 cm (13.4 in) diameter at breast height (dbh), and 19 m (62.3 ft) tall (Ibid.).

In burned forests in the Sierra Nevada, black-backed woodpeckers foraged almost exclusively in stands which had burned at high intensity and were not salvage logged (Hanson and North 2008). Foraging was nearly absent from areas which had burned at moderate or low intensity and from high intensity burn areas which had been salvage logged, even with the retention of at least 7.5 large (>50 cm [19.7 in]) snags per hectare (2.47 ac) as prescribed by the Sierra Nevada Forest Plan Amendment (USFS 2004). Studies in the Rocky Mountains have also reported that black-backed woodpeckers favor recently burned forests which burned at high intensity (Hutto 1995, Smucker et al. 2005).

Few data are available on foraging of black-backed woodpeckers in unburned forests. Black-backed woodpeckers were observed foraging nearly equally on live and dead trees, with a preference for lodgepole pine on an unburned site in Oregon (Bull et al.1986). Wickman (1965) documented black-backed woodpeckers foraging on wind-damaged Douglas fir (*Pseudotsuga menziesii)* and white fir near Burney, California, preferring standing, broken-top trees to downed material. Densities appear to be significantly lower in unburned forests than in recently burned forests (Bock and Lynch 1970, Hutto 1995, Hanson and North 2008); however, black-backed woodpeckers are known to occur and nest in green forest stands and stands infested with bark beetles (Bull et al. 1986, Goggans et al. 1989, Bonnot et al. 2008, Fogg et al. 2012).

<u>Prey Species Habitat</u>: Wood-boring beetles, favored prey of black-backed woodpeckers, are typically abundant in coniferous forest habitats with large-diameter, thick-barked, standing trees, recently killed (therefore, exhibiting little fungal deterioration) in a moderate to severe fire (Nappi et al. 2003, Saint-Germain et al. 2004a, Covert-Bratland et al. 2006, Hutto 2008, Lowell et al. 2010, Dudley et al. 2012, Siegel et al. 2012c). Habitat patches with dense trees may also contribute to the mortality of large-diameter trees preferred by beetles, as closely spaced large trees may be scorched more severely in a fire event. In contrast, a low-intensity fire in an open patch of forest may not generate sufficient heat to severely scorch large-diameter trees (Dudley et al. 2012). Many long-horned (Cerambycidae) beetles select for specific coniferous tree species hosts (Linsley and Chemsak 1984, 1997). A recent study of wood-boring beetle presence one to three years post-fire in the Black Hills of South Dakota found that wood-boring beetles preferred severely burned ponderosa pine with scorched or consumed needles to less severely burned ponderosa pine with green needles (Costello et al. 2011). *Monchamus clamator* was the most abundant species in the latter study, a species also found in a recent post-fire study of black-backed woodpeckers in the Sierra Nevada (Costello et al. 2008, Siegel et al. 2012c).

While research shows both wood-boring beetle and black-backed woodpecker abundance declines three years post-fire (Murphy and Lenhausen 1998, Saab et al. 2004, Farris and Zack 2005, Nappi and Drapeau 2009), other studies have found an additional modest peak in combined abundance six to ten years post-fire (Hoyt and Hannon 2002, Nappi et al. 2010, Saracco et al. 2011, Dudley et al. 2012). A smaller peak in beetle abundance may be attributed to delayed mortality of large-diameter trees on the edges of burns, due to variations in fire severity, allowing for long-term presence of deadwood associated with post-fire conditions (Nappi et al. 2010, Dudley et al. 2012). Some stand-replacement fires burn so intensively, that the interior of these burns are unsuitable for wood-boring and bark beetles, thus making edge habitat surrounding burns important (Murphy and Lenhausen 1998, Saint-Germain et al. 2004c).

Fire-associated (pyrophilous) saproxylic wood-boring beetles may persist in fire-prone, mature unburned forest with large-diameter trees at lower levels of abundance in the absence of fire or bark beetle-killed trees (Saint-Germain et al. 2004b, Saint-Germain et al. 2008, Tremblay et al. 2010). Due to the short adult life span of many fire-associated beetles, emerging generations must find another recent burn within a few weeks to maximize their reproductive fitness. Failing that, population levels will be reduced to unburned habitat carrying capacity (Saint-Germain et al. 2008). If fire was essential to the preferred prey of black-backed woodpeckers, beetle carrying capacity in unburned areas would be zero and local extirpation would be common, especially in areas of fire suppression (Saint-Germain et al. 2008), but this is not the case. Wood-boring beetles attracted to dead or dying trees may be able to persist in areas of highly variable annual tree mortality (from mortality factors besides fire or bark beetles killing living trees, as described by Farris and Zack 2005; Saint-Germain et al. 2008). The habitat quality of the unburned forest is the real limiting factor for pyrophilous beetle population dynamics, and maximizing deadwood availability should be beneficial (Saint-Germain et al. 2008).

Currently, the USFS uses salvage logging as a management tool in the western U.S., within one year post-fire, before saproxylic insects can considerably lower the market value of dead and dying trees (Lowell et al. 2010). Post-fire salvage logging may create a population sink for pyrophilous wood-boring beetles, reducing the fitness of individuals colonizing recently killed snags to near zero (Saint-Germain et al. 2008) and disrupting forest nutrient cycling/decomposition involving woodpeckers (Farris et al. 2004, Cobb et al. 2010a). Black-backed woodpeckers avoid areas where recently killed snags have been completely salvage logged (Hutto 2006, Hanson and North 2008), which could be explained by much lower deadwood-associated beetle species richness (Cobb et al. 2010b). According to Cobb et al. (2010b), "Nevertheless, the negative response of wood-boring and bark [beetle] species to post-fire salvage logging suggests this group may be of particular conservation concern with respect to post-fire salvage logging."

Roosting Habitat

The roosting habitat of black-backed woodpeckers is poorly known with few studies (Goggans et al. (1989). Roosting habitat use may change seasonally. White-headed woodpeckers in Oregon used a variety of roost substrates during the summer but exclusively used cavities in the winter (R. Dixon personal communication).

Winter Habitat

No information was available regarding the ecology of the black-backed woodpecker in winter. Consequently, there is no indication that winter habitat varies markedly from the habitat used in other seasons, although preferred roosting substrate has been observed to shift with season in the closely-related white-headed woodpecker.

Home Range

Home range size in California is poorly understood. In general, black-backed woodpecker home range are believed to be large (100+ ha [247+ ac]) and may vary with vegetation type, habitat quality, number of years after a burn, food availability, time of year, elevation and geographic location. Inference of home range from nest densities in burned forest may lead to significant underestimates of actual home range size (Dudley and Saab 2007).

In the Sierra Nevada, California, Siegel et al. (2012c) reported preliminary findings of an average nesting season black-backed woodpecker home range of 400 ha (988 ac) (range 102 -796 ha [252-1967 ac]; n=6) in burned habitat (2-3 years after fire) using Minimum Convex Polygon (MCP) methodology including 100% of bird locations. Dudley and Saab (2007) measured black-backed woodpecker home range on study areas 6-8 years after fire in southwestern Idaho also using MCP 100% methodology; the average was 429 ha (1060 ac) (range 150-766 ha [371-1893 ac]; n=4). Additionally, home range size was significantly smaller on the more recently burned study areas.

On an unburned, beetle-killed forest in central Oregon, the average home range was measured as 175 ha (432 ac) using similar methodology (range of 72 -328 ha [178-811 ac] n=3; Goggans et al. 1989). Tremblay et al. (2009) measured 100% MCP home range in unburned boreal forest in eastern Canada as, on average, 151 ha (373 ac) (range 100-256 ha [247-633 ac]; n=7).

POPULATION ABUNDANCE

The black-backed woodpecker may become locally abundant in response to an increase in food resources but usually they are uncommon (Bock and Bock 1974). Black-backed woodpecker population numbers appear to be subject to local fluctuations based on environmental conditions, especially the presence of super-abundant food resources, recruitment, and effects of management activities (Dixon and Saab 2000). This aspect of black-backed woodpecker ecology increases the difficulty of assessing population size and trends. Rich et al. (2004) estimated the global population of black backed woodpeckers at 1,300,000 individuals. This estimate was derived from extrapolation of Breeding Bird Survey (BBS) results from the 1990s throughout the species' range and was assigned a data-quality color code of "yellow" (medium quality and therefore to be interpreted with caution).

Historic Abundance in California

Quantitative historic population abundance data for black-backed woodpeckers in California are lacking; however, the population status of the black-backed woodpecker may be crudely be estimated from qualitative statements. Black-backed woodpeckers were variously described as "sparse", "scarce", "rare", "rather rare", "very local", or "locally common" by early ornithologists from regional and statewide perspectives (Belding 1890, Adams 1907, Dawson 1923, Grinnell and Storer 1924, Grinnell and Miller 1944). Grinnell (1915) characterized the species as "fairly common locally" in the Boreal Zone [2,438 m-3505m; 8,000 ft-11,500 ft] within the range of the species. Dawson (1923) considered it to be a "rare and very local resident" while Grinnell and Miller (1944) described it as "scarce generally; fairly common in but a few places". Several regional treatments further characterized historic abundance of the black-backed woodpecker as follows:

Northwestern California: Regional summary data for the western Siskiyou Mountains are scant. Only one record of a black-backed woodpecker exists for the western Siskiyou Mountains (Poker Flat, two individuals collected in early July 1935; MVZ). Grinnell and Miller (1944) considered the species peripheral there.

Northeastern California: Maillard (1927) noted the black-backed woodpecker was resident in the Warner Mountains without characterization of abundance.

Cascade Range: Merriam (1899) characterized the black-backed woodpecker as "rare, but evidently breeding" in the Shasta fir forest zone at Mt. Shasta. Townsend (1887) obtained two specimens of black-backed woodpeckers from east of Mt. Lassen early in June 1884 but did not find any west of the Sierra Nevada, where he considered it was probably rare. He reported that Henshaw found it to be "rather common" along the eastern slope. Grinnell et al. (1930) noted that the black-backed woodpecker was found "sparsely in the main mountainous portion of the section from Battle Creek Meadows east to near Merrillville at altitudes…from 4,800 ft to 8,200 ft [1463 m to 2499 m]".

Sierra Nevada: Several reports described black-backed woodpecker abundance in the Sierra Nevada, as follows:

Northern Sierra Nevada Region	Keeler (1899) characterized black-backed woodpeckers as "one of the rarer species breeding in the northern Sierra Nevada mountains."
Lake Tahoe Region	According to Cooper (1870), black-backed woodpeckers were "quite numerous" at Lake Tahoe and the Sierra Nevada above 1829 m [6,000 ft] elevation in September; Henshaw (1877) also described black-backed woodpeckers as "rather common" around Lake Tahoe…in September, October and November". Adams (1907) noted, however, that the species was a "rather rare resident of the Boreal zone" of Placer County. Orr and Moffitt (1971) indicated that "the only time this species was observed at lake level was on August 30, 1940…at Rubicon Point."
Yosemite Region	Grinnell and Storer (1924) described the black-backed woodpecker as a "sparse resident of Canadian and Hudsonian zones [2,896m-3,505m; 9,500 ft-11,500 ft elevation] on [the] west slope of the Sierra Nevada" in the region around Yosemite.
Southern Sierra Nevada	According to Sumner and Dixon (1953), the black-backed woodpecker was "a rather rare, high mountain woodpecker, restricted to the higher levels [of Sequoia and Kings Canyon National Parks] but apparently resident there. …In the Kings, the species has been recorded as a resident in the Hudsonian Zone."

Other records, location undetermined: Henshaw (1880) *in* Belding (1890) found the black-backed woodpecker to be "a rather common and constant resident of the pine woods from Carson northward into Oregon."

Current Abundance in California

The population size of the black-backed woodpecker in California is not known. A review of existing data sources, none of which appear to be peer reviewed, however, suggests it is small. Siegel et al. (2010) estimated 470-1,341 pairs in recently burned areas on national forests in California but cautioned that the data were preliminary and required refinement. Recent research on black-backed woodpecker occupancy in unburned national forest lands yielded an estimate of 1,398 - 6,899 uniquely occupied black-backed woodpecker sites in the Sierra Nevada (Fogg et al. 2012). The authors cautioned that the data were preliminary, based on one year of field surveys with a small sample size and would be refined with further research. Their estimate assumed that each 100 ha grid square of suitable habitat could be occupied which may overestimate actual denisities. An estimate by Rosenberg (2004) of 6,300 individuals in California was based on BBS data. The Petitioners, by comparison, estimated the current abundance of the California black-backed woodpecker population at 161-300 pairs in burned forest and an additional 200-300 pairs in unburned forest; these estimates were derived by extrapolating detection rates in classified vegetation types from study areas to statewide numbers (Hanson and Cummings 2010). Several statewide and regional evaluations provided qualitative information on the status of the black-backed woodpecker in California, as follows:

Northwestern California: Only one record [unverified but by a reliable observer] was reported of a single bird near Crawford Creek, Siskiyou County in 1993 (Harris 2005). The species is considered "very rare" on the Shasta-Trinity and Klamath national forests (J. Alexander pers. com. *in* Bond et al. 2012).

Northeastern California: Regional summary information on the species' abundance is not available.

Cascade Range: Regional summary information on the species' abundance is not available.

Sierra Nevada: According to Beedy and Granholm (1985), black-backed woodpeckers were "…rare in the Sierra, [but] … fairly common in recently burned forests at higher elevations." Siegel and DeSante (1999) classified them as "rare" in the Sierra but speculated that the positive BBS trend may have been real due to outbreaks of bark beetles brought on by drought and fire. Recent studies suggest black-backed woodpecker occupancy rates were higher on the northern portions of the Sierra Nevada range and at relatively high elevations in burned forest habitats (Siegel et al. 2010, Saracco et al. 2011).

Lake Tahoe Region	Orr and Moffitt (1971) described the black-backed woodpecker as resident in small numbers, particularly at higher elevations: "Arctic three-toed woodpeckers [black-backed woodpeckers] can hardly be classed as common in the Tahoe Region but they may regularly be observed above 2438 m (8,000 ft) during the breeding season. In the fall of the year, there is some indication of a downward population movement toward lake level." The species was considered rare and reported only from limited areas in western parts of the state of Nevada (Alcorn 1988). Dixon and Saab (2000) reported that the species breeds in the Carson Range of west-central Nevada.
Yosemite Region	Gaines (1992) considered the species to be rare residents on the west slope of Yosemite from 1981 m to 2743 m (6,500 ft to 9,000 ft) and extremely rare lower and higher on the west slope; they were

> extremely rare visitors east of crest. He noted, "…nowhere have I found these reclusive birds dependably. I suspect they wander from year to year, settling down to nest in areas infested with the larval bark insects that are their primary fare."

Statewide: Small (1994) referred to the black-backed woodpecker as a "rare to uncommon local resident" in California.

There is no scientific information indicating the black-backed woodpecker population in California is isolated from populations in Oregon. Given the species' habitat associations and apparent capacity to move long distances, it seems unlikely that the birds in California are isolated from birds in Oregon.

California Population Trend

The population trend of the black-backed woodpecker in California is unknown. Statewide long-term bird population monitoring strategies (e.g. BBS, National Audubon Society's Christmas Bird Count (CBC), and Monitoring Avian Productivity and Survivorship (MAPS) program) have all detected black-backed woodpeckers in California but the data are too few to determine a statistically significant population trend or productivity indices for this species. BBS data (USGS BBS 2012) show a non-significant positive population trend for black-backed woodpeckers in California. These data have important deficiencies, however, due to low abundance, small sample size, and imprecise results. In California, black-backed woodpeckers were recorded on 14 of the approximately 80 routes situated in the species' range from 1972-2011; a total of 77 individuals was detected for all years (USGS BBS 2012). The CBC program rarely detects black-backed woodpeckers within California count circles. The species was reported from seven circles in California from 1963-2010, for a total of 49 individual detections. Usually only one individual black-backed woodpecker was detected per year. A high count of nine total individuals from three count circles (Yosemite, South Lake Tahoe, and Lake Almanor) in 1991-92 was unusual (National Audubon Society 2012). Black-backed woodpeckers were rarely captured at five of 29 MAPS stations that operated in the Sierra Nevada during recent years (Siegel and Kaschube 2007, Michel et al. 2011).

Recently, USFS implemented monitoring of the black-backed woodpecker in burned forest habitat across ten National Forests in California under the auspices of the Management Indicator Species Program (USFS 2007; see *Existing Management Efforts*, in this report). Data collected through this program are too few at present to determine black-backed woodpecker population trend in burned habitat although preliminary data suggest relative stability during 2009-2011 (Siegel et al. 2012b).

Factors Affecting Ability of the Black-Backed Woodpecker to Survive and Reproduce

DEGREE AND IMMEDIACY OF THREATS

The relationships between impacts to black-backed woodpecker habitat and their effect on black-backed woodpecker population levels are poorly understood at this time. Many of the identified potential threats to black-backed woodpeckers are related to the species' strong association with recently burned conifer forests. Management activities designed to reduce the frequency, spread, and severity of wildfires, such as forest thinning and fire suppression, may therefore reduce the amount of burned forest habitat available to black-backed woodpeckers in California (Dixon and Saab 2000, Bond et al. 2012). However, the management action which has been shown to be most detrimental to the species is post-fire salvage logging (Saab and Dudley 1998, Hutto and Gallo 2006, Hanson and North 2008, Hutto 2008, Saab et al. 2009, Cahall and Hayes 2009).

The effects of climate change, both direct and indirect, may pose threats to black-backed woodpeckers as well (Stralberg and Jongsomjit 2008, Gardali et al. 2012). There is some evidence that the species may be shifting its distribution elsewhere in its range in response to increasing temperatures (National Audubon Society 2009). Additionally, climate change affects black-backed woodpeckers by influencing the distribution of the forest ecosystems they reside in (Lenihan et al. 2008), influencing the fire regime of those ecosystems (Westerling et al. 2006, Miller et al. 2009), and influencing the population dynamics of prey species (Bentz et al. 2010, Fettig 2012).

Black-backed woodpeckers may also face potential threats which are not directly related to their habitat, including disease (Siegel et al. 2012a), and predation (Dixon and Saab 2000, Bonnot et al. 2008, Nappi and Drapeau 2009).

Post-fire Salvage

The published literature from the Rocky Mountains and the Sierra Nevada indicates that black-backed woodpecker foraging activity and nesting density is reduced in burned forests which are salvage logged compared to similar stands which are not salvage logged (Saab and Dudley 1998, Hutto and Gallo 2006, Saab et al. 2007, Hanson and North 2008, Cahall and Hayes 2009, Saab et al. 2009, Siegal et al. 2010). One seeming exception is Forristal (2009), who found in the mountains of eastern Oregon that light salvage logging did not appear to impact black-backed woodpecker nesting activity or nest survival. However, the intensity of logging examined by Forristal was light enough that it did not cause a significant reduction in the number of snags at a landscape scale. Most authors attribute the reduced use of salvaged forest stands to a reduction in snag density; however, Hanson (2007) reported that black-backed woodpeckers foraged on large snags (>50 cm [19.7 in] dbh) more than expected based on availability. Because larger trees are typically targeted for salvage due to their greater economic value, this may be an additional reason unsalvaged stands are preferred by black-backed woodpeckers. Additionally, salvage logging of recently burned forests is likely to negatively impact wood-boring insect populations (see *Prey Species Habitat* in this report).

The degree or intensity of post-fire salvage can vary by land manager and prescription. As noted above, low intensity salvage may not have a significant deleterious effect on black-backed woodpeckers.

There is uncertainty regarding the magnitude of the threat posed to the viability of the California population of black-backed woodpeckers from post-fire salvage logging. Large burned areas outside of special management zones (wilderness areas, roadless areas, National Parks, and other reserves) on federal lands are typically salvaged, although recent management direction has been to retain some snags of all size classes and to incorporate blocks of unsalvaged forests within those projects (USDA Forest Service 2004). Burned forests on private lands are typically salvage logged by both industrial landowners and small landowners. Figure 4 illustrates land ownership within the range of the black-backed woodpecker.

Dead and dying trees are also removed from private and public lands for non-economic reasons. Land managers may remove burned or insect-killed trees for safety reasons, such as near campgrounds or along roadways. Dead and dying trees may be removed to reduce fuel loads in the interest of preventing future fires. The removal of standing dead trees may be the first step in the preparation of sites for replanting or rehabilitation. These non-salvage removals of dead trees may or may not be significant on their own, but would add to the impacts associated with commercial timber salvage resulting in an increased cumulative effect.

Fire Suppression

Fire suppression has been a management prescription on California's forests since the early 1900s (Skinner and Chang 1996). This has reduced the frequency and extent of wildfires in the conifer forests of California from the levels that existed prior to large scale European American settlement in the early 1850s (Kilgore and Taylor 1979, Agee 1993, Skinner and Chang 1996, Stephens et al. 2007). Stephens et al. (2007) estimated that an average of 23,000 ha (56,834 ac) of forest land burned annually in California during the period of 1950-1999 compared to an estimated 457,658-1,227,445 ha (1,130,198-3,033,083 ac) annually before the arrival of Europeans. Similarly, Hanson (2007) estimated that 20-50% of middle and high elevation Sierra Nevada forests burned at high intensity during the 19th century, while a recent estimate is that an average of only 6,070 ha (15,000 ac) per year burn at high intensity in the Sierra Nevada (USDA 2004). Over a much longer term (3,000 years), Marlon et al. (2012) found a slight decline in burning, with the lowest levels during the 20th century. A prominent peak in forest fire activity occurred in the 1800s, followed by a shift to low burning in the 20th century. This suggests that in the context of black-backed woodpecker evolutionary history, the 1800s were a period of unusually high fire activity and the 20th century was unusually low.

In addition to reducing the extent of burned forest in recent history, fire suppression policies, in combination with post-fire salvage logging, may have reduced the number of snags in extant California forests below historical levels. The California Department of Forestry and Fire Protection (CDF) estimates snag levels of 3.8 snags per acre (0.4 ha) 21" (53.3 cm) dbh or larger and 2.0 snags per acre 29" (73.7 cm) dbh or larger on California forests (CDF 2010, table 1.2.12, p. 74). For comparison, Stephens et al. (2008) found 40 snags/ha (16 snags/ac) in a Jeffrey pine dominated forest in northern

Mexico which has not been subject to historical fire suppression activities shortly following a wildfire.

In recent years this pattern has begun to reverse, with significant increases in the area burned annually in the Sierra Nevada since the 1970s and a rapid increase since the 1980s (Miller et al. 2009). Notably, the increase since 1984 was entirely in moister and higher elevation forests. In the Klamath and southern Cascade Range of northern California, Miller et al. (2012) noted that between 1987 and 2008, the mean fire size and total annual area burned increased to levels above any recorded since 1900. Westerling et al. (2006) found that there was a nearly four-fold increase in the frequency of large (>400 ha [988 ac]) wildfires in western forests in the period of 1987-2003 compared to 1970-1986, and that the total area burned in western forests increased more than six and one half times. Much of this increase was concentrated between 1680 m (5,512 ft) and 2590 m (8,497 ft), with the greatest increase centered around 2130 m (6,988 ft). This area of concentration corresponds closely with black-backed woodpecker distribution in California (see Figure 5). While the frequency and extent of wildfires in the West has begun to increase, it should be noted that recent levels remain many times lower than the prehistoric levels reported by Stephens et al. (2007).

In addition to recent increases in fire frequency and burned area, there has been an observed recent increase in the extent of high severity fire (i.e., fires that burn hot enough to result in the mortality of most trees in a stand, also known as stand-replacing fire) in California forests since the 1980s. Areas burned at high severity appear to be preferred by black-backed woodpeckers for foraging and nesting (see *Habitat Essential for Continued Existence of Species* in this report). Miller et al. (2009) found an increase in stand replacing fires in the Sierra Nevada between 1984 and 2006. In 1984 they found 17% of wildfire areas in the region burned at high severity but by 2006 nearly 30% of wildfire areas were categorized as high severity. However, the trend was not apparent in high elevation forests which are important to black-backed woodpeckers. In a similar study in the North Coast, Klamath, and Cascade mountains of northern California, Miller et al. (2012) failed to detect an increasing trend in wildfire severity between 1987 and 2008. Miller and Safford (2012) in their analysis of fire trends in the southern Cascade Range, Sierra Nevada, and Modoc Plateau between 1984 and 2010 concluded that the annual percentage of fires that burned at high severity increased significantly in yellow pine (ponderosa pine and Jeffrey pine forests) and mixed conifer forests. They also found that the number of large fires (larger than 400 ha; 988 ac), and the annual area of high severity fire increased significantly in those same forest types. In higher elevation red fir forests no significant trends were detected (Ibid.)

Miller et al. (2012) stated that there is currently an unsustainable “fire deficit” in the western U.S. attributed to the combined effects of human activities, ecological, and climate changes. Increased fire activity in the late 20th and early 21st centuries has begun to address this deficit, but it continues to grow (Ibid.).

Pre-fire Treatments

Pre-fire fuels management treatments (e.g., stand thinning, fuel break creation, and low intensity prescribed fire) designed to prevent and reduce the spread of wildfire may impact black-backed woodpeckers by reducing the amount of severely burned forest habitat over time, and also by reducing forest tree density and canopy cover. Pre-fire tree density and crown canopy cover were both highly correlated with high post-fire black-backed woodpecker stand occupancy rates and nest densities in studies in Idaho, South Dakota, and Oregon (Russel et al. 2007, Vierling et al. 2008, Forristal 2009, Saab et al. 2009). In unburned forests of Alberta, Hoyt and Hannon (2002) found black-backed woodpecker occupancy correlated with high live tree densities, and in unburned forests of Oregon Goggans et al. (1989) found the number of medium and large snags correlated to black-backed woodpecker occupancy. Prescribed fire is generally used to reduce forest fuels and prevent high intensity wildfires, thus preventing the creation of black-backed woodpecker habitat. However, some prescribed fires in eastern Washington appeared to result in increased black-backed woodpecker occupancy (Russell et al. 2009), and nesting has recently been documented in a prescribed burn area on the Eldorado National Forest (A. Fogg unpublished data *in* Bond et al. 2012). Although pre-fire fuels management is practiced by most forest land mangers in California, the practice is unlikely to significantly alter fire regimes in California forests due to the limited scale at which it is implemented (North 2012).

Climate Change

A growing body of scientific research indicates that climate change will have significant effects on species and habitats in California (California Natural Resources Agency 2009). As climate change models continue to be developed and refined for California, there are some indications that climate change will impact montane species, including the black-backed woodpecker (North 2012).

The black-backed woodpecker occurs within the Sierra Nevada, Cascade and, in part, Great Basin (Warner Mountains) ecoregions (Hickman 1993) in California. Climate change projections by ecoregion are summarized by PRBO (2011), as follows:

- Thermal conditions within these ecoregions are predicted to increase in mean annual temperatures, warmer winter temperatures, earlier warming in spring, and increased summer temperatures.
- Precipitation projections are uncertain for all three ecoregions.
- Snow pack is projected to dramatically decrease by the end of the 21st century in the Sierra Nevada and Cascade ecoregions. Snow accumulation in the Great Basin is also projected to decrease (Snyder et al. 2004).
- Loss of conifer dominated vegetation is projected, especially at higher elevations. Lenihan et al. (2008) predicted a vegetation shift from conifer forest (commonly used by black-backed woodpeckers under current conditions) to mixed evergreen forest (used infrequently by black-backed woodpeckers under current conditions) with more grassland and loss of alpine/subalpine forest by the end of the 21st century in the Sierra Nevada. In the Cascade Ecoregion, the Sierra mixed conifer/white fir/Jeffrey pine vegetation type is projected to decrease by 70%. Vegetation maps in Lenihan et al (2008) predicted an increase in the area of eastside pine/pinyon pine/juniper habitat in the Great Basin Ecoregion by 45 to 38%. Significant declines in the extent of alpine/subalpine forest (including lodgepole pine forests and whitebark pine forests commonly used by black-backed woodpeckers, both in burned and unburned states under current conditions) were projected by Lenihan et al (2008) under all future climate scenarios examined. Their models indicated projected shifts to longer growing seasons, and increased fire activity at high

elevation sites will favor the replacement of alpine/subalpine forests by other vegetation types by the year 2099 (Figure 6).

- Fire frequency and intensity in the Sierra Nevada, under increasing CO2 levels, is projected to result in larger and more intense fires in a number of vegetation types in the Sierra Nevada over the short term (e.g., Fried et al. 2004, Running 2006, Westerling et al 2006, 2011); however, over the longer term, these conditions may lead to vegetation shifts that support less severe wildfire regimes (Parisien and Moritz 2009). Westerling and Bryant (2008) projected an increase in large fires in the Great Basin ecoregion.

Thermal Conditions: Avian distribution shifts in response to temperature and/or precipitation changes in the Sierra Nevada have been reported (Tingley et al. 2009). National Audubon Society (2009) analyzed forty years of Christmas Bird Count (CBC) data spanning 1966-2005 to examine patterns of distribution shifts for 305 species of birds throughout their North American range. They found evidence of a northward movement of the center of abundance for 58% of the species analyzed, including the black-backed woodpecker. Black-backed woodpeckers showed a significant shift northward of the center of abundance by 100 miles as well as a significant shift inland by 130 miles. These data suggest black-backed woodpecker movement as a possible response to increasing average temperatures. Note that black-backed woodpeckers are very rarely detected on CBC counts in California (see *Current Population Abundance* in this report); therefore, data are too few to analyze at the state level for this species.

Stralberg and Jongsomjit (2008) predicted range contractions for back-backed woodpeckers across the Sierra Nevada and southern Cascade Range based on climate change models with annual mean temperature and precipitation as important variables for both Maxent (maximum entropy) and GAM (generalized additive model) distribution models.

Food Availability for the Black-backed Woodpecker: While fire is historically the fundamental disturbance factor in Sierra Nevada forested ecosystems (Collins and Stephens 2012), bark beetle colonization can also cause significant disturbance in areas containing stressed trees (Lowell et al. 2010, Fettig 2012). Changing climatic conditions may significantly alter the frequency and severity of disturbance factors (e.g., fire frequency, temperature) in the Sierra Nevada (Bentz et al. 2010, Fettig 2012), potentially influencing prey resources of the black-backed woodpecker.

Rising temperatures may directly increase annual bark beetle reproductive output and reduce winter mortality rates (which may vary among species), potentially leading to greater success and a general range expansion of bark beetles (Powell and Logan 2005, Regniere and Bentz 2007, Raffa et al. 2008, Bentz et al. 2010, Fettig 2012). Climate change may also indirectly influence the interaction dynamics between bark beetles, their host trees, and their community associates (fungi, bacteria, nematodes, mites), although little information exists regarding these relationships (Bentz et al. 2010, Fettig 2012). Earlier spring snowmelt may dramatically increase summer drought, water related tree-stress, and susceptibility of large areas of coniferous trees (with reduced vigor/defenses) to bark beetle outbreaks (Allen et al. 2010). Episodic bark beetle outbreaks causing large-scale mortality may have been historically rare in the Sierra

Nevada, but have been documented in past multi-year (i.e., 1986-1992) droughts (Macomber and Woodcock 1994, Ferrell 1996, Barbour et al. 2002, Guarín and Taylor 2005, Deal et al. 2010, Fettig 2012). Fuels and fire behavior may be altered in forests with bark beetle-caused mortality; however, generalizations cannot be made due to variability across the landscape (Hicke et al. 2012). Bark beetle populations may benefit from the impacts of climate change; however, their importance as a prey resource of the black-backed woodpecker in California is not clearly understood (see *Food Habits* in this report).

While research has focused on projected impacts of climate change on bark beetle populations and forest dynamics, projections are lacking regarding impacts of climate change on wood-boring beetles (Cerambycidae), the preferred food source of the black-backed woodpecker in burned forests in California (see *Food Habits* in this report). Short-term increases in the frequency and severity of wildfire disturbance may benefit wood-boring beetles (and therefore black-backed woodpeckers) by increasing available foraging habitat for wood-borers. Long-term changes in vegetation type and distribution as described by Safford et al. (2012) may affect reproduction, survivorship, abundance, distribution, species diversity, and the ecosystem role of wood-boring beetles in the Sierra Nevada but there are currently no data available.

Documented changes in the phenology of species are evident globally, with potentially severe impacts to the life history characteristics of some species (Pounds et al. 1999, Root et al. 2005). Breeding phenology and the availability of food resources to nestlings may impact black-backed woodpeckers. Fayt (2006), in a study in Finland, hypothesized that the Eurasian three-toed woodpecker, a species closely related to the black-backed woodpecker, may not be able to adjust breeding phenology to coincide with preferred wood-boring beetle prey availability when spring temperatures were exceptionally warm (>6-8° C [10.8-14.4°F]). Accelerated beetle larvae development may prevent breeding woodpeckers from matching nest initiation dates to the food supply. Productivity increased, however, with modest (from 2.3° to 4.35° C [4.14-7.83°F]) mean temperature increases in spring.

<u>Fire and Climate Interactions</u>: Climate can influence wildfire frequency, severity, and geographic extent through temperature, precipitation, wind speed, humidity and lightening activity (Gedalof 2011). Additionally, over longer periods of time (decades) climate can influence wildfire dynamics by shaping the species composition and fuel densities of vegetative communities in a given location (Westerling et al. 2006). Interestingly, in forested areas, precipitation negatively affects fire in the very short term by wetting fuels, but positively effects fire in the longer term by increasing fuels through augmented vegetation growth (Westerling and Bryant 2008, Miller et al. 2009). Climate-driven changes in vegetative communities may compound vegetation changes resulting from human management activities (primarily fire suppression, see Stephens et al. 2007). The relative roles of climate change and human management in influencing fire regimes vary by ecosystem, and can be difficult to separate (Westerling et al. 2006, Miller et al. 2009).

Recent climate change has been observed to influence fire patterns in California. Miller et al. (2009), in their study of the Sierra Nevada and southern Cascade Range, found that between 1908 and 2006, there were significant increases in mean annual precipitation and mean minimum temperature; furthermore, observed increases in fire size and burned area could be attributed to those changes. Other studies have also determined that recent climate changes (primarily increasing temperatures and changing precipitation patterns) are correlated with increasing fire activity (Westerling et al. 2006, Miller et al. 2012; See Figure 5).

Studies which have analyzed the potential effect of likely future climate scenarios on future wildfire activity in California largely agree that over the next several decades, fire frequency, size, and severity are likely to increase (Westerling and Bryant 2008, Spracklen et al. 2009, Westerling et al. 2011, Krawchuck and Moritz 2012). However, Gedalof (2011) noted that many model predications beyond the interval of several decades are probably unreliable as vegetation structure and composition will be changing rapidly in response to changing climatic conditions and fire regimes. Key findings of these studies follow:

- Westerling and Bryant (2008) found that in northern California by the end of the 21st century the probability of a wildfire > 200 ha (494 ac) occurring on a given unit of land in a given month will be 12% - 53% greater than it is today.

- Spracklen et al., (2009), assuming a future climate predicted by the IPCC A1B greenhouse gas emissions scenario, projected the area burned in the western United States in 2046-2055 to be 54% greater than the area burned in the period of 1996-2005. The largest increases in burned area were projected for the Pacific Northwest (78%), which includes the Sierra Nevada and the Klamath-Cascades in their model, and the Rocky Mountains (175%), where wildfire appears to depend most strongly on temperature.

- Westerling et al. (2011) found that under possible future greenhouse gas emissions scenarios (Special Report on Emissions Scenarios A2 scenario), wildfire burned area may increase by more than 100% in much of the forested areas of northern California by 2085. However, the authors noted that higher elevation forests (where black-backed woodpeckers are currently found at the highest densities) will be somewhat buffered from increasing fire activity by their greater available moisture. The largest increase in burned area was expected in mid-elevation forests on the west side of the Sierra Nevada.

- Krawchuck and Moritz (2012) projected patterns of area burned for ecoprovinces in the western U.S. with an assumed 1° C (1.8° F) increase in global average temperature and a suite of Global Climate Models (GCMs) and projected large increases in fire for northwestern California, Cascade Ranges, and the Sierra Nevada.

There is broad agreement amongst these recent studies that the extent of wildfire-burned area is likely to increase in the forests of northern California for at least the next several decades. Beyond that timeframe there is less certainty, although most studies predict a continuing trend of increased wildfire activity. Accordingly, it appears the influence of climate change on future wildfire activity is likely to increase the amount of burned-forest foraging and nesting habitat available to black-backed woodpeckers.

However, burned forest is only beneficial to black-backed woodpeckers if it is managed for their benefit. The degree to which projected increases in wildfire extant will benefit the species will be moderated by the degree to which burned forests are removed for salvage or retained for ecosystem benefits. Since 2003, approximately 80% of high severity burned forest within USFS area were unsalvaged, for purposes of illustration, if this were to continue then 80% of the increased burned-forest foraging and nesting habitat would be available for black-backed woodpeckers (Bond et al. 2012).

Climate Vulnerability Assessment: Gardali et al. (2012) assessed the vulnerability of birds to climate change in California. They defined climate vulnerability as the amount of evidence that climate change will negatively impact a population and assigned sensitivity and exposure scores for each taxon evaluated, including the black-backed woodpecker. Climate change sensitivity criteria included habitat specialization, physiological tolerances, migratory status, and dispersal ability. Exposure criteria included changes in habitat suitability, changes in food availability, and changes in extreme weather.

A ranked list of bird species vulnerable to climate change was developed and further refined with three priority-level categories. They found the black-backed woodpeckers to be vulnerable to climate change but in the lowest priority category. Black-backed woodpeckers received a high vulnerability score for habitat specialization based on the species' reliance on conifer habitat and very strong preference for recently burned habitat. A moderate vulnerability score was assigned for average dispersal ability. Black-backed woodpeckers are capable of irruptive movement but extensive gaps in forest cover may act as a barrier to dispersal (see *Movements* in this report). Black-backed woodpeckers were scored high in only one exposure category: change in habitat suitability. This score was based on a predicted loss of conifer dominated vegetation, especially at higher elevations in the Sierra Nevada and Cascade ecoregions (PRBO 2011; see Figure 4). A predicted increase in conifer forest habitat in the Great Basin Ecoregion might benefit the black-backed woodpecker; however, the species does not use pinyon pine or juniper, the dominant coniferous species in this ecoregion.

Small Population Size

Small population size increases the risk of extirpation through demographic, environmental, and genetic stochastic events (random changes over time), particularly if the population is isolated, as well as deleterious effects associated with low genetic diversity (Traill et al. 2007, Traill et al. 2010). Demographic stochasticity can cause unbalanced age or sex ratios resulting in reduced capacity to breed. Genetic stochasticity can result in the loss of adaptive genes from the population or the proliferation of maladaptive genes. Additionally, small populations are less able to weather and recover from random catastrophic events. For example, black-backed woodpeckers in California could be significantly impacted by a prolonged period of little or no wildfire activity in coniferous forests. However, a species with a small population size may not necessarily be in serious danger of extinction. Population viability is also related to the stability of a species' environment and the life history of the species, including reproductive capacity and density dependence (Flather et al. 2011).
Given that there is wide variation between and within the available California black-backed woodpecker population estimates, and no estimate has been rigorously

reviewed, it is impossible to quantify the threat to the species posed by small population size. Additionally, the extent to which the California population is able to exchange genes with black-backed woodpeckers outside of California (and therefore mitigate the risks associated with a small gene pool and genetic stochasticity) is also unknown. While there is no information indicating the black-backed woodpecker population in California is isolated from populations in Oregon, the degree of connectivity between populations is a question that will require further research. The threat posed to black-backed woodpeckers in California from small population size effects, like any species with a small population size, has potential to be significant, but is currently unknown.

Disease

Information on diseases of the black-backed woodpecker is limited to one paper. The first record of Spiruroid nematode (Genus *Procyrnea*) infection in a black-backed woodpecker was documented in Lassen National Forest in 2011. The infection was considered lethal to the animal. *Procyrnea* has been implicated in die-offs of other bird species, including woodpeckers (Siegel et al. 2012a).

No information is available on ectoparasites affecting black-backed woodpeckers. Fleas were collected in the nests of the closely related American three-toed woodpecker in Alaska (Haas and Wilson 1984 *in* Leonard 2001), and hippoboscid flies have been found on other North American woodpeckers (R. Dixon personal communication).

Other Risk Factors

Predation: There are few data related to predators of black-backed woodpeckers. A Cooper's hawk (*Accipiter cooperi*) killed an adult black-backed woodpecker affixed with a tracking device (Dixon and Saab 2000). Predation was considered a major cause of nest failure in a study in South Dakota (Bonnot et al. 2008). A black bear (*Ursus americanus*) destroyed a nest in burned habitat in Canada; chickarees (*Tamiasciurus douglasii*) and flying squirrels (*Glaucomys sabrinus*) were suspected nest predators in Oregon (Dixon and Saab 2000, Nappi and Drapeau 2009). Great horned owls (*Bubo virginianus*) and northern goshawks (*Accipiter gentilis*) are other likely predators (R. Dixon personal communication). Predation alone as a factor, does not appear to constitute a threat to the continued existence of the species.

Competition: Competition between black-backed woodpeckers and other species of birds has been recorded. In particular, other species of cavity nesters (e.g., mountain bluebird (*Sialia currucoides*), other species of woodpeckers) showed aggressive behavior towards black-backed woodpeckers and vice versa (Dixon and Saab 2000). Villared and Beninger (1993) reported that in burned forest from Quebec, black-backed woodpecker males were displaced by hairy woodpeckers (*Picoides villosus*) from foraging sites in both winter and spring (n=22). As with predation, native competitors to the black-backed woodpecker in California are not considered by the Department to be a threat to the continued existence of the species.

Overexploitation: No information on overexploitation is available; Dixon and Saab (2000) speculated that black-backed woodpeckers may be shot if found damaging human-built structures. A few individual black-backed woodpeckers have been captured over the past several years for research purposes with few reported fatalities.

However, the Department concludes that overexploitation is not a factor contributing to the continued existence of the species.

The Department is not aware of any information which would indicate predation/competition/overexploitation alone constitutes a threat to the black-backed woodpecker in California.

EXISTING MANAGEMENT EFFORTS

Current Land Management Practices

Land management practices in the range of black-backed woodpeckers in California vary with ownership. Fifty five percent (55%) of the forestland in California is publicly owned, the vast majority of which is owned and managed by the federal government (CDF 2010). The remaining 45% is privately owned. Most of the federal forest land in California is owned and managed by the United States Department of Agriculture Forest Service (USFS). The USFS manages 4,355,231 ha (10,762,000 ac) of conifer forest land in California (CDF 2010). The National Park Service (NPS) is another significant landowner in the species' range, owning and managing 447,583 ha (1,106,000 ac) of conifer forest land (Ibid.). Although some black-backed woodpecker habitat is owned and managed by California State Parks, the California Department of Forestry and Fire Protection, and other public agencies, most of the 2,692,376 ha (6,653,000 ac) of non-federal conifer forest land is privately owned (Ibid., See Figure 4).

U.S. Forest Service Management: Land management on USFS lands is governed by the Land Resources Management Plan (LRMP) of each National Forest. The LRMPs of the Sierra Nevada National Forests were amended by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) which specifies that vegetation management strategies that are "aggressive enough to reduce the risk of wildfire to communities in the urban-wildland interface while modifying fire behavior over the broader landscape" (USDA Forest Service 2004). Specific management objectives are identified by land allocation. For example, fire prevention and fuels reduction objectives are more aggressive in Wildland-Urban Interface (WUI) Defense Zones and WUI Threat Zones than in General Forest or Old Forest Emphasis Area Zones (Ibid.).

When the 2004 SNFPA was adopted, it was estimated that fuel treatments would cover 25-30% of the USFS land base over a management cycle of 20 or more years. Additionally, annual forest thinning was planned to remove less than 0.3% of the existing tree volume (Bond et al. 2012). However, actual implementation of the SNFA since 2004 has been below those estimates. The average annual area subject to vegetation management has been approximately 12,950 ha (32,000 ac). At this rate, a 20-year management cycle would treat less than 5% of the USFS land base (Ibid.).

Decisions are made regarding the salvage of fire- and insect-damaged timber on USFS lands at the individual site level with consideration given to human safety over the short term and long term, and the desired future conditions of the site (Bond et al. 2012). The of USFS conifer forest land have burned in the Sierra Nevada and approximately 12,141 ha (30,000 ac) have been salvaged. Of the 44,111 ha (109,000 ac) of high severity burns, approximately 8,822 ha (21,800 ac), or 20% has been salvaged (Ibid.). Burned forests on USFS lands may also be subject to firewood cutting. The USFS issues wood cutting permits to individuals to cut firewood in designated areas, often recently burned areas. The impacts of this activity include the removal of black-backed woodpecker habitat, disturbance associated with cutting trees with chainsaws, and the potential take of nesting birds. R. Siegel (unpublished data) has observed the removal of snags within 20 m (66 ft) of nesting black-backed woodpeckers by firewood cutters on National Forest land on two separate occaisions.

On USFS lands, decisions about fire suppression actions are made giving consideration to the conservation of natural resources, restoration of ecological health, the protection of communities, the protection of fire fighters from unnecessary risk, and the human health impacts of fire smoke. Resource and ecological health considerations include protecting the old forest habitat of California spotted owls (*Strix occidentalis occidentalis*), northern goshawk, fisher (*Martes pennanti*), and American marten (*Martes americanus*, Ibid.). Also, on USFS lands, prescribed fire and naturally ignited management fire is sometimes used, where conditions allow, to achieve ecological restoration and fuel reduction goals (Ibid.), although as Stephens et al. (2012) note, in the western U.S., use of prescribed fire by forest managers has been so constrained by social, economic, and administrative issues that prescribed-fire use is low.

<u>National Park Service Management</u>: National Park Service lands within the range of the black-backed woodpecker include Lassen Volcanic National Park, Yosemite National Park, Devil's Postpile National Monument, Kings Canyon National Park and Sequoia National Park. Forest lands within these national parks and monument are not managed for timber production, or salvage logged following fires other than in extremely limited circumstances for public safety reasons. The Sierra Nevada parks have active wildland fire management programs which include managed natural fires and prescribed fires (Yosemite National Park 2004). Fire management on National Park Service lands is guided by the 1995 Federal Wildland Fire Policy, and strives to restore natural fire regimes where feasible (D. Graber personal communication*. in* Bond et al. 2012).

<u>State and Private Lands</u>: Forest management on state and private conifer forest lands in California is regulated by the California Forest Practice Rules (FPRs) (Title 14, California Code of Regulations, chapters 4, 4.5, and 10) which implement the Z'berg-Nejedly Forest Practice Act. The FPRs require Registered Professional Foresters to prepare Timber Harvesting Plans (THPs), or similar documents (e.g. NTMPs) prior to harvesting trees on California timberlands. The preparation and approval of THPs is intended to ensure that potentially significant impacts to the environment are considered and, when feasible mitigated. Publicly funded or authorized projects within the range of the black-backed woodpecker which do not include the commercial harvest of timber, the conversion of timberland to non-timber uses, or which require additional local or state government approvals are subject to the California Environmental Quality Act (CEQA, California Public Resources Code section 21000).

The FPRs specifically require foresters to consider the retention and recruitment of snags for wildlife habitat (FPRs Technical Rule Addendum 2 – Cumulative Impacts Assessment). Additionally, section 897(b)(1)(B) of the FPRs states that one of the goals of forest management in California under the FPRs (and one of the criteria used by the State Board of Forestry in deciding whether to approve THPs) is to “Maintain functional wildlife habitat in sufficient condition for the continued use by the existing wildlife community within the planning watershed”. The FPRs call for the retention of all snags to provide wildlife habitat; however, they also require any snag posing a safety, fire, insect, or disease outbreak hazard to be felled, and allow the felling of merchantable snags (FPR sections 919.1, 939.1, 959.1). The net result is that the retention of snags on private forest lands in California is highly variable.

The FPRs exempt some types of timber operations from the THP preparation and approval process (FPRs section 1038). Exempt projects are not exempt from the FPRs, only the THP preparation and approval process. Among the allowed exemptions is the removal of snags and dying trees (up to 10% of the timber volume per acre) from timberlands (FPRs section 1038(b)). The California Department of Forestry and Fire Protection reported that large landowners typically filed an exemption for this purpose over their entire property on an annual basis (CDFG 2010). The exemption most germane to black-backed woodpeckers however is the removal of up to 100% of the timber from “substantially damaged timberlands” (areas of timberland where wildfire, insects, disease, wind, flood, or other blight has reduced the live timber volume below California’s minimum requirements (FPRs sections 1038(d), 895.1). Accordingly, nearly all severely burned forests on private lands in California are salvaged.

Non-timber projects on state and private lands which are funded or authorized by public agencies are subject to the provisions of CEQA (e.g., highway construction, residential and commercial development, some energy projects). CEQA requires that actions which may substantially reduce the habitat, decrease the number, or restrict the range of any species which can be considered rare, threatened, or endangered (regardless of status under state or federal law) must be identified, disclosed, considered, and mitigated or justified (California Code of Regulations, Title 14, sections 15065(1), 15380). However, like the FPRs, there are no established guidelines or minimum conservation measures related to species impacts or their mitigation measures.

Sensitive Species Designations

State, federal and non-governmental organizations designate “at risk” species (e.g., threatened and endangered species, Species of Special Concern, Species of Greatest Conservation Concern, etc.) and assess and rank their conservation needs. Status designations for the black-backed woodpecker are summarized below by jurisdiction or organization:

State of California Status: The Commission designated the black-backed woodpecker a “candidate” for listing as endangered or threatened under the California Endangered Species Act, effective January 6, 2012. (See *Regulatory Framework* in this report.)

“Species of Special Concern” (SSC) is a Department administrative designation intended to alert biologists, land managers, and others to a species’ declining status and to encourage them to afford these species additional management consideration. SSCs are defined as species, subspecies, or distinct populations of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria: is extirpated from the State or, in the case of birds, in its primary seasonal or breeding role; is listed as federally-, but not State-, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed; is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status; has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status (Comrack et al. 2008).

The Bird Species of Special Concern (BSSC) list was recently updated based upon objective, standardized methodology and ranking process (Shuford and Gardali 2008). As part of the process, the black-backed woodpecker was evaluated, scored and ranked against seven criteria along with other nominee taxa and was not found to merit inclusion on the special concern list.

Remsen (1978) considered the black-backed woodpecker for inclusion on the Department's first BSSC list but ultimately rejected it, considering it "a scarce species, but probably widely distributed and doing well within its range." The BSSC database for all nominee taxa is available online at the Department's website (CDFG 2012).

Federal Status: The black-backed woodpecker is not currently listed as endangered or threatened nor is it a candidate for listing under the federal Endangered Species Act. It is not included on the USFWS Birds of Conservation Concern list (USFWS 2002, 2008, 2012). Recently, a petition to list the species as threatened or endangered under the Federal Endangered Species Act was submitted to the Department of the Interior and the USFWS (Hanson et al. 2012). The petition included black-backed woodpecker populations in California, Oregon, South Dakota and a part of Wyoming. USFWS is currently assessing the petition.

The USFS designated the black-backed woodpecker a "Management Indicator Species" (MIS; USFS 2007). MIS are selected to address National Forest Management Act requirements related to diversity of plant and animal communities. Species are selected because their population changes may indicate the effects of land management activities. MIS status designation does not convey additional conservation protection from the USFS in and of itself. However, the habitat needs of MIS are to be considered in the establishment of forest plan objectives for important wildlife and fish habitat, and as forest plans are implemented through individual projects, Forest Service managers are to assess their effects on MIS habitat. Population monitoring is an integral component of the MIS. (Siegel et al. 2012b) Since 2008, USFS has partnered with the Instituted for Bird Populations (IBP) to implement long-term annual monitoring of black-backed woodpeckers within burned forest areas across ten Sierra Nevada National Forests (Ibid.). The primary goal of the program is to monitor trends in the amount of recently burned forest within the study area that is occupied by black-backed woodpeckers, so that USFS personnel can evaluate the likely effects of forest plan implementation on black-backed woodpecker populations. Additional goals are to better understand black-backed woodpecker abundance, distribution, and habitat associations across the Sierra Nevada, to develop information that can inform effective conservation of black-backed woodpecker in the Sierra Nevada, and to collect and interpret information on other bird species utilizing burned forests.

Status in Oregon and Nevada: Oregon Department of Fish and Wildlife (ODFW) classified the black-backed woodpecker as "sensitive-vulnerable" throughout the State (ODFW 2008). ODFW define "sensitive" as naturally-reproducing fish and wildlife species, subspecies, or populations which are facing one or more threats to their populations and/or habitats. Implementation of appropriate conservation measures to address the threats may prevent them from declining to the point of qualifying for threatened or endangered status. Vulnerable sensitive species are those facing one or more threats to their populations and/or habitats. Vulnerable species are not currently imperiled with extirpation from a specific geographic area of the state but could become imperiled with continued or increased threats to populations and/or habitats (M. Nugent, pers. comm.). The black-backed woodpecker was not recognized as "sensitive" by the state of Nevada (Wildlife Action Plan Team 2006.)

Non-governmental Organization Designations: NatureServe, a non-profit conservation organization whose mission is to provide the scientific basis for effective conservation action through its network of natural heritage programs, ranked the black-backed woodpecker as globally secure; however, at the subnational level (Oregon and California), the species has been assigned vulnerable and (Nevada) critically imperiled ranks by the respective states. It defines the term "vulnerable" as "…a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation" (NatureServe 2012).

California Partners in Flight, a coalition of government and non-governmental organizations with a shared goal of "keeping common birds common", designated the back-backed woodpecker as a focal species for coniferous forest habitats. Focal species represent a spectrum of habitat characteristics and types and help define which spatial and compositional attributes characterize a healthy ecosystem and guide the development of appropriate management regimes (CPIF 2002). Focal species designation does not confer "sensitive" status to species so designated. Recently, a conservation strategy for the black-backed woodpecker in California was developed by the Institute for Bird Populations and California Partners in Flight (Bond et al. 2012).

Monitoring

Bird monitoring methods, including "area search", "point count" and "call back", are used variably, depending upon species targeted, time of year, and research or management question posed. In general, black-backed woodpeckers are relatively quiet and unobtrusive and can therefore present monitoring challenges. Nielson-Pincus (2005) found playback of recorded black-backed woodpecker vocalizations improved detection of the species by 61% in northeastern Oregon and concluded that "rare species [such as black-backed woodpeckers] are therefore not accurately surveyed using traditional methods alone". Saracco et al. (2011) reported a strong positive effect for the use of broadcast calls on detection probability of black-backed woodpeckers in the Sierra Nevada.

Management Recommendations

Habitat Management: The following management recommendations are based on the best available scientific information on the black-backed woodpecker and are intended to improve conditions for the species in California. Part of effective conservation of black-blacked woodpeckers in California is for recently burned conifer forest, as well as suitable unburned forest, to be maintained across the species' range in the state. As new information becomes available, recommendations may be further refined. These goals and recommendations are adapted from the recently completed conservation strategy for the black-backed woodpecker in California (Bond et al. 2012).

Goal 1- Manage recent fire areas on both public and private lands to preserve and promote habitat for the black-backed woodpecker.

Recommendation 1.1: Within the range of the black-backed woodpecker, ensure that post-fire management occurring in new fires that burn 50 or more ha (≥123 acres) of conifer forest at moderate- to high-severity consider snag retention and other burned-forest habitat needs of the species. Where feasible, black-backed woodpeckers will likely benefit most from large patches of burned forest being retained in unharvested condition.

Data are not yet available to provide specific guidelines on the density of retained snags necessary to support black-backed woodpecker occupancy and reproduction. One study (Siegel et al. 2012c) reported an average snag basal area of 22 m2/ha (96 ft2/acre) (range = 6–34 m2/ha (26-148 ft2/acre)) within home ranges of 9 radio-tracked black-backed Woodpeckers on Lassen NF, although home ranges within this landscape were quite large, perhaps indicating suboptimal habitat. Additionally, stands selected by the woodpeckers for nesting within this landscape generally had much higher snag densities.

Where post-fire snag removal is to occur, patches retained to support black-backed woodpeckers should incorporate areas with the highest densities of the largest snags to provide foraging opportunities (see Siegel et al. 2012b) as well as high density patches of medium- and small-diameter snags (see Seavy et al. 2012) in the interior of the fire area to support higher nesting success in the early post-fire years (see Saab et al. 2011). Researchers working in different forest types have defined tree size classes in various ways, but as a general guideline, large snags indicative of preferred foraging habitat roughly correspond to California Wildlife Habitat Relationships (CWHR; Mayer and Laudenslayer 1988) size class 5 (dbh >24") and medium- and small-diameter snags typical of nesting habitat roughly correspond to CWHR size class 4 (dbh = 11-24") or occasionally 3 (dbh = 6-11").

Recommendation 1.2: Within burned forest, focus on retaining large patches of predominately prey-rich trees as evidenced by wood-boring beetle holes on trunks, or by using another appropriate index (see Recommendation 6.2). Where snag removal is proposed to meet other objectives, black-backed woodpeckers would likely benefit from targeting areas with relatively prey-poor snags, and retaining patches of snags that are relatively prey-rich. Because insect colonization varies among sites, identification of prey-poor and prey-rich areas is best informed by site-specific information on prey distribution (see Powell 2000, Bonnot et al. 2009). Where such data are not available, managers should focus on retaining as many snags as possible within the larger size classes available. Note that black-backed woodpeckers regularly forage on partially or completely charred snags – charred bark does not imply that the snag has been burned too severely to serve as foraging substrate.

Recommendation 1.3: If post-fire management is intended to be compatible with black-backed woodpecker conservation, area of post-fire clear-cut patches (where all the snags in an area are removed) should not exceed 2.5 ha (6.18 acres) (see Schwab et al. 2006), at least until relevant findings from California ecosystems are available.

Recommendation 1.4: Retain high tree density in the unburned forest periphery around fire areas, to provide foraging habitat in the later post-fire years (see Saab et al. 2011).

Recommendation 1.5: Avoid harvesting fire-killed forest stands during the nesting season (generally May 1 through July 31). This management recommendation will protect dozens of other nesting bird species associated with burned forests in addition to the black-backed woodpecker. After about 8 years post-fire, such stands are unlikely to contain many nesting black-backed Woodpeckers, but many other bird species will nevertheless still be nesting in snags during this period. In order to protect black-backed woodpecker nests during the breeding season, in accordance with FGC Section 3503, species-specific surveys (Seavy et al. 2012, Siegel et al. 2012b) should be conducted to identify nest trees and potential nest trees, to protect them from harvest or salvage; disturbance buffer zones should also be established around such trees.

Recommendation 1.6: Where managing for black-backed woodpeckers is a priority, avoid cutting standing snags for fuelwood in recent fire areas (<8 years post-fire) during the nesting season (generally May 1 through July 31). Harvesting of a portion of the available downed trees is an alternative that will not jeopardize black-backed woodpecker nests.

Recommendation 1.7: Consider the ecological importance of moderate- and high-severity burned forest in Land and Resource Management Plan updates. Incorporate post-fire management strategies designed to retain high-quality black-backed woodpecker habitat in the planning area, and emphasize the use of prescribed fire and wildland fire.

Recommendation 1.8: If no other legal or administrative protection for the Black-backed woodpecker is adopted, consider designating the black-backed woodpecker as a Species of Conservation Concern or Sensitive in USDA. Forest Service Region 5 if emerging data support such a designation.

Recommendation 1.9: Work with the California Department of Forestry and Fire Protection (Cal-Fire) to address the needs of black-backed woodpeckers on private lands by modifying the guidelines regarding burned-forest management. Consider black-backed woodpecker surveys prior to timber harvesting in burned forests on private land in California, including emergency exemptions (FPRs section 1038), and nest stand protection measures during the nesting period. Consider establishing minimum thresholds in the Forest Practice Rules to retain and recruit snag habitat within the landscape important to black-backed woodpecker.

Goal 2- Use prescribed fire and wildland fire to create primary habitat that is well-dispersed across the landscape.

Recommendation 2.1: Consider implementing prescribed fire in the unburned periphery of recent fire areas 5 to 6 years after fire to create additional black-backed woodpecker habitat as the habitat suitability of the original fire area begins to wane.

Recommendation 2.2: Use prescribed fire, especially with mixed-severity effects, to create black-backed woodpecker habitat that is well-distributed across the landscape, especially in areas that have not experience wildfire recently; additional research should provide specific guidance regarding optimal spatial distribution of prescribed burns (see Russell et al. 2009) and which habitat types to prioritize for prescribed burning to maximize benefit to black-backed woodpeckers (see Recommendation 6.5). Note that some degree of tree mortality resulting from prescribed burns is likely to be beneficial to black-backed woodpeckers.

Recommendation 2.3: Where feasible and compatible with other management objectives, allow naturally ignited fires to burn and create optimal black-backed woodpecker habitat in forested areas outside the wildland-urban interface (WUI). Consider restricting insecticide and beetle repellant use, in occupied black-backed woodpecker habitat.

Goal 3- Manage unburned forest to promote suitable post-fire habitat for Black-backed woodpeckers after future fires.

Recommendation 3.1: Where feasible, manage unburned forest to promote recruitment of large trees and patches of high tree density, to improve habitat quality after fire occurs.

Goal 4- Manage “green” forest, particularly stands dominated by lodgepole pine and red fir, in a manner that promotes black-backed woodpecker occupancy.

Recommendation 4.1: Manage unburned forests to retain and recruit medium - to large sized (i.e., roughly corresponding to CWHR size class 4 and 5) dying trees and recently dead snags in the earliest stages of decay (*large trees*: Setterington et al. 2000, *early decay stages*: Tremblay et al. 2009). In areas managed specifically for black-backed woodpecker, manage for and retain even higher densities of medium to large, early-stage snags. Snag retention guidelines in green forests could be established based on information gleaned from studies on habitat requirements, home-range size, and food sources in unburned forests in California (see Recommendation 6.6).

Recommendation 4.2: In areas where black-backed woodpecker conservation is a priority, avoid fuelwood cutting (or issuing fuelwood cutting permits) within stands of lodgepole pine during the nesting season (generally May 1 through July 31), or conduct broadcast surveys (Saracco et al. 2011) to identify unoccupied stands where fuelwood cutting during the nesting period may not pose any risk to black-backed woodpecker nests. Harvesting of a portion of the available downed trees is an alternative that will not jeopardize black-backed Woodpecker nests.

Recommendation 4.3: In the absence of data from California regarding the importance of aggregations of beetle-killed trees to black-backed woodpeckers, assume stands that experience mortality due to beetle outbreaks provide Black-backed Woodpecker habitat (see Goggans et al. 1989, Bonnot et al. 2009). In areas with aggregations of recent (<8 years) beetle-killed trees managed for black-backed woodpeckers, avoid harvesting snags. Ultimately, retention targets for beetle-killed trees should be based on empirical research findings (see Recommendation 6.5).

Research and Monitoring: The following management recommendations are based upon the need to continue gathering scientific information on the black-backed woodpecker in California. Further research and monitoring will aid in practical implementation of the habitat management recommendations above, and help to determine population size and trend. As new information becomes available, recommendations may be further refined. These goals and recommendations are adapted from Bond et al. (2012).

Goal 5 - Estimate the population size and trend of California's population of black-backed woodpeckers.

Recommendation 5.1: Sustain ongoing efforts (e.g., Siegel et al. 2010) to monitor trends in the amount of burned forest on national forests in California that is occupied by black-backed woodpeckers. Support efforts to assess and monitor site occupancy in California.

Recommendation 5.2: Continue research to estimate home-range size of black-backed woodpeckers in recent fire areas and degree of overlap among adjacent home ranges; use this information in efforts to estimate population size in burned forests.

Recommendation 5.3: Build on recent efforts to estimate the population size of black-backed woodpeckers in California, including objective assessments in both burned and unburned forests on public and private lands and monitor population trends over time.

Recommendation 5.4: Conduct broadcast surveys to estimate how many black-backed woodpeckers occur in wilderness areas, national parks, and other management preserves in California.

Recommendation 5.5: Consider initiating demographic studies of black-backed woodpeckers to estimate and compare adult and juvenile survival and reproductive rates in different-aged fire areas, as well as 'green' forests.

Recommendation 5.6: Assess the long term demography of the California black-backed woodpecker population; explore whether local populations experience periods of rapid expansion following the colonization of recent burns followed by periods of slow population decline.

Recommendation 5.7: Consider forming a black-backed woodpecker working group in California, modeled after the Black-backed Woodpecker Technical Workshop in 2010.

Goal 6 - Develop and refine information on black-backed woodpecker habitat needs in California.

Recommendation 6.1: Continue ongoing research to characterize black-backed woodpecker nesting habitat and assess foraging habitat selection in recent (1–10 year old) fire areas as well as in unburned forests.

Recommendation 6.2: Conduct prey studies to determine criteria for selecting post-fire stands and tree species for retention. Determine wood-boring beetle habitat selection in burned forests. Ascertain whether individual tree species, diameters, and levels of scorch can be used as an index for abundance of wood-boring beetle larvae. This information can be used in determining burned-forest patches to retain in areas where snag removal is to occur.

Recommendation 6.3: Assess how different intensities and spatial configurations of salvage logging and other post-fire activities requiring snag removal affect Black-backed Woodpecker nesting, foraging, and occupancy rates.

Recommendation 6.4: Develop spatially explicit models to predict high-quality post fire black-backed woodpecker nesting habitat in California to help guide post-fire management.

Recommendation 6.5: Assess the degree to which forest stands that undergo prescribed fire are subsequently used by black-backed woodpeckers; determine what post-fire stand characteristics make use by black-backed woodpeckers more or less likely.

Recommendation 6.6: Determine occupancy, habitat requirements, home-range size, food sources, and nest success of black-backed woodpeckers associated with unburned forest stands that contain patches of trees recently killed by beetles.

Recommendation 6.7: Assess the degree to which small patches of beetle-killed trees may explain the distribution of black-backed woodpeckers in unburned areas; Aerial Detection Survey data from the U. S. Forest Service Forest Health Monitoring program may be useful in answering this question.

Recommendation 6.8: Particularly if occurrence patterns of beetle-killed trees do not explain patterns in black-backed woodpecker occupancy of unburned forests (see Recommendation 6.7), assess other factors that may have explanatory power, and determine occupancy, habitat requirements, home-range size, food sources, and nest success of Black-backed Woodpeckers in unburned forests in California.

Recommendation 6.9: Assess black-backed woodpecker use of unburned subalpine forest in California.

Recommendation 6.10: Study and describe dispersal and colonization dynamics of black-backed woodpeckers occupying fire areas and surrounding unburned forests in California. Important questions include:

- What factors (e.g., tree density, wood-boring beetle population, proximity to other occupied fires) predict whether a new fire area will be colonized?
- Are new fire areas colonized by first-year birds or older birds, or both?
- Do birds recruit into new fire areas from other fire areas (are there distance thresholds?) or from nearby unburned forest, or both?
- Where do Black-backed Woodpeckers disperse to from fire areas, as time since fire increases?
- What is the desirable spatial distribution and heterogeneity (in terms of fire severity) of prescribed fires for maintaining connectivity of black-backed woodpecker populations between burned patches and maintaining gene flow?
- How do populations persist in the time between fires within a given area?

Recommendation 6.11: Assess historic range of variability in fire frequency, size, and severity within the range of the black-backed woodpecker in California.

Recommendation 6.12: Assess winter ecology and potential seasonal migratory movements in California.

Goal 7 - Conduct population viability analyses to inform forest management strategies for conservation of black-backed woodpeckers in California

Recommendation 7.1: Utilize data collected to meet Goals 5 and 6, to conduct population viability analyses for the black-backed woodpecker under varying environmental and management scenarios.

Goal 8 - Assess genetic distinctness of black-backed woodpeckers in California, and genetic variation within California.

Recommendation 8.1: Collect and analyze black-backed woodpecker genetic samples from multiple locations across the species' California range to determine the degree of isolation from birds elsewhere in the species' range, and to assess whether there is substantial genetic population structure within California.

Education and Outreach: The 8 management goals recommended above will require participation by land managers, land owners, and the general public to successfully aid in conservation of the black-backed woodpecker in California. Severely burned forest has long been viewed as "catastrophic" and "devastated landscape," however scientific literature suggests the black-backed woodpecker has a strong affinity for early age class snags (minimal amount of decay) and an abundant food source of wood-boring beetles present in these dead trees (Hutto 2008, Bond et al. 2012b). The following goals and recommendations are adapted from Bond et al. (2012), and aim to raise public awareness regarding the ecological value of burned forest and the critical role played by the black-backed woodpecker.

Goal 9 - Expand efforts to educate land managers and the general public about the value of burned forests to Black-backed woodpeckers and other fire-associated species.

Recommendation 9.1: Incorporate "Recently Burned Forest" as a distinct habitat type in the California Department of Fish and Game's California Wildlife Habitat Relationships (CWHR) system and future conservation planning efforts conducted through California Partners in Flight.

Recommendation 9.2: Develop a web portal that can serve as a clearinghouse for information, survey results, and links to publications and other online resources that may help land managers better manage black-backed woodpecker populations and habitats.

Recommendation 9.3: Produce multi-media materials demonstrating the ecological value of burned forests to black-backed woodpeckers and other fire-associated species. Materials should target a variety of audiences, including land managers, private landowners, and general public, including users of national forest lands.

Recommendation 9.4: Conduct workshops to teach land managers about black-backed woodpecker biology and habitat needs and provide instruction on conducting surveys for black-backed woodpeckers.

Recommendation 9.5: Produce and distribute pamphlets or other materials asking woodcutters to avoid cutting snags that have nest cavities made by woodpeckers.

Recommendation 9.6: If legal protection for the black-backed woodpecker is not adopted under the California Endangered Species Act (CESA), the Department should consider re-evaluating the black-backed woodpecker for California Bird Species of Special Concern (BSSC) designation. Additionally, research and monitoring resources are more likely to be targeted towards

BSSC species than to species with no special status. Additionally, consider adding black-backed woodpecker to the “list of monitored” species under Title 14, Section 670.6, and implement the management recommendations outlined above.

Scientific Determinations Regarding the Status of the Black-backed Woodpecker in California

CESA directs the Department to prepare this report regarding the status of the black-backed woodpecker in California based upon the best scientific information. Key to the Department's related analyses are relevant factors highlighted in regulation. Under the pertinent regulation, a "species shall be listed as endangered or threatened ... if the Commission determines that its 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." (Cal. Code Regs., tit. 14, § 670.1 (i)(1)(A)).

Also key from a scientific standpoint are the definitions of endangered and threatened species, respectively, in the Fish and Game Code. An endangered species under CESA, for example, is one "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.) A threatened species under CESA is one "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 required by [CESA]." (*Id.*, § 2067.)

The Department's scientific determinations, including determinations supported/offered through the independent peer review process, are summarized below:

LIFE HISTORY

- Black-backed woodpecker nesting period spans mid-April through late-July.
- Nests are excavated in the trunks of living, dying or dead trees. Conifers are preferred. Snags are preferred.
- Both sexes incubate and brood two to six young.
- Large wood-boring beetle larvae, ecologically linked to burned habitats, are preferred prey.
- Importance of bark beetles and bark beetle-killed forest in California to black-backed woodpeckers is unknown.
- The species is non-migratory but capable of dispersing to recently burned habitats. Dispersal mechanisms are poorly understood.
- Extensive gaps in forest habitat may impede movements i.e. gaps between the boreal forest (Rocky Mountains to Quebec), Cascade region (sampled in Oregon), and the Black Hills of South Dakota.
- Life span is unknown. Closely related species' life span is six to nine years.

PRESENT OR THREATENED MODIFICATION OR DESTRUCTION OF HABITAT

- Burned conifer black-backed woodpecker habitat continues to be removed and degraded through salvage logging over most of the species' range. Although substantial acreage of federally-managed lands are not subject to salvage logging (e.g., wilderness areas, roadless areas, national parks), and recent USFS management direction emphasizes the ecological importance of burned forest habitat, since 2003 approximately 20% of the area of high severity burns in USFS forest has been salvage logged in the Sierra Nevada (conversely, since 2003, approximately 87,000 acres of USFS forest subject to high severity burns were not salvage). Due to logistical and economic reasons, lands targeted for salvage logging often coincide with the best available black-backed woodpecker habitat. On private lands, it is believed that nearly all burned timber is salvage logged following fires.

- Fire suppression and fuels management have been, and continue to be the dominant management goals on most California forests resulting in reduced area of burned forest compared to historic times. However, in recent decades, fire frequency, intensity, and extent have increased despite fire prevention and suppression efforts.
- There are numerous exceptions to snag retention and recruitment requirements on state and private forests in California.There is uncertainty regarding the magnitude of the threat posed to the viability of the California population of black-backed woodpeckers by post-fire salvage logging.

HABITAT PREFERENCES

- Black-backed woodpeckers occupy a variety of montane and boreal coniferous forest habitat types throughout their range.
- The species is strongly associated with recently burned coniferous forest and is able to opportunistically disperse to newly burned sites.
- Black-backed woodpeckers exploit and occur at their highest densities in recently burned forests for the first five to eight years following the fire.
- Black-backed woodpeckers inhabit green (unburned) forests, however it is likely they are more difficult to detect in these forests, and efforts to study their habitat preferences have not included experimental manipulations before and after fire in forest systems.
- Breeding densities are higher in burned forest compared to unburned forest.
- Black-backed woodpecker nest densities are highest in areas with the highest snag densities.
- Large patches of burned forest appear to be optimal for nesting.
- Studies in California and elsewhere suggest black-backed woodpecker home range is large but varies with vegetation type, habitat quality, food availability, number of years after a burn, elevation and geographic location.

POPULATION SIZE AND TREND IN CALIFORNIA

- Population size of black-backed woodpeckers in California is unknown but it appears to be small (estimates range from 722 - 6,300 individuals).
- The population trend in California is unknown, although preliminary data suggest relative stability during 2009-2011.
- There is no evidence that the population status is substantially different than it was historically based on qualitative information.
- The Department is unable to quantify, or estimate, the potential threat to black-backed woodpeckers in California posed by the inherent risks of small

populations, though like any species with a small population, there is potential for the threat to be significant.

RANGE AND RANGE TREND IN CALIFORNIA

- The current range of the black-backed woodpecker in California includes the Sierra Nevada, the Cascade Range, the Warner Mountains and, peripherally, the Siskiyou Mountains.
- In California, black-backed woodpeckers are found from 1,219 m to 3,200 m (4,000 ft -10,500 ft) above sea level; most detections have been between 1,461 to 2,743 m (4,793 – 9,000 ft) elevation.
- In recently burned habitat in the Sierra Nevada, black-backed woodpecker occupancy is greater at more northerly latitudes and at higher elevations.
- California range trend is stable.

RANGE ISOLATION

- Black-backed woodpecker populations in California are not geographically isolated from populations in adjacent states (Oregon and Nevada).
- It is unknown how much gene flow occurs between the Oregon woodpecker population and the bulk of the California population or if barriers to genetic exchange exist due to gaps in conifer forest cover.

GENETIC DISTINCTIVENESS

- California black-backed woodpecker populations are most likely aligned with the western population cluster which includes Oregon (and likely Washington) and therefore are likely genetically distinct from the northern boreal population.
- Genetic sampling of California's populations has not been conducted.

DISEASE, PREDATION, OVEREXPLOITATION OR COMPETITION

The Department found no evidence to indicate that disease, predation, overexploitation, or competition are significant factors affecting the black-backed woodpecker.

OTHER NATURAL OCCURRENCES OR HUMAN-RELATED ACTIVITIES

- Black-backed woodpeckers may be vulnerable to predicted climate change in California.
- Future loss of coniferous forest habitat and increasing mean annual temperatures were considered important variables that could negatively impact the species.
- Projected increases in fire frequency, however, would likely benefit black-backed woodpeckers, however any increase in burnt forest habitat will be moderated by the extent of post-fire snag removal.
- Forest management is increasingly recognizing the importance of snag retention and burned forest conditions, thereby likely improving conditions in the future.

Listing Recommendation

CESA directs the Department to prepare this report regarding the status of the black-backed woodpecker in California based upon the best scientific information. CESA also directs the Department based on its analysis to indicate in the status report whether the petitioned action is warranted (Fish & G. Code, § 2074.6; Cal. Code Regs., tit. 14, § 670.1, subd. (f).) The Department includes and makes its recommendation in its status report as submitted to the Commission in an advisory capacity based on the best available science. The Department recommends that the Commission find that the black-backed woodpecker does not warrant listing at this time.

Protection Afforded by Listing

It is the policy of the State to conserve, protect, restore and enhance any endangered or any threatened species and its habitat (FGC section 2052). If listed, the black-backed woodpecker will receive protection from unauthorized take under CESA, making the conservation, protection, and enhancement of the black-backed woodpecker and its habitat issues of statewide concern. CESA defines “take” as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (FGC section 86). Project proponents will be subject to the prohibitions on take and other proscriptions in CESA that are punishable under State law. The Department may authorize exceptions to the prohibitions in CESA under certain circumstances (FGC sections 2081, 2081.1, 2086, 2087 and 2835). However, the impacts associated with authorizing an activity that would involve take of black-backed woodpeckers would need to be minimized and fully mitigated according to State standards.

Environmental documents subject to CESA review may result in increased information about the black-backed woodpecker because updated occurrence and abundance information on listed species is usually required for the project site and surrounding areas. This information, along with discussion of potential impacts of the project, with avoidance, minimization, and mitigation measures, must be provided in order for the Department to analyze projects and recommend approval or modification.

Listing the black-backed woodpecker may increase the likelihood that State and federal land and resource management agencies would allocate funds towards protection and recovery actions. With limited funding and a growing list of threatened and endangered species, priority is usually given to species that are listed.

Economic Considerations

The Department is not required to prepare an analysis of economic impacts (FGC section 2074.6).

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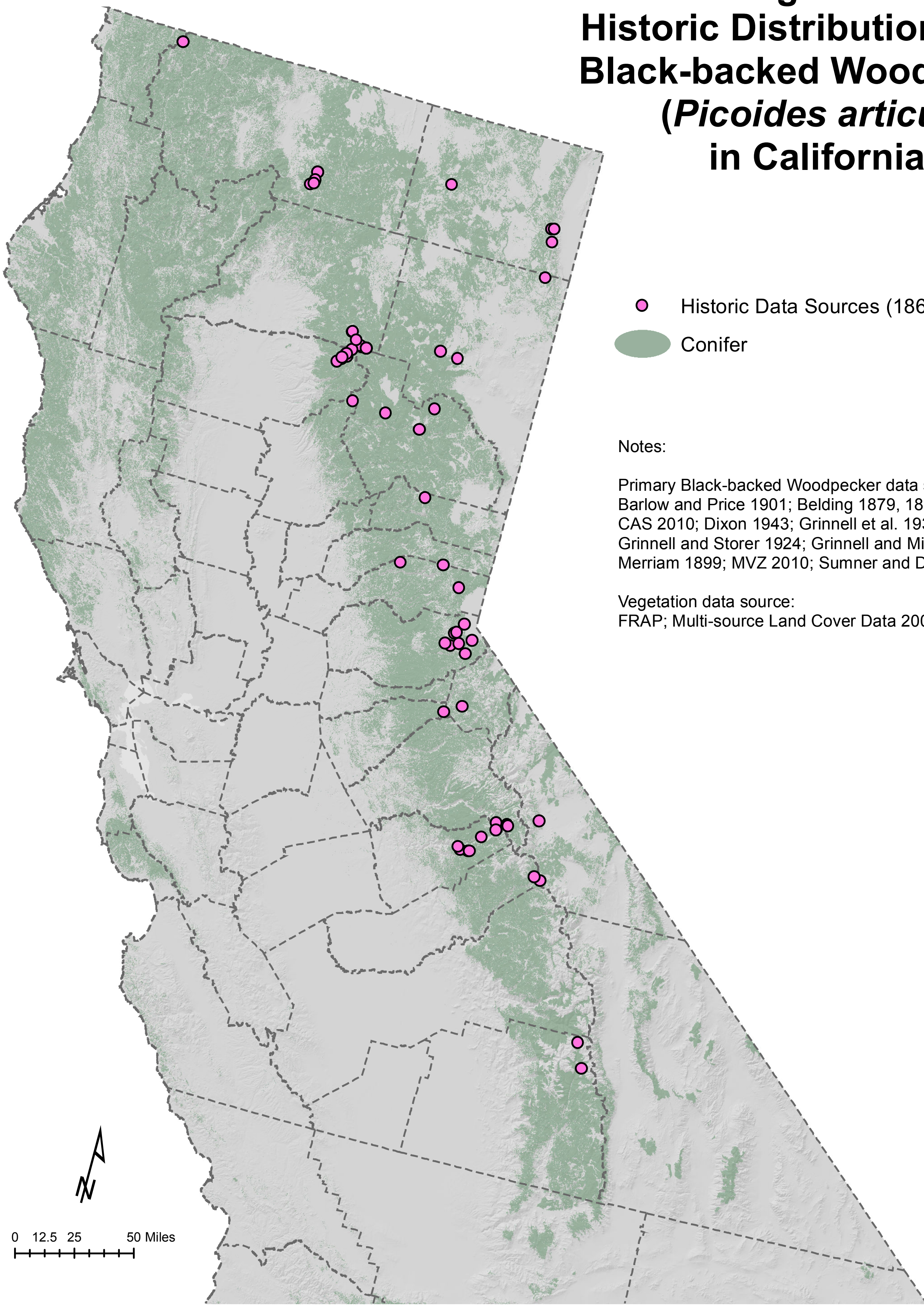
Figure I:
Historic Distribution of the Black-backed Woodpecker (*Picoides articus*) in California



Historic Data Sources (1863 - 1949)

Conifer

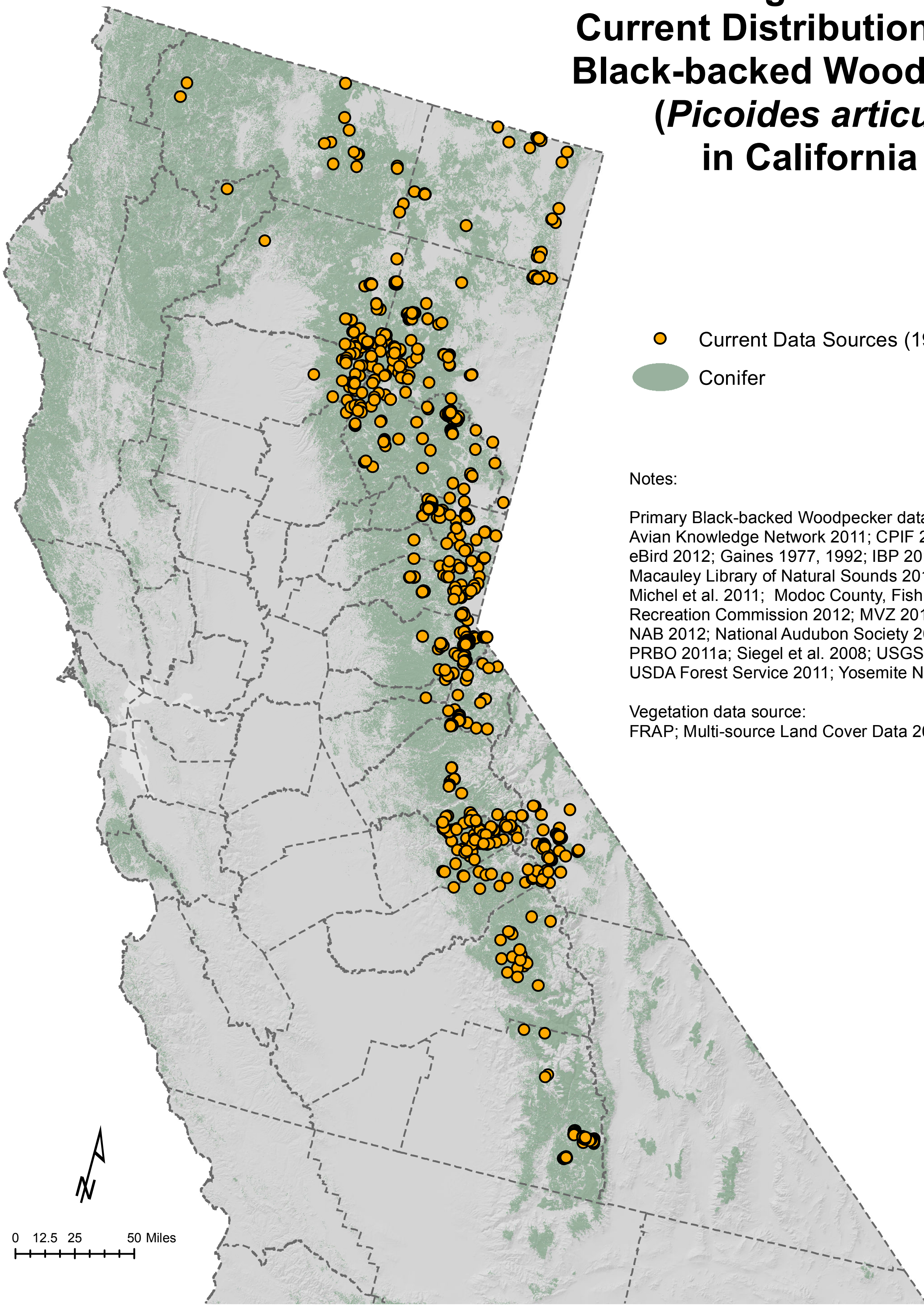
Notes:

Primary Black-backed Woodpecker data sources:
Barlow and Price 1901; Belding 1879, 1890; Bent 1939; CAS 2010; Dixon 1943; Grinnell et al. 1930; Grinnell and Storer 1924; Grinnell and Miller 1944; Merriam 1899; MVZ 2010; Sumner and Dixon 1953.

Vegetation data source:
FRAP; Multi-source Land Cover Data 2002, Version 2

LO/WLB 2/21/2013

Figure 2: Current Distribution of the Black-backed Woodpecker (*Picoides articus*) in California



Current Data Sources (1950 - 2012)

Conifer

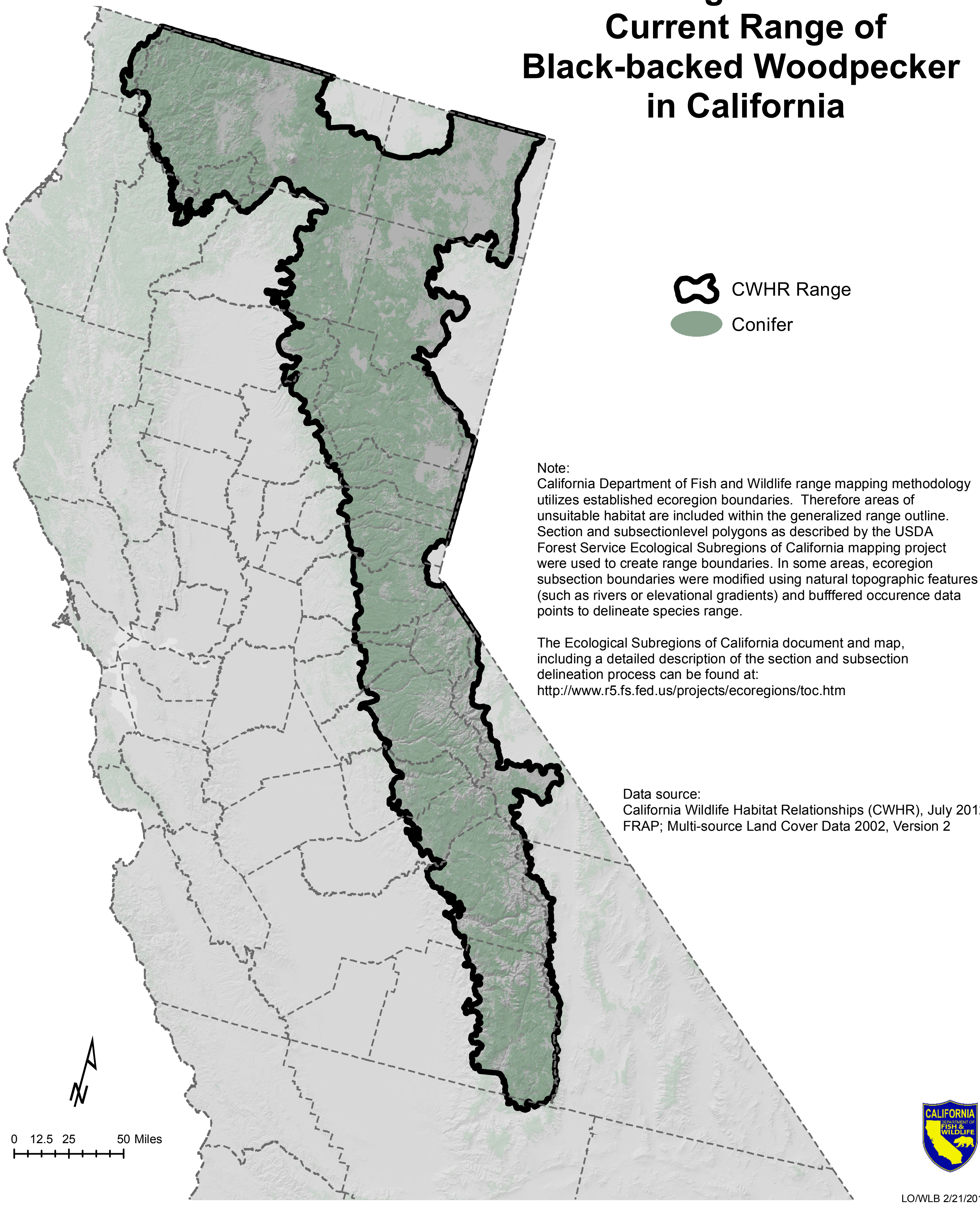
Notes:

Primary Black-backed Woodpecker data sources:
Avian Knowledge Network 2011; CPIF 2011; eBird 2012; Gaines 1977, 1992; IBP 2012; Macauley Library of Natural Sounds 2010; Michel et al. 2011; Modoc County, Fish & Game Recreation Commission 2012; MVZ 2010; NAB 2012; National Audubon Society 2012; PRBO 2011a; Siegel et al. 2008; USGS - BBS 2012; USDA Forest Service 2011; Yosemite National Park 2012

Vegetation data source:
FRAP; Multi-source Land Cover Data 2002, Version 2

LO/WLB 2/21/2013

Figure 3: Current Range of Black-backed Woodpecker in California



Note:
California Department of Fish and Wildlife range mapping methodology utilizes established ecoregion boundaries. Therefore areas of unsuitable habitat are included within the generalized range outline. Section and subsectionlevel polygons as described by the USDA Forest Service Ecological Subregions of California mapping project were used to create range boundaries. In some areas, ecoregion subsection boundaries were modified using natural topographic features (such as rivers or elevational gradients) and bufffered occurence data points to delineate species range.

The Ecological Subregions of California document and map, including a detailed description of the section and subsection delineation process can be found at:
http://www.r5.fs.fed.us/projects/ecoregions/toc.htm

Data source:
California Wildlife Habitat Relationships (CWHR), July 2012
FRAP; Multi-source Land Cover Data 2002, Version 2

LO/WLB 2/21/2013

Figure 4:
Public Lands Ownership in Black-backed Woodpecker Range

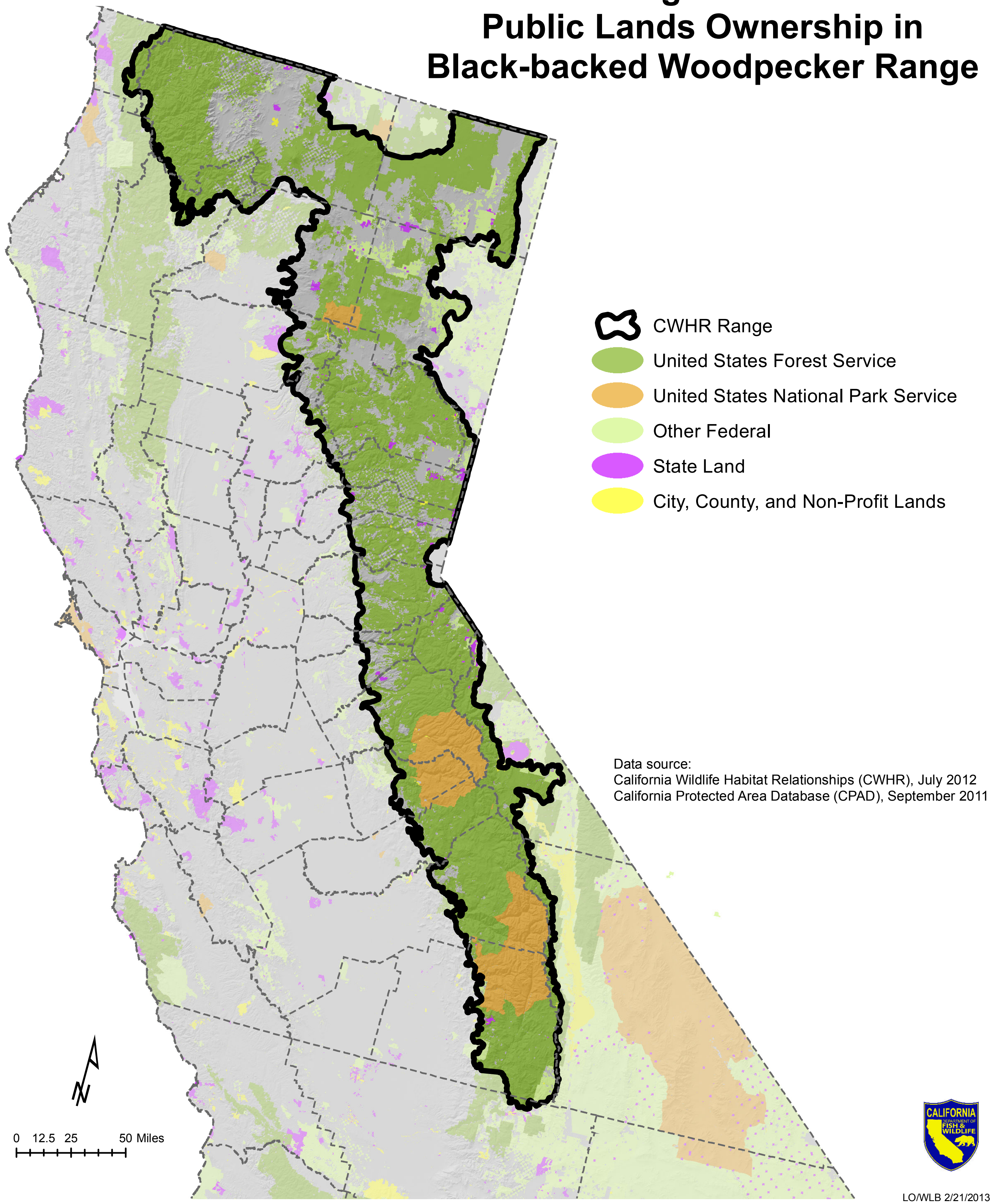
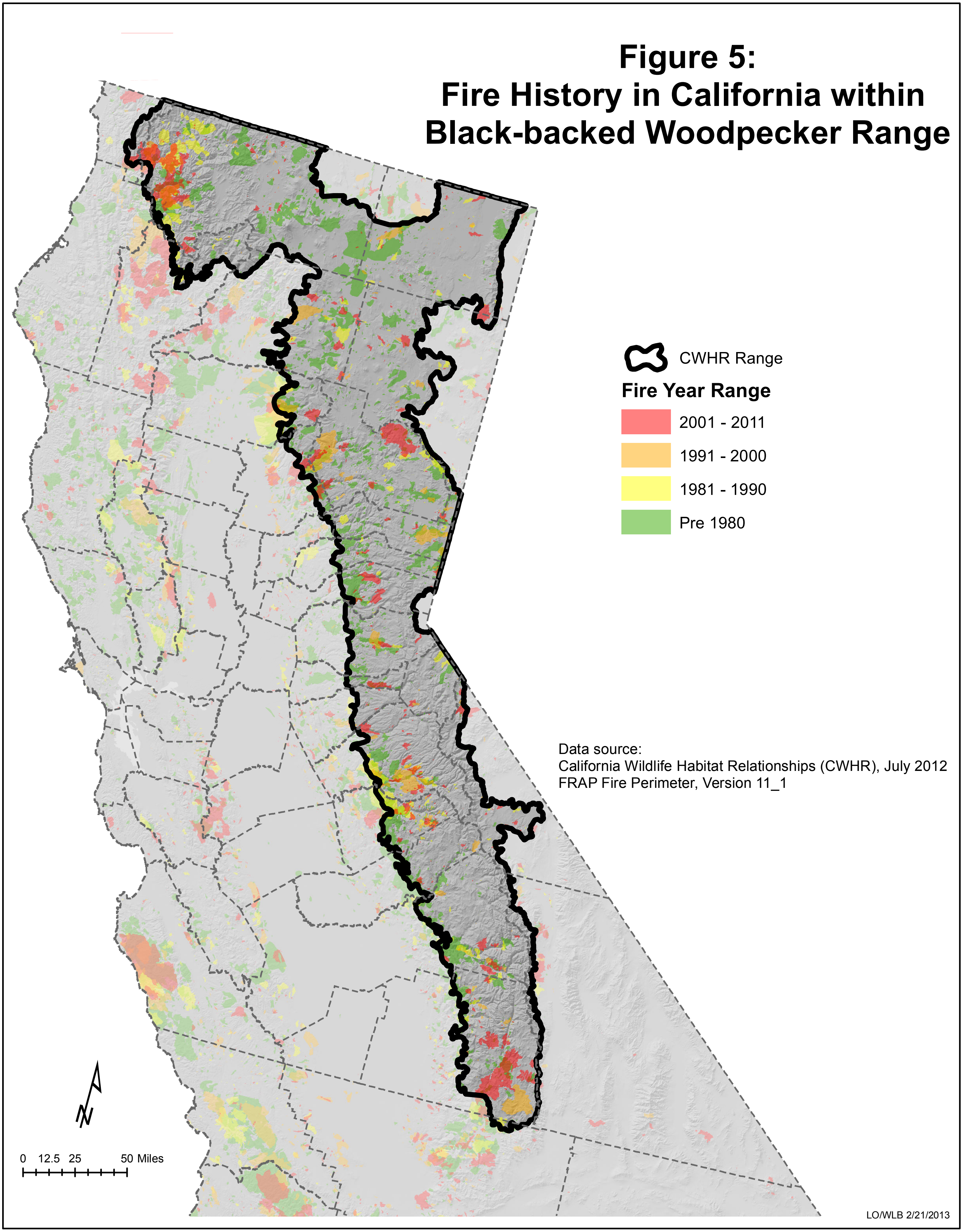


Figure 5: Fire History in California within Black-backed Woodpecker Range



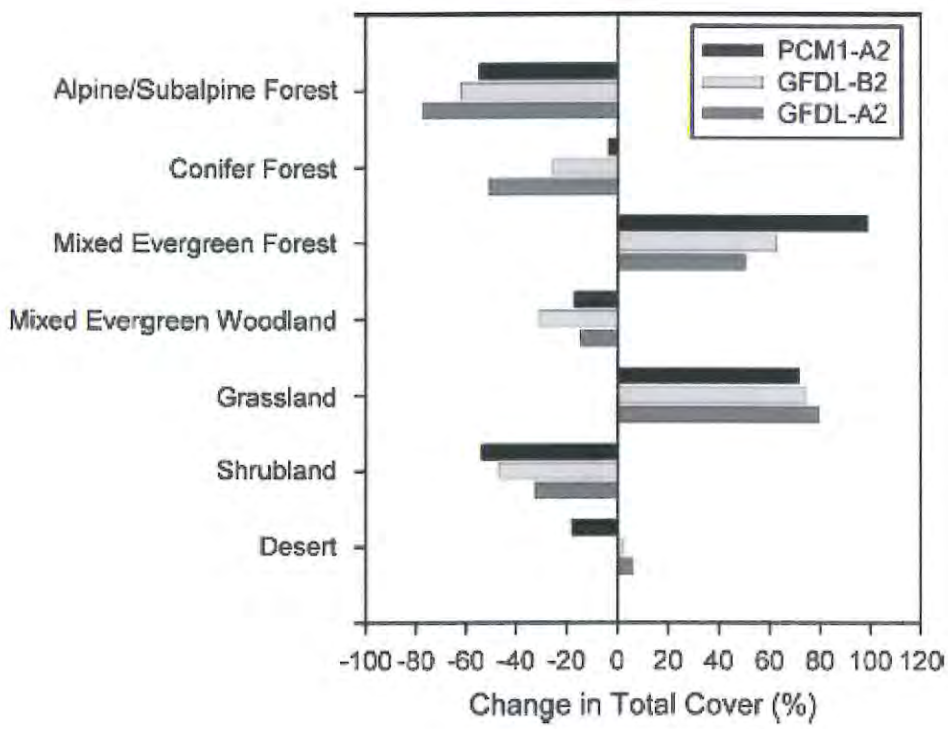


Figure 6: Projected Percentage Change in the Total Cover of the Vegetation Classes (from Lenihan et al. (2008), used by permission)

Figure from Lenihan et al. (2008) displaying modeled reduction in alpine/subalpine forest and conifer forest vegetation classes by the end of the study period (years 2071-2100) when compared to the recent historic period (1961-1990) under three modeled climate scenarios. Note mixed evergreen forest (including ponderosa pine-black oak forest, and Douglas-fir-tanoak forest) increases over the same period; however, this vegetation class is used infrequently by black-backed woodpeckers under current conditions.

APPENDIX 1.

PUBLIC NOTICE

News Release (January 13, 2012)

Media Contacts:
Lyann Comrack, DFG Wildlife Branch, (916) 341-6981
Kirsten Macintyre, DFG Communications, (916) 322-8988

DFG Invites Public Comment Related to Black-backed Woodpecker

The Department of Fish and Game (DFG) is seeking public comment as part of a status review of California's Black-backed Woodpecker (*Picoides arcticus*) population. DFG is currently evaluating whether the species warrants listing as a threatened or endangered species under state law.

The Black-backed Woodpecker is a medium-sized bird that is found in coniferous forests in North America. In California, they occur sparsely at moderate to higher elevations in the southern Cascades, Klamath Region, Warner Mountains and the Sierra Nevada, south to Kern County. The species apparently prefers intensively burned forests over unburned forests and forests that have burned at lower intensities.

In October 2010, the Center for Biological Diversity and the John Muir Project of Earth Island Institute submitted a petition to the Fish and Game Commission to formally list the Black-backed Woodpecker as a threatened or endangered species. As part of the status review process, DFG is soliciting public comment regarding the woodpecker's ecology, biology, life history, distribution, abundance, threats, habitat that may be essential for the species and recommendations for management.

Comments, data and other information must be submitted in writing to:

California Department of Fish and Game
Nongame Wildlife Program
Attn: Lyann Comrack
1812 Ninth Street
Sacramento, CA 95811

Comments may also be submitted by e-mail to: BBWO@dfg.ca.gov.

All comments received by the due date of June 1, 2012 will be included in a subsequent DFG report to the Commission**.** Following the receipt of the report, the Commission will allow a 30-day public comment period prior to taking any action on DFG's recommendation.

DFG's petition evaluation report for the Black-backed Woodpecker can be found at:
www.dfg.ca.gov/wildlife/nongame/publications/.
###

PUBLIC NOTICE

January 13, 2012

TO WHOM IT MAY CONCERN:

Pursuant to Section 2074.4 of the California Fish and Game Code (FGC), **NOTICE IS HEREBY GIVEN** that on December 15, 2011, the California Fish and Game Commission accepted for consideration the petition submitted to list the black-backed woodpecker (*Picoides arcticus*) as threatened or endangered (Section 670.1, 670.5, Title 14, California Code of Regulations) as follows:

Species	Proposal
Black-backed woodpecker *(Picoides arcticus)*	List as Threatened or Endangered

The California Endangered Species Act (FGC, Chapter 1.5, Section 2050 *et seq*.) requires that the Department of Fish and Game notify affected and interested parties that the Commission has accepted the petition for the purpose of receiving information and comments that will aid in evaluating the petition and determining whether or not the above proposal should be adopted or rejected by the Commission. The Commission's December 15, 2011 action has resulted in this species receiving the interim designation of "candidate for listing", effective January 6, 2012, under the California Endangered Species Act. The Department has 12 months to review the petition, evaluate the available information, and report back to the Commission whether or not the petitioned action is warranted (FGC 2074.6). The Department's recommendation must be based on the best scientific information available to the Department.

Therefore, **NOTICE IS FURTHER GIVEN** that anyone with data or comments on the taxonomic status, ecology, biology, life history, management recommendations, distribution, abundance, threats, habitat that may be essential for the species, or other factors related to the status of the above species, is hereby requested to provide such data or comments to:

California Department of Fish and Game
Nongame Wildlife Program
Attn: Ms. Lyann Comrack
1812 9th Street
Sacramento, California 95811

Please submit 2 hard copies and a digital copy. Comments may also be sent via email to:

BBWO@dfg.ca.gov

It is requested that responses be received by **June 1, 2012** to allow sufficient time for inclusion in the Department's final report to the Fish and Game Commission. If the Department concludes that the petitioned action is warranted, it will recommend that the Commission adopt the proposal. If the Department concludes that the petitioned action is not warranted, it will recommend that the Commission reject the proposal. Receipt of the report will be placed on the agenda for the next available meeting of the Commission after delivery. The report will be made available to the public at that time. Following receipt of the Department's report, the Commission will allow a 30-day public comment period prior to taking any action on the Department's recommendation.

If you have any questions, please contact Ms. Lyann Comrack, Staff Environmental Scientist, by telephone at (916) 341-6981 or by email at lcomrack@dfg.ca.gov.

##

DFG Black-backed Woodpecker Stakeholders, December 15, 2011, Lyann Comrack and Dan Applebee DFG lead scientists

Agency/Company	Last Name	First Name	Address 1	Address 2	City	State	Zip
Audubon California	Taylor	Daniel		765 University Avenue, Suite 200	Sacramento	CA	95825
Audubon California	Kelsey	Rodd		765 University Avenue, Suite 200	Sacramento	CA	95825
Board of Forestry	Gentry	George		1416 Ninth Street, Room 1506-14	Sacramento	CA	95814
Bureau of Land Management	Kosic	Arlene		1695 Heindon Road	Arcata	CA	95521
Bureau of Land Management	Pool	Mike		2800 Cottage Way, Suite W-1623	Sacramento	CA	95825
Bureau of Land Management	Roush	Paul		1695 Heindon Road	Arcata	CA	95521
CA Dept of Parks and Recreation	Shaub	Dave		1416 Ninth Street	Sacramento	CA	95814
CA Dept. of Fish and Game	Bittman	Roxanne	Biogeographic Data Branch	1807-13th Street, Suite 202	Sacramento	CA	95814
CA Forestry Association	Dias	Michelle		1215 K Street, Suite 1830	Sacramento	CA	95814
Cal Fire	Snyder	Bill	Resource Management	1416 Ninth Street	Sacramento	CA	94814
Cal Fire	Tuttle	Crawford		1416 Ninth Street	Sacramento	CA	95814
California Farm Bureau Federation	Cremers	Noelle		1127 11th Street, Ste. 626	Sacramento	CA	95814
Caltrans	Erickson	Jay		1120 N Street	Sacramento	CA	95814
Caltrans	Iwasaki	Randell		1120 N Street	Sacramento	CA	95814
Caltrans	Kempton	Will		1120 N Street	Sacramento	CA	95814
Caltrans	Norvell	Jay		1120 N Street	Sacramento	CA	95814
Center for Biological Diversity	Augustine	Justin		351 California Street, Suite 600	San Francisco	CA	94104
Center for Biological Diversity	Spitler	Paul		P.O. Box 2175	Bend	OR	97709
Central Sierra Environmental Resource Center	Buckley	John		P.O. Box 396	Twain Harte	CA	95383
Collins Pine Company	Francis	Jay		P.O.Box 796	Chester	CA	96020
Conservation Biology Institute				815 Madison Ave.	San Diego	CA	92116
Defenders of Wildlife	Delfino	Kim		1303 J Street, Suite 270	Sacramento	CA	95814
Defenders of Wildlife	Flick	Pamela		1303 J Street, #270	Paradise	CA	95969
Department of Food and Agriculture	Shaffer	Steve	Office of Agricultural and Environmental Stewardship	1220 N Street, Room A-400	Sacramento	CA	95814
Fruitgrowers	Brown	Charlie		1216 Fruit Growers Rd	Hilt	CA	96044
Geyer Associates	Geyer	Bill		1029 K St. #33	Sacramento	CA	95814
Institute for Bird Populations	Saracco	Jim		PO Box 1346	Point Reyes Station	CA	94956
Institute for Bird Populations	Siegel	Rodney		PO Box 1346	Point Reyes Station	CA	94956
Institute for Bird Populations	Wilkerson	Bob		PO Box 1346	Point Reyes Station	CA	94956
John Muir Project of Earth Island Institute	Hanson	Chad		P.O. Box 697	Cedar Ridge	CA	95924

National Park Service	Graber	David	Sequoia & Kings Canyon National Parks	47050 Generals Highway	Three Rivers	CA	93271-9651
National Park Service	Stock	Sarah		P.O. Box 700	El Portal	CA	95318
National Park Service	Thompson	Steve		P.O. Box 700	El Portal	CA	95318
Natural History Museum of Los Angeles County	Garrett	Kimball	Orinthology Collections	900 Exposition Blvd.	Los Angeles	CA	90007
NRDC	Lawrence	Niel		3723 Holiday Drive	Olympia	WA	98501
Pacific Gas & Electric Company	Goehring	Dave		127 East Main Street	Grass Valley	CA	95945
PRBO Conservation Science	Cohen	Ellie		3820 Cypress Drive #11	Petaluma	CA	94954
PRBO Conservation Science	Roberts	L. Jay		3820 Cypress Drive #11	Petaluma	CA	94954
PRBO Conservation Science	Seavy	Nat		3820 Cypress Drive #11	Petaluma	CA	94954
Roseburg Resources Co.	Klug	Rich		98 Mill Street	Weed	CA	96094
Roseburg Resources Co.	Henson	Steve	Chief Forester	98 Mill Street	Weed	CA	96094
Sheppard Mullin	Foley-Gannon	Ella		4 Embarcadero Center, 17th floor	San Francisco	CA	94111
Sheppard Mullin	Garner	Keith		4 Embarcadero Center, 17th floor	San Francisco	CA	94111
Sheppard Mullin	Powell	Tyson		4 Embarcadero Center, 17th floor	San Francisco	CA	94111
Sheppard Mullin	Uram	Robert		4 Embarcadero Center, 17th floor	San Francisco	CA	94111
Sierra Club	Corcoran	Bill		3435 Wilshire Boulevard, Suite 660	Los Angeles	CA	90010
Sierra Forest Legacy	Britting	Sue		P.O. Box 377	Coloma	CA	95613
Sierra Forest Legacy	Thomas	Craig		1418 20th Street, Suite 100	Sacramento	CA	95811
Sierra Pacific Industries	Pawlicki	Mark		P.O. Box 496028	Redding	CA	96049
Sierra Pacific Industries	Roberts	Kevin		P.O. Box 496014	Redding	CA	96049-6014
Sierra Pacific Industries	Tomascheski	Dan		P.O. Box 496014	Redding	CA	96049--6014
Southern California Edison Company	Emmert	Patrick		P.O. Box 600	Shaver Lake	CA	93664
Southern Sierra Research Station	Whitfield	Mary		P.O. Box 1316, 7872 Fay Ranch Rd	Weldon	CA	93283
Timber Products Company	Ostrowski	Jim		P.O. Box 766	Yreka	CA	96097
Timberland Resource Consultants	Hess	Keith D.		165 South Fortuna Blvd., Ste. 4	Fortuna	CA	95540
Tule River Tribe	Rueger	Brian		340 North Reservation Road	Porterville	CA	93257
U.S. Fish and Wildlife Service	Finley	Laura	Yreka Office	1829 S. Oregon Street	Yreka	CA	96097
U.S. Fish and Wildlife Service	Roberts	Lynn	Arcata Office	1655 Heindon Rd.	Arcata	CA	95521
U.S. Fish and Wildlife Service	Strassburger	Marie	Migratory Birds	2800 Cottage Way, Room W-2605	Sacramento	CA	95825
U.S. Fish and Wildlife Service	Doster	Rob	Migratory Birds	2800 Cottage Way, Room W-2605	Sacramento	CA	95825
U.S. Fish and Wildlife Service	Thome	Darrin		2800 Cottage Way, Rm W-2606	Sacramento	CA	95825
U.S. Forest Service	Chapel	Mike		650 Capitol Mall, Room 8-200	Sacramento	CA	95814
U.S. Forest Service	Craig	Diana	Pacific Southwest Region	1323 Club Drive	Vallejo	CA	94592
U.S. Forest Service	Hennessy	Mary Beth	Pacific Southwest Region	1323 Club Drive	Vallejo	CA	94592

U.S. Forest Service	Keane	John	Pacific Southwest Research Station	1731 Research Park Dr.	Davis	CA	95618
U.S. Forest Service	Lipton	Dawn	El Dorado National Forest	100 Forni Road	Placerville	CA	95667
U.S. Forest Service	MacFarlane	Diane		1323 Club Drive	Vallejo	CA	94592
U.S. Forest Service	Manley	Pat	Pacific Southwest Research Station	1731 Research Park Dr.	Davis	CA	95618
U.S. Forest Service	Purcell	Kathryn	Sierra Nevada Research Center	2081 E. Sierra Avenue	Fresno	CA	93710
U.S. Forest Service	Saab	Victoria	Rocky Mountain Research Station Forestry Sciences Laboratory	1648 South 7th Ave, MSU Campus	Bozeman	MT	59717
U.S. Forest Service	Safford	Hugh		1323 Club Drive	Vallejo	C	94592
U.S. Forest Service	Stine	Peter	Sierra Nevada Research Center	1731 Research Park Drive	Davis	CA	95618
U.S. Forest Service	Whitman	Debra		1323 Club Drive	Vallejo	CA	94592
U.S. Forest Service	Yasuda	Susa	Pacific Southwest Region	3237 Peacekeeper Way	McClellan	CA	95652
U.S. Forest Service	Yasuda	Donald	Pacific Southwest Region	3237 Peacekeeper Way	McClellan	CA	95652
University of Montana	Hutto	Richard	Division of Biological Sciences		Missoula	MT	59801
W.M. Beaty & Associates, Inc.	Carey	Robert		P.O. Box 990898	Redding	CA	96099
W.M. Beaty & Associates, Inc.	Farber	Stuart		845 Butte St, P.O. Box 990898	Redding	CA	96099
Wildlife Conservation Society	Matthews	Sean		154 State Street, Apt 1R	Northampton	MA	01060
	Groth	Lawrence		2516 Blanding Avenue	Alameda	CA	94501
Ornithological Consultant	Sterling	John		26 Palm Ave.	Woodland	CA	95695
	Strelneck	Martin		PO Box 165	Lee Vining	CA	93541
	Simms	Bob		1401 Lower Lake Rd	Placerville	CA	95667
BOARD OF SUPERVISORS	COUNTY OF ALAMEDA			1221 OAK ST RM 536	Oakland	CA	94612

BOARD OF SUPERVISORS	COUNTY OF ALPINE	PO BOX 158	Markleeville	CA	96120
BOARD OF SUPERVISORS	COUNTY OF AMADOR	810 COURT ST	Jackson	CA	95642
BOARD OF SUPERVISORS	COUNTY OF BUTTE	25 COUNTY CENTER DR	Oroville	CA	95965
BOARD OF SUPERVISORS	COUNTY OF CALAVERAS	GOVERNMENT CENTER 891 MOUN	San Andreas	CA	95249
BOARD OF SUPERVISORS	COUNTY OF COLUSA	546 JAY ST	Coulsa	CA	95932
BOARD OF SUPERVISORS	COUNTY OF CONTRA COSTA	651 PINE ST RM 106	Martinez	CA	94553
BOARD OF SUPERVISORS	COUNTY OF DEL NORTE	981 H STREET, SUITE 200	Cresent City	CA	95531
BOARD OF SUPERVISORS	COUNTY OF EL DORADO	330 FAIR LANE	Placerville	CA	95667
BOARD OF SUPERVISORS	COUNTY OF FRESNO	2281 TULARE ST HALL OF RECOR	Fresno	CA	93721
BOARD OF SUPERVISORS	COUNTY OF GLENN	PO BOX 391	Willows	CA	95988
BOARD OF SUPERVISORS	COUNTY OF HUMBOLDT	825 5TH ST	Eureka	CA	95501
BOARD OF SUPERVISORS	COUNTY OF IMPERIAL	940 W MAIN ST SUITE 202	El Centro	CA	92243
BOARD OF SUPERVISORS	COUNTY OF INYO	PO BOX N	Indpendence	CA	93526
BOARD OF SUPERVISORS	COUNTY OF KERN	1115 TRUXTUN AVE 5TH FLOOR	Bakersfield	CA	93301
BOARD OF SUPERVISORS	COUNTY OF KINGS	1400 W LACEY BLVD	Hanford	CA	93230
BOARD OF SUPERVISORS	COUNTY OF LAKE	255 N FORBES ST	Lakeport	CA	95453
BOARD OF SUPERVISORS	COUNTY OF LASSEN	221 S. ROOP STREET SUITE 4	Susanville	CA	96130
BOARD OF SUPERVISORS	COUNTY OF LOS ANGELES	500 WEST TEMPLE ST SUITE 383	Los Angeles	CA	90012
BOARD OF SUPERVISORS	COUNTY OF MADERA	200 W 4TH STREET	Madera	CA	93637
BOARD OF SUPERVISORS	COUNTY OF MARIN	3501 CIVIC CENTER DR ROOM 329	San Rafael	CA	94903
BOARD OF SUPERVISORS	COUNTY OF MARIPOSA	PO BOX 784	Mariposa	CA	95338
BOARD OF SUPERVISORS	COUNTY OF MENDOCINO	501 LOW GAP ROAD RD ROOM 10	Ukiah	CA	95482
BOARD OF SUPERVISORS	COUNTY OF MERCED	2222 M ST	Merced	CA	95340
BOARD OF SUPERVISORS	COUNTY OF MODOC	204 S. COURT STREET	Alturas	CA	96101
BOARD OF SUPERVISORS	COUNTY OF MONO	PO BOX 715	Bridgeport	CA	93517
BOARD OF SUPERVISORS	COUNTY OF MONTEREY	PO BOX 1728	Salinas	CA	93902
BOARD OF SUPERVISORS	COUNTY OF NAPA	1195 THIRD ST RM 310	Napa	CA	94559
BOARD OF SUPERVISORS	COUNTY OF NEVADA	950 MAIDU AVE	Nevada City	CA	95959
BOARD OF SUPERVISORS	COUNTY OF ORANGE	333 W SANTA ANA BLVD	Santa Ana	CA	92701
BOARD OF SUPERVISORS	COUNTY OF PLACER	175 FULWEILER AVE	Auburn	CA	95603
BOARD OF SUPERVISORS	COUNTY OF PLUMAS	520 MAIN ST RM 201	Qunicy	CA	95971
BOARD OF SUPERVISORS	COUNTY OF RIVERSIDE	4080 LEMON ST ADMIN CENTER	Riverside	CA	92501
BOARD OF SUPERVISORS	COUNTY OF SACRAMENTO	700 H ST RM 2450	Sacramento	CA	95814
BOARD OF SUPERVISORS	COUNTY OF SAN BENITO	481 FOURTH STREET	Hollister	CA	95023
BOARD OF SUPERVISORS	COUNTY OF SAN BERNARDINO	385 N ARROW HEAD AVE	San Bernardino	CA	94215-0120
BOARD OF SUPERVISORS	COUNTY OF SAN DIEGO	1600 PACIFIC HWY RM 335	San Diego	CA	92101
BOARD OF SUPERVISORS	COUNTY OF SAN FRANCISCO	SAN FRANCISCO CITY HALL RM 2	San Francisco	CA	94102
BOARD OF SUPERVISORS	COUNTY OF SAN JOAQUIN	222 E WEBER AVE	Stockton	CA	95202
BOARD OF SUPERVISORS	COUNTY OF SAN LUIS OBISPO	COUNTY GOVERNMENT CENTER	San Luis Obispo	CA	93408
BOARD OF SUPERVISORS	COUNTY OF SAN MATEO	400 COUNTY CENTER FIRST FLO	Redwood City	CA	94063
BOARD OF SUPERVISORS	COUNTY OF SANTA BARBARA	105 E ANAPAMU ST	Santa Barbara	CA	93101
BOARD OF SUPERVISORS	COUNTY OF SANTA CLARA	70 WEST HEDDING ST	San Jose	CA	95110
BOARD OF SUPERVISORS	COUNTY OF SANTA CRUZ	701 OCEAN ST RM 500	Santa Cruz	CA	95060
BOARD OF SUPERVISORS	COUNTY OF SHASTA	1450 COURT ST STE 308B	Redding	CA	96001-1680

BOARD OF SUPERVISORS	COUNTY OF SIERRA		PO BOX D	Downieville	CA	95936
BOARD OF SUPERVISORS	COUNTY OF SISKIYOU		PO BOX 750	Yreka	CA	96097
BOARD OF SUPERVISORS	COUNTY OF SOLANO		675 TEXAS ST STE 6500	Fairfield	CA	94533
BOARD OF SUPERVISORS	COUNTY OF SONOMA		575 ADMINISTRATION DR RM 100A	Santa Rosa	CA	95403
BOARD OF SUPERVISORS	COUNTY OF STANISLAUS		1010 TENTH STREET STE 6500	Modesto	CA	95354
BOARD OF SUPERVISORS	COUNTY OF SUTTER		1160 CIVIC CENTER BLVD	Yuba City	CA	95993
BOARD OF SUPERVISORS	COUNTY OF TEHAMA		PO BOX 250	Red Bluff	CA	96080
BOARD OF SUPERVISORS	COUNTY OF TRINITY		PO BOX 1613	Weaverville	CA	96093-1613
BOARD OF SUPERVISORS	COUNTY OF TULARE		2800 W BURREL AVE	Visalia	CA	93291
BOARD OF SUPERVISORS	COUNTY OF TUOLUMNE		2 SOUTH GREEN ST	Sonora	CA	95370
BOARD OF SUPERVISORS	COUNTY OF VENTURA		800 SOUTH VICTORIA AVE	Ventura	CA	93009
BOARD OF SUPERVISORS	COUNTY OF YOLO		625 COURT ST RM 204	Woodland	CA	95695
BOARD OF SUPERVISORS	COUNTY OF YUBA		915 8TH STREET STE 109	Marysville	CA	95901
County of Alameda	Sheriff Herbert Walters	County Fish and Game Commission	4985 Broder Blvd.	Dublin	CA	94568
County of Alpine		County Fish and Game Commission	P.O. Box 266	Markleeville	CA	96120
County of Calaveras	Mr. Dennis Hood	County Fish and Game Commission	891 Countain Ranch Road	San Andreas	CA	95244
County of Colusa		County Fish and Game Commission	546 J Street	Colusa	CA	95932
County of Contra Costa		County Fish and Game Commission	651 Pine Street, NW 4th Street	Martinez	CA	95553
County of Del Norte		County Fish and Game Commission	586 G Street	Crescent City	CA	95531
County of El Dorado	Mr. Karl Weiland	County Fish and Game Commission	330 Fair Lane	Placerville	CA	95667
County of Fresno	Mr. Dale Tartaglia	County Recreation & Wildlife Commission	2220 Tulare Street, Ste. 1600	Fresno	CA	93721
County of Humboldt	Ms. Johanna Rodoni	County Fish and Game Commission	P.O. Box 922	Ferndale	CA	95536
County of Imperial		County Fish and Game Commission	1002 State Street	El Centro	CA	92243

County of Inyo and Mono	Ms. Vicki Russell	Counties Fish and Game Advisory Commission	373 Hammil Road	Hammil Valley	CA	93514
County of Kern	Mr. David McArther	County Fish and Game Fine Commission	1110 Golden State Avenue	Bakersfield	CA	93301
County of Kings	Mr. Kevin Loewen	County Fish and Game Advisory Committee	1400 W Lacey Blvd	Hanford	CA	93230
County of Lake	Mr. Greg Giusti	County Fish and Game Commission	883 Lakeport	Lakeport	CA	95453
County of Lassen	Mr. Rob Hill	County Fish and Game Commission	707 Nevada Street	Susanville	CA	96130
County of Los Angeles		County Fish and Game Commission	500 West Temple Street, Room 383	Los Angeles	CA	90012
County of Madera	Mr. Neil K. McDougal	County Fish and Game Commission	46089 Road 208	Friant	CA	93626
County of Marin	Mr. Ed Schultz	County Wildlife and Fisheries Advisory Commission	1682 Novato Blvd. Ste. 150 B	Novato	CA	94947-7021
County of Mendocino	Mr. Craig Bell	County Fish and Game Commission	501 Low Gap Rd	Ukiah	CA	95482
County of Monterey	Mr. Rich Hewitt	County Fish and Game Commission	P.O. Box 5249	Salinas	CA	93915
County of Napa	Mr. Stephen Rae	County Wildlife Conservation Commission	1195 Third Street., Ste. 210	Napa	CA	94559-3092
County of Nevada		County Fish and Game Commission	255 South Aburn Street	Grass Valley	CA	95943

County of Orange		County Fish and Game Commission	PO Box 4048	Santa Ana	CA	92702-4048
County of Placer		County Fish and Game Commission	8459 Lakeland Dr	Granit Bay	CA	95746
County of Riverside	Mr. Jim Real	County Fish and Game Commission	4600 Crestmore Road	Riverside	CA	92509-6858
County of Sacramento	Mr. Dan Gonzales	County Fish and Game Commission	3711 Branch Center Road	Sacramento	CA	95827
County of San Benito	c/o Clerk of the Board	County Fish and Game Commission	481 Fourth Street	Hollister	CA	95023-3840
County of San Bernardino		County Fish and Game Commission	157 West 5th Street, 2nd Floor	San Bernardino	CA	92415-0450
County of San Diego		County Fish and Game Commission	5555 Overland Avenue, Bldg. # 3	San Diego	CA	92123
County of San Luis Obispo	Mr. Norm Martignoni	County Fish and Game Commission	PO. Box 406	Morro Bay	CA	93443
County of Santa Clara	Mr. John Kolski	County Fish and Game Commission	70 West Hedding Street	San Jose	CA	95110
County of Santa Cruz	Ms. Kristen Kittleson	County Fish and Game Commission	701 Ocean Street, Rm. 312	Santa Cruz	CA	95060
County of Shasta	Ms. Sue Crowe and Mr. Jim Colin	County Fish and Game Commission, c/o Shasta County Public Works	1855 Placer Street	Redding	CA	96001
County of Sierra	Ms. Marilyn Tierney	County Fish and Game Commission	P.O. Box 554	Downieville	CA	95936
County of Solano	Mr. Steve Hermsmeyer	County Fish and Game Commission	675 Texas Street, Ste. 2500	Fairfield	CA	94533

County of Sonoma	Ms. Crystal Norris	County Fish and Wildlife Commission	133 Aviation Blvd., Ste. 110	Santa Rosa	CA	95403
County of Stanislaus	Dr. Ed Channing	County Fish and Game Fine Commission	1115 Sierra Drive	Turlock	CA	95380
County of Sutter		County Fish and Game Commission	1160 Civic Center Blvd.	Yuba City	CA	95993
County of Tehama		County Fish and Game Commission	15565 China Repids Drive	Red Bluff	CA	96080
County of Trinity		County Fish and Game Commission	PO Drawer 1258	Weaverville	CA	96093
County of Tuolumne	Mr. Bud Baker	County Fish and Game Commission	18036 Blue Bell East	Sonora	CA	95370
County of Ventura	Alan Sanders	County Fish and Game Commission	232 N. 3rd Street	Port Hueneme	CA	93041
County of Yolo	Yolo County Parks & Resources Dept.	County Fish and Game Commission	120 West Main Street, Suite C	Woodland	CA	95695

APPENDIX 2.

PEER REVIEW SOLICITATION LETTERS

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Wildlife Branch
1812 Ninth Street
Sacramento, CA 95811-7012
http://www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 23, 2012

Mr. Ryan Burnett
PRBO Conservation Biology
3820 Cypress Drive #11
Petaluma, CA 94954

Subject: Black-Backed Woodpecker Status Report Peer Review

Dear Mr. Burnett:

The Department of Fish and Game (Department) is preparing a draft report on the status of the black-backed woodpecker (*Picoides arcticus*) in response to a petition submitted by the John Muir Project of Earth Island Institute and the Center for Biological Diversity to list this species as threatened or endangered under the California Endangered Species Act. The report, which will make a recommendation to the Fish and Game Commission (Commission) regarding the listing of this species, will describe the results of our status review and analysis of the best available scientific information. The final status review report will be submitted to the Commission by January 6, 2013.

The Department requests your service as a peer reviewer of the draft status review report because of your expertise, publication record, and standing in the scientific community. Your comments and ideas would strengthen the scientific credibility of the report. Peer reviewers will be asked to identify changes or additions to make the draft report more accurate and complete, to discuss whether the conclusions seem logical based on the information provided, and to identify additional sources of information (literature, contacts, etc.) that may be valuable to include in the report.

The Department expects the external peer review will occur over a roughly 8-week period between early September and mid-October, 2012. We appreciate that you undoubtedly have a full schedule during this period, but hope that you can find time to participate in this important process. Please contact Ms. Lyann Comrack to respond to this request or to discuss any questions you may have at the letterhead address, by email (LComrack@dfg.ca.gov), or telephone (916-341-6981).

Thank you for your consideration of this request.

Sincerely,

Dale T. Steele for

Eric Loft, Ph.D., Chief
Wildlife Branch

cc: Department of Fish and Game, Wildlife Branch-Nongame Wildlife Program
Mr. Dale Steele
Ms. Lyann Comrack
Mr. Daniel Applebee

Conserving California's Wildlife Since 1870

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Wildlife Branch
1812 Ninth Street
Sacramento, CA 95811-7012
http://www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 23, 2012

Dr. Rita Dixon
Idaho Department of Fish and Game
600 S Walnut St, PO Box 25
Boise, ID 83707 USA

Subject: Black-Backed Woodpecker Status Report Peer Review

Dear Dr. Dixon:

The Department of Fish and Game (Department) is preparing a draft report on the status of the black-backed woodpecker (*Picoides arcticus*) in response to a petition submitted by the John Muir Project of Earth Island Institute and the Center for Biological Diversity to list this species as threatened or endangered under the California Endangered Species Act. The report, which will make a recommendation to the Fish and Game Commission (Commission) regarding the listing of this species, will describe the results of our status review and analysis of the best available scientific information. The final status review report will be submitted to the Commission by January 6, 2013.

The Department requests your service as a peer reviewer of the draft status review report because of your expertise, publication record, and standing in the scientific community. Your comments and ideas would strengthen the scientific credibility of the report. Peer reviewers will be asked to identify changes or additions to make the draft report more accurate and complete, to discuss whether the conclusions seem logical based on the information provided, and to identify additional sources of information (literature, contacts, etc.) that may be valuable to include in the report.

The Department expects the external peer review will occur over a roughly 8-week period between early September and mid-October, 2012. We appreciate that you undoubtedly have a full schedule during this period, but hope that you can find time to participate in this important process. Please contact Ms. Lyann Comrack to respond to this request or to discuss any questions you may have at the letterhead address, by email (LComrack@dfg.ca.gov), or telephone (916-341-6981).

Thank you for your consideration of this request.

Sincerely,

Eric Loft, Ph.D., Chief
Wildlife Branch

cc: Department of Fish and Game, Wildlife Branch-Nongame Wildlife Program
Mr. Dale Steele
Ms. Lyann Comrack
Mr. Daniel Applebee

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Wildlife Branch
1812 Ninth Street
Sacramento, CA 95811-7012
http://www.dfg.ca.gov

March 23, 2012

Dr. Kathryn Purcell
Research Wildlife Biologist
USDA Forest Service
Sierra Nevada Research Center
20081 East Sierra Avenue
Fresno, CA 93710

Subject: Black-Backed Woodpecker Status Report Peer Review

Dear Dr. Purcell:

The Department of Fish and Game (Department) is preparing a draft report on the status of the black-backed woodpecker (*Picoides arcticus*) in response to a petition submitted by the John Muir Project of Earth Island Institute and the Center for Biological Diversity to list this species as threatened or endangered under the California Endangered Species Act. The report, which will make a recommendation to the Fish and Game Commission (Commission) regarding the listing of this species, will describe the results of our status review and analysis of the best available scientific information. The final status review report will be submitted to the Commission by January 6, 2013.

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EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 23, 2012

Dr. Rodney Siegel
Institute for Bird Populations
P.O. Box 1346
Point Reyes Station, CA 94956

Subject: Black-Backed Woodpecker Status Report Peer Review

Dear Dr. Siegel:

The Department of Fish and Game (Department) is preparing a draft report on the status of the black-backed woodpecker (*Picoides arcticus*) in response to a petition submitted by the John Muir Project of Earth Island Institute and the Center for Biological Diversity to list this species as threatened or endangered under the California Endangered Species Act. The report, which will make a recommendation to the Fish and Game Commission (Commission) regarding the listing of this species, will describe the results of our status review and analysis of the best available scientific information. The final status review report will be submitted to the Commission by January 6, 2013.

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Thank you for your consideration of this request.

Sincerely,

Eric Loft, Ph.D., Chief
Wildlife Branch

cc: Department of Fish and Game, Wildlife Branch-Nongame Wildlife Program
Mr. Dale Steele
Ms. Lyann Comrack
Mr. Daniel Applebee

State of California -The Natural Resources Agency
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1812 Ninth Street
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EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 23, 2012

Dr. Scott Stephens
Stephens Lab
ESPM Department, Division of Ecosystem Science
University of California Berkeley
137 Mulford Hall, MC #3114
Berkeley, CA 94720-3114

Subject: Black-Backed Woodpecker Status Report Peer Review

Dear Dr. Stephens:

The Department of Fish and Game (Department) is preparing a draft report on the status of the black-backed woodpecker (*Picoides arcticus*) in response to a petition submitted by the John Muir Project of Earth Island Institute and the Center for Biological Diversity to list this species as threatened or endangered under the California Endangered Species Act. The report, which will make a recommendation to the Fish and Game Commission (Commission) regarding the listing of this species, will describe the results of our status review and analysis of the best available scientific information. The final status review report will be submitted to the Commission by January 6, 2013.

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Thank you for your consideration of this request.

Sincerely,

Dale Steele for

Eric Loft, Ph.D., Chief
Wildlife Branch

cc: Department of Fish and Game, Wildlife Branch-Nongame Wildlife Program
Mr. Dale Steele
Ms. Lyann Comrack
Mr. Daniel Applebee

Conserving California's Wildlife Since 1870

APPENDIX 3.

PUBLIC COMMENT CORRESPONDENCE

Summary of Comments Received from the Public

Sixteen pieces of correspondence were received by the Department during the public notice period ending June 1, 2012. Four additional comments were received after June 1, 2012 through September 14, 2012 for a total of twenty responses. Of these:

40% (n=8) opposed listing the black-backed woodpecker. This total includes two responses from different persons within the same organization.

35% (n=7) did not state support or opposition. This total includes two responses from the same individual. This total includes two responses from entities that supplied information that may imply opposition to listing but no explicit opinion was expressed.

25% (n=5) supported listing the black-backed woodpecker. This total includes three responses from the Petitioners.

Affiliations of the respondents are summarized below. Note multiple letters from the same entity or organization are tallied only once.

29.4% (n=5) private industry
17.6% (n=3) non-governmental organizations (Petitioners included)
17.6% (n=3) private consultants
17.6% (n=3) State and county governments
11.8% (n=2) members of the public without stated affiliation
5.9% (n=1) federal government

Respondents are listed below in the order their comments were received. Copies of data sets, maps, and photographs obtained through the public comment process may be obtained by contacting the Department of Fish and Game (BBWO@dfg.ca.gov).

Rodney Siegel, Institute for Bird Populations
Email to the Department dated December 16, 2011 (1 page)

Kathryn Bricker, Unaffiliated
Email to Department dated January 14, 2012 (1 page)

Jeff N. Davis, Colibri Ecological Consulting
Email to Department dated January 16, 2012 (1 page + attachment)
Email to Department dated January 19, 2012 (1 page + attachment)

Gabino Alonso, Unaffiliated
Email to Department dated January 17, 2012 (1 page)

John Sterling, Private Consultant
Email to the Department dated January 18, 2012 (1 page)

Brian Shaw, Klamath Wildlife Resources
Email to Department dated February 15, 2012 (3 pages + attachment)

Larry J. Moore, Modoc County Fish, Game and Recreation Commission
Letter to Department undated but postmarked March 1, 2012 (7 pages + attachment)

Leslie Stewart, Thern Electric and Solar
Email to the Department dated March 23, 2012 (1 page)

Steven Brink, California Forestry Association
Email to Department May 27, 2012 (1 page)

Dirk Embree, Michigan-California Timber Company
Email to Department dated May 31, 2012 (1 page)

Tom Engstrom, Sierra Pacific Industries
Letter to Department dated May 31, 2012 (3 pages + attachments)

Randy Moore, USDA Forest Service
Letter to Department dated May 31, 2012 (4 pages + attachment)

Chad Hanson, John Muir Project of Earth Island Institute
Letter to the Department dated June 1, 2012 (12 pages + attachments)

Justin Augustine, Center for Biological Diversity
Letter to the Department dated June 1, 2012 (2 pages)

David A. Bischel, California Forestry Association
Letter to Department dated June 1, 2012 (2 pages)

William Snyder, CAL FIRE – FRAP
Letter to Commission dated June 5, 2012 (2 pages + attachments)

Daniel Shaw, California Department of Parks and Recreation
Emails to the Department both dated June 8, 2012 (1 page + attachments)

Jim Little, Forest Landowners of California
Letter to Commission dated June 21, 2012 (1 page)

Chad Hanson, John Muir Project of Earth Island Institute
Letter to the Department dated August 21, 2012 (16 pages + CD)

Public Comments regarding BBWO Candidacy

Rodney Siegel, Institute for Bird Populations

Email to the Department dated December 16, 2011 (1 page):
"…IBP is interested in helping however we can. We have a lot of data, and a rapidly growing set of analyzed results. In addition to the 3 reports and 1 published ms that are available here:

http://www.birdpop.org/Sierra/bbwo_results.htm

we also are currently working on the following:

- our first annual report from a 2-year intensive study of BBWO foraging ecology and home range size. Our preliminary analysis is yielding some very interesting results, and the report should be available by late January.

- a manuscript on the effects of post-fire snag removal on occupancy patterns of BBWO throughout California. This is nearly finished and I am hoping to submit it to a journal before Xmas.

- a paper in review at Journal of Zoo and Wildlife Medicine that details some interesting findings from a necropsy we did after one of our study birds died - the death was apparently due to an infection by a parasitic nematode of a genus that has been responsible for substantial die-off in other bird species, including woodpeckers.

- an effort to assess genetic relatedness of BBWO to other populations. We collected a small number of feather samples last year (and are hoping to get more in 2012), which we have sent to Mike Schwartz's lab at U.S. Forest Service Rocky Mountain Research Station for DNA extraction."

Kathryn Bricker, Unaffiliated

Email to Department dated January 14, 2012 (1 page):
"I am a Lake Tahoe resident in who hikes in the area now called the Angora Fire burn area. The black backed woodpeckers are nowhere to be seen. They must be protected and allowed to thrive by leaving this habitat for them. All of the residents of this area feel strongly about this and thank those who are seeking their protection."

Jeff N. Davis, Colibri Ecological Consulting

Email to Department dated January 16, 2012 (1 page + attachment):
"Just a quick note to say that I agree with the statement in your February 11, 2012 report to the Commission that the petitioners may have understated the importance of unburned forest habitat. Most of my

observations of the species through incidental encounters over the past 25 years in the central and southern Sierra while backpacking, working for the USFS and NPS, leading birding tours, and birding recreationally have been in unburned forest habitat. During this period, I have reliably found the species year after year during the nesting season in unburned lodgepole pine forests near Bridalveil Creek Campground in Yosemite NP, Mariposa County and at Courtright Reservoir, Fresno County. I have never studied this species and have no real data to provide. But for many years my sense has been that Black-backed Woodpeckers use unburned forests more than is generally appreciated.

By the way, in case it may be of use to the Department in further evaluating the petition to list the species or for any other reason, I attached an Excel spreadsheet of Black-backed Woodpecker records submitted during the period 1996-2011 to the Northern California regional editors of North American Birds, a quarterly journal of ornithological record published by the American Birding Association. As the regional editor covering woodpeckers, I maintain Black-backed Woodpecker records dating back to the 1940s. However, records submitted prior to 1996 are in hardcopy format only. If those early records might be of use, let me know and I'll compile them for you when I can."

Email to Department with attachment dated January 19, 2012:
"My NAB [North American Birds] files don't go back quite as far as I thought, and I discovered a data gap from 1992-1995. Attached is a file covering the years 1955-1991."

Gabino Alonso, Unaffiliated

Email to Department dated January 17, 2012 (1 page):
"The Black-backed Woodpecker (three toe pik) is not a threatened or endangered species. I see them all the time in California's forests but more often I hear their single and sharp pik that is lower pitched than our American Woodpecker.

What I do notice is the difference in the population of these birds in areas that have suppressed forest fires for decades. The best nesting habitat for these birds is burnt forest, not pristine manicured forest like those in our national parks like Lassen and other national forest that follow unsound fire suppression policies. If you go to Warner Mtns you can easily find Black-backed Woodpecker in Apr-May working on the stands of burnt trees near Blue Lake where a fire occurred in 2001.

Not sure why Center for Biological Diversity and the John Muir Project of Earth Island Institute has petition for this. These organization and many others are not known for their scientific methods, honesty and openness. I see them as a journalism and marketing group. What we do need is more highly field trained, scientific minded biologists in the DFG and in other groups with better instruments and methods to monitor populations over time that take into consideration the dynamics of habitat, weather, etc.

Let's not raise a red flag until we have a clear understanding of the population trends and not respond to minor fluctuations. It would be more prudent to focus on how to improve forest management so that it is healthier and that the overall population of species that use forests habitat improves and there is more carrying capacity generated."

John Sterling, Private Consultant

Email to the Department dated January 18, 2012 (1 page):
"I certainly have strong feelings that the proponents are cherry-picking data and providing a very skewed perspective. Black-backed Woodpeckers (BBWO) are found in many areas of green forest throughout its range in California. They are probably in their highest densities in 3-4 year old burned forests because they are attracted to the abundant food source (the same can be said for other species as well), but BBWO are also attracted to snags and "diseased" trees scattered through many forests within its range. I fully appreciate the proponents' concern over the management of forests, especially burns. These burns should be protected and not clear-cut. They are important components of the ecosystem and support many species beyond BBWO. But to attempt to use the CESA by listing the BBWO is a wrong-headed approach. Let's use real information and real science to inform forestry policy, and not try to "force" BBWO into a square hole by chiseling off important aspects of its ecology/status/distribution. If the BBWO is listed, I suspect that the forestry industry will sue and they won't have to go far to find that the petition is without real merit. The proponents, in my opinion, have lost a lot of credibility."

Brian Shaw, Klamath Wildlife Resources

Email to Department dated February 15, 2012 (3 pages + attachment):
"As I mentioned in my e-mail yesterday, I have a decent amount of observational experience and information to provide you on Black Backed Woodpecker (BBWO). My information was gained from a full season (2005) of surveying for Willow Flycatcher (and other species) on the Plumas National Forest, at which time if no WIFL responses were received, the protocol states of course to observe all other birds in the area. Also this keeps the observer AWAKE at 5am in the summer time. :) Our study area was in eastern Plumas County from Lake Davis (near town of Portola) northwestward up and over the saddle into the Genessee Valley (near towns of Taylorsville and Genessee). The particular narrowed down area of interest within this large overall area was an area along Little Grizzly Creek (and its riparian and surrounding uplands). A mile-long stretch of the river and adjacent riparian areas is the sub-area where BBWO were observed for many mornings. I've attached a map for

you also. Also, additional monitoring was completed outside of the "sunrise to 1030 am" protocol survey period for WIFL, due to the interest that the BBOW in the area had sparked within the crew.

Without getting too technical, which would be easy to do, I want to provide you with the important points of our observations. There were two distinct apparent territories/activity areas that were observed during the mornings, with 4 adults (two pair) and at least one young observed. Both territories were along a long, sometimes wide, sometimes thin stringer of Lodgepole Pine that borders Little Grizzly Creek, which in parts is channelized and in others meanders through areas of meadow. The particular 1-mile stretch (approx.) of Lodgepole Pine here is a younger, recolonizing (in parts) area that was previously mined heavily. It has been ~100 years at least since the area was mined. As with many of the prolific lodgepole pine forests that extend from Lake Davis to the west along/amidst the abundant meadows in the area, and is the case with lodgepole forests in general, there is much competition and heavy dieoff as a result, as many of these forests form "thickets" of trees. I know this is the case in the Cascades of Oregon in many areas. However, this area in particular has far more die-off and "thicket-like" areas of lodgpole trees than others near and around the Lake Davis meadow complex and riparian areas. Thus there are significantly more dead or dying trees throughout the area where our BBWO observations were made than in other nearby forests/riparian areas.

Regarding the BBOW behavior, we found one nest tree, which was in a large Ponderosa Pine (mature but declining, 45" DBH) cavity just upslope (to south) from the thicket of trees that we were observing. The pair of birds flew back to and fro, foraging and bringing prey items to the nest cavity. It was apparent that the cavity had young in it, as per the youthful squawks and squeals coming from the cavity, AND the continuing trips back and forth by the adults to forage areas and back to the cavity. This was the only nest cavity that was observed. The other pair was seen upstream foraging together (loosely) just under one mile (.80 miles). This pair was observed simultaneously with the other nesting pair downstream (as per radio communication between two people observing each activity area at the same time). This pair was seen in close contact with each other on at least 10 mornings. As in they would share the same roost trees, foraging trees, and would never be further than 50 meters of each other. Thus, two activity areas were observed, with one producing a nest cavity.

Regarding habitat, and its comparison to the "Petition To List, John Muir and Center For Biological Diversity," document.....this habitat falls into the category of "NON-BURNED" or "competition die-off" areas. As a result of the competition within these lodgepole thickets, there was definitely sign of beetle infestations as a result, which of course is typical, especially during a pine species dieoff. The two BBWO that were observed at the nest tree, were seen excavating and grabbing decent sized (visible without binoculars) beetles out of dying /dead lodgepole trees nearby on tens of occasions. Now, there were only pockets of trees that were dying or dead in and around these two activity areas. I would say that over 80% of the trees were alive. The thicket width was an average of 35 meters thick and was at least one mile long, with extensions into other non-thicket areas of non-dying lodgepole forests and SMC 4 M/D forests on either side of the one mile "study area" (term used lightly....was more of an "observation area"), where there was more "normal" levels of snags and dying trees (1-3 snags per acre or so). Outside of the lodgepole thickets, while conducting WIFL surveys, we observed NO other BBOW over a 600 acre WIFL survey area.

Bottom line is that this shows that BBOW, as other studies in the "Petition to List Document", that BBOW will use really any area with dead and dying trees (especially pines in CA) in mountain areas of the west. This Grizzly Creek observation area of BBOW most closely resembles the Oregon foraging/nesting areas mentioned in the Petition to List Document", again that fall into the "non-burn" areas, but still with natural competition dieoff, with successive beetle infestations, providing a solid prey base for BBOW.

These observations can also be added/compared to some of the discussion in the "Petition TO List Document (PTDL)" in the discussion of the "Cub Fire" and the "Moonlight Fire" areas. Although in my opinion, they overdo the discussion about allowing the private companies to salvage log, which reduces BBOW habitat......when MOST of the land there is US Forest Service land and WAS NOT logged post-fire. So, there is plenty of post-fire BBOW habitat still extant in the Moonlight Fire area. But our observation area compares to some of the data in that it adds to the knowledge base of the "largest area of BBOW habitat in the state" in Plumas County, as it states in the PTDL. Our observation area is only 15 miles as the BBOW flies from the southern edge of the Moonlight Complex fire. So our observations can also be added to these other Plumas NF/County observations, and can be added to the "non-burned" habitat use discussion for BBOW.

OK, so the map I attached is the only map I could find that shows the "BBOW observation area" and is actually a Great Gray Owl survey map from the area (surveyed at the same time period). The BBOW were found in Section 12, from near Call Point #32 northwest along Little Grizzly Creek until the end of the mine tailings pond (which isn’t a pond now, it is a rehabilitation area (no veg yet) that is basically a sand dune with little vegetation). Please let me know if you have any other questions about this. Thanks!”

Modoc County

Fish, Game & Recreation Commission

202 W 4th Street

Alturas, CA 96101

California Department of Fish and Game

Nongame Wildlife Program, Attn: Lyann Comrack

1812 Ninth St., Sacramento, California 95811

Please accept the following as public comment concerning the Black Backed Woodpecker.

Black Backed Woodpecker
(Picoides Arcticus)

Public comment regarding the petition from John Muir Project of Earth Island Institute and Center for Biological Diversity to list the Black Backed Woodpecker as threatened or endangered.

By utilizing the February 11, 2011 Department of Fish and Game report to the Fish and Game Commission regarding the Evaluation of Petition to list the Black Backed Woodpecker, I would like to add the following comments and information for consideration in this matter.

<u>Summary of Department's Evaluation</u>

Prior to expressing my areas of concern with the evaluation it is certainly evident that those who prepared the report deserve recognition for their efforts. The presentation is done in a professional, easy to understand manner which certainly allows for better discussion. After reading about this bird and doing some research, I better understand and appreciate the time and effort put forth in the preparation of such a document. That being said, I would generally agree with the Department's evaluations. I have chosen to address only a few areas relating to the petitioners document. Exceptions and concerns to the evaluation.

Demography: The life span of the Black Backed having not been established warrants further study. The information related to the Three Toed Woodpecker and White headed Woodpecker, even while closely related, should not be a substituted for valid information of a species for consideration.

Food Habits: More study of wood-borers and bark beetles would be beneficial as it directly relates to other areas of concern for the listing of the Black Backed Woodpecker, i.e. salvage logging, non fire related beetle infestations, and fire intensities. For example, in nesting habitat, does a mountain pine beetle infestation provide for a faster introduction of decomposition by allowing easier access to the tree for other means of deterioration such as wood borers or ants? Further, what is the relationship between the time of fire, beetle infestation, foraging, nesting and the average time before salvage logging is taking place. Should a major beetle infestation occur within the first year after the fire, there is insufficient data to show the actual increase in Black Backed Woodpecker population if the majority of beetle activity would be within that period. It could be argued that the Cerambycide and Buprestids have a relatively short availability for woodpecker forage, perhaps as little as a year before they pupate and become for the most part unavailable until they mature and emerge from the sapwood. It may be of benefit to have more studies of the surrounding undisturbed forest during the first year following the fire to help establish if the increase in birds are merely migration from surrounding areas with a less abundant food supply. The petitioner expounds under habitat requirements that the Black Backed Woodpecker within 50 km of a fire may have emigrated to the burn, resulting in a lack of birds within this distance. I would tend to agree with this statement however at this point we should not be at a "may have" level of research if this bird is being considered for listing. It is incumbent upon the petitioner to present sufficient study to rise above a "may have" scenario. More birds at a burn area do not necessarily indicate a larger or healthier population, particularly if there is not sufficient supporting data from the surrounding areas. A relatively recent study of White woodpeckers with high densities on burn plots suggest fire as a possible cue that attracts large numbers of birds to the area. The fact that the treatment (fire) rather than food availability was a direct driver of detection probability. (Christopher Rall2006). Also, not every fire would necessarily induce significant beetle colonization. It could be argued that the larger acreage fires may exhibit less significant beetle invasion due to a more dispersed infestation.

Range Isolation: Agree with the Department. The assertion that the Black Backed Woodpecker may be disjunction from the continuous boreal forest population would be of question with resident species documented in the Cascades and Siskiyou mountains of Oregon. We believe that the petitioner has not sufficiently addressed this issue, and further study is needed consideration of listing.

Degree and Immediacy of Threat (pg 21): The three major study areas referred to by the petitioner in the post fire salvage logging lacks information or study on those areas where little or no salvage logging occurred. In the Moonlight/wheeler, Fred's fire, and Power fire, each have references to non-forested, very sparsely forested or immature forests that were not salvage logged due to a lack of significant amount of merchantable timber volume. There seems to be a lack of information on these areas. To reach a conclusion on this bird for a listing, good science is the answer. Take the time for a comprehensive study, present the data, and make an informed choice. The acreage of these areas, snag counts, type and size of trees are not discussed, nor is nesting information presented. There does not appear to be information presented to allow an assessment of forage and nest use in these less than optimal areas as compared to an area of high intensity fire. Additionally, would the less than optimal areas provide better forage and nesting habitat than the adjoining unburned forest and to what degree could we expect an increase in bird activity, if any, in these areas. The impacts to the Black Backed Woodpecker from post fire salvage logging should be more fully explored. There appears to be limited information available showing the average time period between the end of a fire and the commencement and scale of salvage logging, especially on public lands. Should the burned area of public lands not be salvage logged for a period of 1 to 2 years, would the most intense beetle forage opportunities already have occurred? It would not be unreasonable to expect that most beetle activity would generally occur, beginning and peaking within 1 to 3 years. Should the fire salvage begin within the first year there still exists a reduced forage opportunity and ultimately a reduced level of nesting as compared to unsalvaged burns. Post fire removal of hazardous snags or fallen trees along roads, trails, power lines or near human habituation should be expected at an accelerated pace.

Abundance and Population Trend: Historical and Current Abundance in California. We agree with the Department and are concerned that regional summaries are lacking, especially for Modoc County, and the Warner Mountains. We question the lack of information researched and provided for our county and the Warner Mountains when it is somewhat readily available even for a novice. The Institute for Bird Population lists 5 different fire study areas in Modoc County. They list the Bell, Bell West, Blue Fire, Fletcher Fire, and the High Fire, and cover 2009 and 2010 for most of them. Interesting was the number of sightings at the Blue fire and Fletcher Fire, 5 and 15 respectively for 2009, and 5 and 5 in 2010. The attachment from the respondent lists a survey in Modoc County 7 years post fire for the Bell Fire with no observations. The same fire one year later had one sighting listed by the Institute for Bird

Population. While the single sighting at that particular fire area may not have the weight of more numerous sightings, information should be provided for discussion and use in making a sound decision based on the best available information. We are concerned that the population of the Black Backed Woodpecker is being understated and would strongly suggest a more thorough study be completed. We addressed only the fire areas and would tend to agree with the Department that the petitioner may have also understated the importance of unburned forest habitat. Related to this area of comment is the Impact of Existing Management discussed below. The inclusion of data from the National Park System in California may well reflect on the bird population numbers and support our concern that the population of the Black Backed Woodpecker is being understated. Attached is a bird study done in 1989 through 1991 in Modoc County, Lassen National Forest and Lassen Volcanic National park. The study was not specific to the Black Backed Woodpecker but does include observations and nesting information.

Impact of Existing Management: We agree with the Departments position that information from the National Park System has not been included, and we would tend to believe that it would provide useful information since they are not commonly salvaged logged or used for timber production. It would not be unreasonable to believe that a study of these areas would have an impact on the abundance and population trend discussed above.

Adjoining State Designations: We would urge the Department and the Commission to exercise discretion in considering the current status of the Black Backed Woodpecker in both Oregon and Nevada. Both Oregon and Nevada have different criteria than does California and their positions should not be used as a substitute for a lack of sufficient, unbiased information in making a sound decision for our state.

Suggestions for Future Management: Item E: halting plans for reducing high intensity fires in conifer forests wild lands not adjacent to homes. Does the accumulation of duff on the forest floor particularly of a species of trees with thin bark thickness such as Lodgepole Pine contribute to improved host supply of food or nesting sites in the event of a high intensity fire? Would a prescribed burn result in better host supply in a Lodge pole vs. Jeffrey pine forest, or perhaps

Ponderosa pine. Item F: Prohibiting insecticide use in forest habitats within the range of the Black Backed Woodpecker. Prohibiting the use of any insecticides within the range of the Black Backed Woodpecker may be excessive and warrants more clarification. In spraying for the Mountain Pine Beetle on public property, the use of Carbaryl, Chitosan, Permethrin, or Bifernthrin could all be used but would not be recommended for large scale operations due to cost and ecological concerns. The use of this method is preventative and is not effective on trees which are already beetle infested. Their use would tend to be for the protection of high value trees, those found in parks, near buildings etc. Item C: In unburned forests, retain patches of snags in a variety of decay stages, including those susceptible to future insect occupancy. The petitioner doesn't specify what size area would encompass a patch of snags and such a non specific requirement would present an undue burden on the landowner, public or private. The retention of snags and perch trees should already be addressed in a timber harvest plan or a salvage logging review process. The use of snags for woodpecker forage and nesting sites has value however there appear to be some times issues. One study indicates that most 3 year old snags are probably past the peak bark and wood boring beetle activity, and less likely to be used by foraging woodpeckers. Woodpecker foraging and the successional decay of ponderosa pine, Farris, Garton, Heglund, Zack, and Shea. (Attached)

Conclusion: The Department prepared a well written report to the commission and the overall results of that report do not warrant listing the Black Backed Woodpecker as threatened or endangered. Sufficient study of this bird has not been completed in California to show that this species of bird is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts as set forth under Fish and Game Code 2607. Certainly, the petition has not presented adequate, unbiased, information to show that this bird has risen to the level of being in serious danger of becoming extinct throughout all, or a significant portion of its range for the conditions listed under Fish and Game Code 2062. It is our opinion that the numerical count of this bird has been very much underestimated in California and that the petitioner did not provide adequate information from throughout the range of the Black Backed Woodpecker in California. With the underestimate of the population and the other issues outlined above, we would ask the Department and the Commission to exercise sound professional judgement, based on good science, in not considering the Black Backed Woodpecker for listing at this time.

Respectfully Submitted,

Cheryl Kunert

for Larry J. Moore

Modoc County Fish, Game and Recreation Commission

Cc: Modoc County Board of Supervisors

Leslie Stewart, Thern Electric and Solar

Email to the Department dated March 23, 2012 (1 page):
"Please list the black backed woodpecker as threatened or endangered. Thank you."

Steven Brink, California Forestry Association

Email to Department May 27, 2012 (1 page):
"The Black-Backed Woodpecker habitat is much more diverse than just burned landscapes, contrary to what you will hear from Chad Hansen and others. Unfortunately I do not have hard data to support my statement. I'll seek others to provide it. However, regarding burned landscapes that the woodpecker does use, the Forest Service has a wealth of information about how many acres and location of those acres that are charred annually by wildfires. They have the severity information of each wildfire, as well. On average, over 30,000 acres/year of California National Forest forested lands have burned (2000-2011 data) creating habitat for the woodpecker. I know of no other species in California that gets a fresh addition of on average 30,000 acres/year of habitat. The Forest Service data and graphs can be found at:
http://www.fs.fed.us/r5/rsl/projects/postfirecondition/

Society decided a long time ago that when life and property are threatened, we will attempt to suppress wildfires. In part, this policy has led to dramatically overly dense forest conditions especially on the National Forests. This has lead and will continue to lead toward extremely severe and large wildfires for the foreseeable future. Society is not going to change its policy. Hence, it is reasonable to expect that large, severe, wildfires will continue for the foreseeable future. There is no reason to list the Black-Backed Woodpecker."

Dirk Embree, Michigan-California Timber Company

Email to Department dated May 31, 2012 (1 page):
"Thank you for the opportunity to comment and provide data regarding the proposed listing of the black-backed woodpecker (*Picoides arcticus*) as either Threatened or Endangered under the California Endangered Species Act. As members of the timber industry and managing approximately 115,000 acres of mostly forested land in Shasta, Trinity and Siskiyou counties of northern California, the Michigan-California Timber Company offers the following information regarding habitat associated with this species on the ownership:

- Bark beetle out-breaks on the ownership have increased.
- The number of snags and live culls on the ownership are increasing.
- The harvest of dead, dying and diseased trees on the ownership has been greatly reduced.

- Non-merchantable snags and live culls are retained on the ownership, unless they pose a safety hazard.
- Substantial amounts of mature habitats are retained across the ownership for other species, such as the northern spotted owl (*Strix occidentalis caurina*), and along class I and II watercourses.

Any additional restrictions or delays in the salvage of fire burned timber could limit the economic feasibility to reforest the site. This could have long-lasting impacts, both in terms of loss of manageable ground and the liability associated with a fuel-laden brush field that will likely burn again in the future. This could also have longer term impacts on forest interior species, including the black-backed woodpecker, given the substantial time difference it takes for natural reforestation to occur compared to actually reforesting the site.

In addition, we encourage the department to look at the percent of burned forest habitat and trees that are actually salvaged on public lands compared to what are not. This analysis should also include wilderness areas, parks, and other areas that are off limits to resource extraction. And lastly, the amount of greenhouse gases (CH_4 and CO_2) released, either directly or indirectly, through the decomposition of post fire snags and the secondary fire that will burn the retained snags and brush in the future, should also be evaluated and compared to the carbon storage benefit of actually reforesting the site along with the carbon being stored in wood products.

Thanks again for the opportunity to provide and comment on the petition to list this species. Should you have any questions, please contact me at (530) 842-2310 x 1240. Thank you."

Daniel Shaw, California Department of Parks and Recreation

Emails to the Department both dated June 8, 2012 (1 page + attachments): "Lisa Fields let me know that you would like information on the black-backed woodpecker pair at Sugar Pine Point State Park. I was out there on April 27 of this year and there was a pair actively foraging. They were foraging in the only plot on our Tahoe parks property that we have burned 3 times with prescribed fire in the past 20 years. There is quite a bit of scorch on the trunks of the live trees that are left and some dead trees. The treatment was a pretty hot fall burn. I don't actively search for black-backed woodpeckers on our property but I worked on a black-backed project with Vicki Saab in Idaho years ago so I make note of them when I see them and this is the only place that I have seen black-backed woodpeckers on our property. Let me know if you need any additional information." "Photo of the area. Burned in 92, 97, and 07."

Sierra Pacific Industries

Forestry Division | P.O. Box 496014 | Redding, CA 96049-6014 | (530) 378-8000

May 31, 2012

California Department of Fish and Game
Nongame Wildlife Program
Attn: Ms. Lyann Comrack
1812 9th Street
Sacramento, California 95811

Re: Black-Backed Woodpecker Comments

Dear Ms. Comrack:

Sierra Pacific Industries owns a large amount of acreage within the southern Cascade and Sierra Nevada Mountain Ranges, a portion of which is suitable habitat for the black-backed woodpecker, *Picoides arcticus* (BBWO). We wish to offer comments to the Department on its evaluation to list the species under the California Endangered Species Act. In general, we agree with the Department's initial written assessment of the petition to list: there is not sufficient information to indicate the petitioned action is warranted.

CESA has distinct thresholds for determining whether a species qualifies for listing. An "endangered species" means 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.

Likewise, a "Threatened species" means 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 the Fish and Game Code.

Recent studies indicate the BBWO is widely distributed through its native range in California. Siegel et al. (2012) analyzed burned areas from the Oregon Border to the Sequoia National Forest east of Bakersfield. While the species is not abundant, it was detected in 25 of the 49 fires sampled and was well distributed latitudinally.

The petition alleges there is a loss of habitat which may lead to extinction – mostly due to salvage logging following a fire. If this were true, then very few of the fires included in the study would have any detections – not the ca. 50% Siegel et al. (2012) indicate.

Observations on the ground show the federal agencies, which manage the vast majority of higher elevation lands where there is suitable BBWO habitat, have very little salvage logging activity. In areas where there has been salvage activity, for example the 3,100-acre Angora Fire in the Lake Tahoe Basin, Wildlife Snag Zones were set aside from salvage to provide habitat for species such as the BBWO.

There also seems to be controversy surrounding the Fred's Fire in El Dorado County and whether this fire should not have been salvage logged to protect woodpecker habitat. Siegel et al. (2012) did not have BBWO detections in the Fred's Fire, but the elevation of this fire was well below to marginally below the range of the BBWO and the tree species mix was primarily mixed-conifer species – not the red fir or lodgepole pine apparently preferred by the BBWO. Additionally, in 2009 surveys the Fred's Fire would have been 5 years old and the probability of detection would have been falling due to the collapse of the wood boring insect populations by then.

Also, it is important to note that on the salvage logged Angora Fire, about 25 miles due east of the Fred's Fire but at a much higher elevation, 13 of 19 sampling stations detected BBWO's.

The Department's written assessment of the listing petition questioned the BBWO's use of unburned forests. New information about that very concern shows BBWO's occupy unburned areas and further supports the original assessment the BBWO does not warrant listing under the California Endangered Species Act (CESA).

For example, we agree with the Department that the petition understates the population residing in non-burned areas of its California range. A recent study by Fogg et al. (2012) analyzed the occurrence of the species over the same range as Siegel (2012). By sampling transects throughout the range, the report concludes the presence of the species is not well understood. They too found BBWO well distributed from the Oregon Border to the Southern Sierra Nevada. They were able to conservatively estimate there are between 1398 and 6899 sites occupied by black-backed woodpeckers on unburned sites just on National Forest lands in the Sierra Nevada. Contrast this current data with the petition's claim of 161 to 300 pairs in suitable and marginal sites in California. The Department should present updated information on burned and unburned population estimates and compare them to the petition's estimates. We think it shows the bird is doing much better than the petitioners wish to portray.

We also ask the Department to analyze the different survey methods used by birders and present the information in a table that the public can easily understand. The Audubon Christmas Bird Counts, although they provide information for specific areas, are not targeting suitable high elevation habitat for these woodpeckers and are not conducted at the appropriate times of the year to adequately detect birds. We also question the effectiveness of the breeding bird surveys. We place much more trust in the survey methods and expertise provided by the IBP and the PRBO.

We note no other listing criteria in the statute (change of habitat, overexploitation, predation, competition, or disease) seem to materially apply to this species.

Thank you for the opportunity to comment on this species.

Sincerely,

Tom Engstrom

Tom Engstrom
Wildlife and Botany Program Manager.

References:

Fogg, A.M., R.D. Burnett, and L.J. Roberts. 2012. Occurrence patterns of black-backed woodpecker in unburned national forest land in the Sierra Nevada. Point Reyes Bird Observatory (PRBO), Contribution # 1872, 27 pp.

Siegel R.B., J.F. Saracco, and R.L. Wilkerson. 2010. Management Indicator Species (MIS) surveys on Sierra Nevada National Forests: Black-backed woodpecker 2009 Annual Report - A report in fulfillment of Forest Service Agreement No. 08-CS-11052005-201, Modification #1. The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, CA 94956. www.birdpop.org.

Siegel, R.B., M.W. Tingley, and R.L. Wilkerson. 2012. Black-backed woodpecker MIS surveys on Sierra Nevada National Forests: 2011 annual report. Unpub. report for US Forest Service. The Institute for Bird Populations (IBP), Point Reyes Station, CA. 57 pp.

March 30, 2010 Version

Questions and Responses Regarding "The Myth of "Catastrophic" Wildfire: A New Ecological Paradigm of Forest Health"

The Forest Service Pacific Northwest Research Station has prepared the following set of questions and responses, as a follow up to numerous inquiries the Station has received regarding the validity of key points from the "The Myth of "Catastrophic" Wildfire: A New Ecological Paradigm of Forest Health" document by Chad Hanson. This document is an opinion piece recently appearing on the John Muir Project Island Institute website. The report has not been scientifically peer reviewed and contains many erroneous statements and attempts to extrapolate limited data to the entire western U.S.

Question 1: Is this document a peer-reviewed scientific publication?

The document was published as a report by Chad Hanson on the John Muir Project Earth Island Institute website at http://www.johnmuirproject.org/documents/Hanson%20White%20Paper%2029Jan10%20Final.pdf. This document is an opinion piece that has not been published in a scientifically peer reviewed outlet. The Earth Island Institute is not a recognized scientific outlet with known and replicated quality assurance and quality control processes. The document and its findings have not been subjected to the rigors of formal technical or peer review.

Question 2: Are the findings in the document widely applicable to the entire western US as asserted by the author?

In several instances, the report extrapolates a few studies to the entire western U.S., lumping the Pacific Northwest, southwestern U.S. and Rocky Mountains in the same inferences — e.g. not enough fire, and fire management (outside of the WUI) is misguided. The examples cited are not sufficient for such extrapolation. The author does not acknowledge the normal scientific step of citing uncertainties that exist in extrapolating studies to larger areas and different ecosystems — e.g. the statement that there was "2-4 times more high-intensity fire" (page 17) in the past. Generalizations like this require qualification and documentation of context and sources of error.

Question 3: Are the author's views on forest thinning and carbon sequestration supported by the scientific literature? ["MYTH 10 and FACxT q10"]

Very few published studies have examined this issue. Three studies (two by North & Hurteau, one by Wiedinmyer & Hurteau) conclude that thinning can reduce carbon losses relative to stands that experience wildfire without thinning. Another study (by Mitchell & Harmon) found the opposite to be true. The issue is far from resolved and depends on assumptions about fire and fuel characteristics as well as the specific model used. For example, in forests with frequent wildfires, thinning and prescribed fire could reduce carbon loss, but in forests with less frequent fires, thinning and prescribed burning could release more carbon than would be released under a passive management system. Spatial and temporal scale also affect inferences about carbon storage.

Long-term carbon storage is a function of climate and its effects on fuels, ignitions, and fire severity over time and space, as well as the normal processes of tree growth (biomass accretion) and decomposition (slow oxidation of carbon, as opposed to rapid oxidation by fire). Efforts to minimize fire and optimize growing stock can be interrupted by fire, despite efforts to exclude it. In high-severity fire regimes (e.g., lodgepole pine, subalpine fir), considerable carbon is lost prior to regeneration of the subsequent stand. In mixed conifer forests, where surface fire effects historically dominated (see Agee and Skinner 2005 and references therein, Hessburg et al. 2007 and references therein), rebalancing of carbon occurred by constant thinning and consumption of surface and ladder fuels by frequent, low and mixed severity fires, where surface fire effects were dominant, and occasionally via patches of stand replacement fire. Thinning with prescribed burning can emulate these effects. However, surface fuels created by silvicultural activities must be removed to ensure reduced fire hazard (Huff et al. 1995 and references therein).

Question 4: Are the author's views on removing biomass for fuel reduction supported by the scientific literature? ["MYTH 11 and FACT 11"]

No evidence suggests that removing biomass for fuel reduction and energy production will benefit forests ecologically. However, there is support for the practice of reducing fuels on part of a landscape to protect fire-sensitive parts of the landscape or reducing fuels as part of a broader restoration program. Removal of dead wood and large live trees may provide economic or energy benefits, but does remove habitat for some species. Tradeoffs, including those related to biomass removal and other ecosystem services, are always a consideration for management of multiple resources, and they need to be addressed across large landscapes, not just one stand at a time.

The notion that "peak biomass has been found in areas that have experienced high-intensity fires" (page 24) needs to be qualified. Total biomass is relatively high (most of it dead) after high-severity fire in old- growth Douglas-fir or eucalyptus (Keith et al. 2009 study), however, the site will serve as a carbon source to the atmosphere for 40-50 years (Janisch and Harmon 2002) until the young forest accumulates carbon faster than is being lost through decay of dead wood. The report's statements (e.g., peak biomass in areas that experienced high-intensity wildland fire) are misleading and give the impression that the highest biomass is found right after a wildfire, when in fact, it is found in a forest that has not had fire for many centuries. Biomass thinning removes mostly live trees and is not synonymous with post-fire salvage logging, which removes mostly dead trees.

Historical fires in interior dry forests were a true biomass thinning that killed smaller trees, and maximum productive capacity was typically not experienced across a landscape due to the effects of frequent fires. Canopy cover, density, and layering have increased greatly in interior dry forests (Hessburg et al. 1999, 2000, 2003, 2005, 2007). The report advocates for conditions that were not sustainable in the past, cannot be sustained in the future, and would be deleterious to many native species and ecological processes. "Carbon sequestration" on fire prone public lands really means sustainable carbon storage where fire, one way or another will remove biomass and rebalance the equation. Sustainable carbon storage is a function of fire ecologies of major ecosystems in long-term balance over space and time. One alternative to reaching a sustainable balance in some systems is thinning and fuel treatments, including prescribed burning, in patches that create a desired mosaic of forest size, age, and density mosaic for the future.

Question 5: Does the paper include inaccurate statements or interpretations of FS actions or the fire behavior literature? If so please describe.

The report contains numerous instances of inaccurate interpretations or biased statements.

- The report uses a different definition of wildland-urban interface (WUI) than is used by the FS or any standard source. Congress requires the FS to use the areas identified in the Community Wildfire Protection Plans as WUI. Therefore the statement that "Currently, less than 3% of U.S. Forest Service fuel reduction projects are near homes" grossly underestimates the quantity and effectiveness of fuel treatments in the WUI. The 2009 GAO report finds that about 2/3 of the total treated acres on FS lands are within the WUI. Schoennagel et al. (2009) is often cited as evidence of poor performance with WUI treatment, but that analysis is not objective and has been rebutted in the scientific literature.
- The scientific literature supports that high intensity wildfire increases particulates in the air rather than decreasing them as the report asserts.
- The statement "The only effective way to protect homes from wildland fire is to reduce the combustibility of the homes themselves, and reduce brush and very small trees within 100 feet of the homes. Commercial thinning projects that remove mature trees hundreds of yards – and often several miles – from the nearest home do not protect homes…," is oversimplified and out of context. In the case of crown fires in forest or chaparral, embers may be transported 2 miles or more ahead of the flaming front where they can and on rooftops and burn homes from the roof downward. Some areas of the landscape act as more efficient conveyors of wildfire than others, due to topographic channeling of wind flow and duel accumulations associated with high productivity. Therefore, thinning and fuel treatments that are targeted spatially and temporally can reduce intense fire behavior adjacent to homes and other valued landscape components.
- The following statement is biased and lacks scientific credibility: "Snag forest habitat is alive, and vibrant. It is colorful, and rich with varied sounds, given the sheer density of wildlife activity. It is the most rare (sic), endangered, and ecologically important forest habitat in western U.S. forests, and the stand-transforming fires that create this habitat are not damaging the forest ecosystem." This is an opinion without ecological evidence, reflecting the non-scientific advocacy perspective in the report.
- The following statement is biased and lacks scientific credibility: "Our focus and our resources must be redirected to ensure protection of homes, rather than conducting pointless and destructive "fuels reduction" and "forest health" logging projects in remote forested areas based upon an outdated and unscientific management paradigm – a paradigm that financially benefits the timber industry and the budgets of land management agencies, but further deprives conifer forest ecosystems of the habitat

features they need most to support imperiled species." Dozens of studies have documented the effectiveness of fuel treatments in reducing fire hazard, enhancing associated ecological values (e.g., wildlife habitat), and providing fiber for wood and paper products and to substitute for fossil fuels.

- The statement "Even Spotted Owls depend upon significant patches of high-intensity fire in their territories in order to maintain habitat for their small mammal prey base. These areas are ecological treasures." is based on one poorly replicated study by Monica Bond in California. It is an outlier compared to more credible research published in first- tier journals that state late-successional and old forest patches of a size comparable to spotted owl breeding season home ranges are optimal for breeding and successful fledging of young adults. Bond's study does not effectively demonstrate that stands killed by high severity fires are useful to spotted owls. Throughout Oregon and Washington, owl neighborhoods that experienced high severity fires (>70% of basal area killed) are currently owl free.
- The statement "Current fires are mostly low- and moderate-intensity, and high-intensity fire comprises a relatively small proportion of the total area burned. Areas that have not burned in a long time are not burning more intensely." is patently false and disingenuous. The vast majority of wildfire area is burned by high and moderate intensity fires, where crown fire effects (active or passive) dominate.
- Parts of the following are either false or illogical: "Vigorous natural regeneration of conifer seedlings occurs after high-intensity fire. Numerous large trees also survive, and their growth tends to increase substantially after the fire, which converts woody material on the forest floor into highly usable nutrients for tree growth. By contrast, after very long absence of these fires, forests can lose so much of their productivity that, ultimately, sites lose the ability to support forest at all." Where fires are high severity and patches of stand replacement are large, seed sources for natural regeneration are often distant. An ecological generalist like lodgepole pine can in some cases dominate a site previously occupied by Douglas-fir, ponderosa pine, western larch, or other species. Shrub fields are also a common result after large fires. High severity fires often volatilize enormous amounts of nitrogen and phosphorous, bankrupting soils for decades to centuries as they recover their fertility. Low severity fires tend to maintain nitrogen-fixing understory shrub and herb vegetation.
- The comment "Fires are not becoming more intense" is contrary to published data. Published accounts of the last 25 years illustrate the increased intensity of fires (Miller et al 2009, Spies et al. 2006).
- This statement is false: "Predictions vary about the effect of global warming and climate change on forest fire activity, but the most recent projections indicate reduced fire activity in most forests due to changes in combustible vegetation, and increased precipitation in many areas. Even scenarios for increased fire activity would not rectify the current deep deficit of fire in forest ecosystems." All credible climate predictions in the West show hotter, drier conditions and more area burned (Mckenzie et al. 2004).
- This statement is reflects a lack of understanding of fuels and combustion in wildfires: "High-intensity fire burns cleaner than low-intensity, and produces fewer particulates." Emissions depend on fire weather, fire behavior, and fuel conditions. They especially depend on the combustion of downed wood, stumps, and roots that can burn for days to weeks following large wildfires. Extensive research has shown that for the same conditions, prescribed fires have fewer harmful particulate emissions harmful to human health than wildfires.
- This statement is ambiguous: "Old-growth conifer forests cannot function as carbon sinks without fire. Without large, intense wildland fires to cycle nutrients and rejuvenate the productivity of the soil, forests can become carbon sources after about 600 years of age." This is patently false for west-side old forests, but may be true for true east-side old forests. However, on the east side, a patch is not old forest if it has been burned by high severity fire, because by definition, the stand has been replaced (>70% overstory mortality) and remaining trees are a remnant of the former forest. Historical forests and fire regimes on the east-side Cascades did not support nearly the tree stocking and basal area that are supported today. Sustainable carbon storage will most likely be at much lower levels than are currently supported on the landscape.

Contact for additional information: Becky Gravenmier, PNW Station, Planning Coordinator, 503-808-2851, bgravenmier@fs.fed.us

Sierra Pacific Industries

Forestry Division•P.O. Box 496014•Redding, California96049-6014 Phone (530) 378-8000 •FAX (530) 378-8139

April 5, 2011

California Fish and Game Commission
1416 Ninth Street
Sacramento, CA95814

Re: OPPOSE Black-backed Woodpecker Petition for Listing

Dear Commissioners:

Sierra Pacific Industries owns forestland in the Cascade and Sierra NevadaRanges as well as the Modoc Plateau which contains suitable habitat for the black-backed woodpecker (BBWO), *Picoidesarcticus*. We believe the management of our forestland provides sustainable habitat for all wildlife species, including the BBWO.

After reviewing the petition to list the species, the Department of Fish and Game's (Department) evaluation of the petition, our analysis of the literature, and the statutory criteria which qualifies a species for listing, we conclude a reasonable person would choose to not list the species.

BBWO are not in serious danger of becoming extinct throughout all or a significant portion of its range due to loss or change of habitat.

- The species is insectivorous and when insect populations increase, BBWO populations "irrupt" in response to food availability. When insect populations decline, BBWO populations decline.
- Insects eaten by BBWO, long-horned beetles and wood-boring beetles, are endemic throughout the range of the BBWO. The insects also have boom and bust cycles tied to droughts, diseases in trees, and forest fires. When any of these environmental stressors weaken or kill trees, these insects attack the trees and lay eggs under the bark. BBWO feed on these insects and larvae. It is intuitive BBWO live in forested and subalpine conditions at maintenance levels until a fire occurs.
- Fires, disease outbreaks, and wind events all cause tree mortality and they occur throughout the California range of BBWO. BBWO will take advantage of these natural disasters and feed on the insects found at these disaster sites.
- There are many acres of federal "Wilderness" designated for no active human management. When fires, disease outbreaks, and wind events occur in "Wilderness" areas, BBWO have full access to these areas since their insect food source is present.

- There are many acres of federally managed lands that are not zoned for timber harvest. When fires, disease outbreaks, and wind events occur, BBWO's access these areas because their insect food source is present.
- There are many acres of privately owned forest land whose owners are not interested in harvesting trees. When fires, disease outbreaks, and wind events occur, BBWO's can access these areas because their insect food source is present.
- The petition mentions several fires where salvage logging has occurred to support their argument that habitat is being lost. A look at the actual acres salvage logged versus the areas burned over the last 10 years and over the entire range in California will likely show a low percentage of burned habitat has actually been logged.
- The BBWO range maps included as Figures 1 and 2 in the Department's report indicate a significant range extension of the BBWO in the WarnerMountains, the eastside Sierra Nevada, and the southern Sierra Nevada from historic times.
- Saracco et al. (2011) report the presence of BBWO in a burned landscape was not dependent upon pre-fire and post-fire canopy. One may infer that burned small tree forests with low canopy cover had roughly the same probability of having BBWO's present than a burned large tree forest with high canopy cover. This is counter to the petitioner's claim old-growth forests are necessary to conserve the species.
- Saracco et al. (2011) also report BBWO's may be more tolerant of homogeneous landscapes, presumably those with a mixture of burned vs. unburned and large vs. small trees. We believe this habitat is common in the range of the species and we expect this to continue well into the future. There is no immediate or even intermediate-term concern for decreasing BBWO habitat.
- Saracco et al. (2011) estimate 81,486 ha or 201,352 acres of burned habitat currently estimated to be occupied by BBWO. BBWO's use burn areas up to 10 years post-burn with two peak usage years – 2-3 years following a fire and 6 years following a fire. A 2009 Forest Service species survey for BBWO ranged from the Oregon border to the southern Sierra Nevada range. (Siegel et al. 2010) These researchers stated:

> "We detected Black-backed Woodpeckers at 169 survey stations (Table 2) distributed across 28 of the 51 fire areas we surveyed (Figs. 4-7). We detected Black-backed Woodpeckers on nine of the ten national forest units in our study area—the only forest where we did not detect the species was SierraNF, where our random sample yielded only one fire area (the North Fork fire area; Fig. 6) to survey. We detected Black-backed Woodpeckers on both the west and east sides of the Sierra crest, and across nearly the full latitudinal range of our study area, including the most northerly fire area we surveyed (the Fletcher fire area on the Modoc NF, which spans the California – Oregon border; Fig. 4), and the third most southerly fire area we surveyed (the Vista fire area on the Sequoia NF; Fig. 7)." (Siegel et al. 2010)

- As the Department indicated in their report on the petition, no estimate was made of non-burned habitat availability. Based on the feeding and nesting needs of the species and the ubiquitous nature of insects in the Sierra Nevada, Cascade, and WarnerRanges, we expect the habitat to be extensive and not limiting to BBWO.
- It is also important to note that the petitioners contentions on BBWO declining in numbers is not based upon any credible evidence, no region wide surveys. The USFS MIS survey is very selectively quoted by the petitioners. Thus missing the quote above about occupied habitat and current distribution across the entire historic range.
- There is great scientific debate about the relative prevalence of high intensity fires in the past, and that the western forests where BBWO are found today were kept in a relative open and low snag condition for the past few millennia, thus as the DFG report appropriately points out the BBWO must persist at sustainable levels in unburned forests and not have a dependence on high canopy closure "old growth" otherwise they would have been extinct long ago.

Other decision criteria in the endangered species statute call for analysis of exploitation, predation, competition, or disease. The petition does not address these issues and the Department does not cite them as being significant in their analysis of the petition. We conclude there is no affect to BBWO from exploitation, predation, competition, or disease.

Like the Department, we urge the Commission to reject the petition.

Sincerely,

Edward C. Murphy, RPF # 2066
Manager, Resource Information Systems
Sierra Pacific Industries

References:

Saracco, J.F., R.B. Siegel, and R.L. Wilkerson. 2011. Occupancy modeling of black-backed woodpeckers on burned Sierra Nevada forests. Ecosphere 2(3): Article 31. 17p.

R. B. Siegel, J. F. Saracco, and R. L. Wilkerson. 2010. Management Indicator Species (MIS) surveys on Sierra Nevada National Forests: Black-backed woodpecker2009 Annual Report - A report in fulfillment of Forest Service Agreement No. 08-CS-11052005-201, Modification #1. The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, CA94956. www.birdpop.org

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File Code: 2600
Date: MAY 3 1 2012

Ms. Lyann Comrack
California Department of Fish and Game
Nongame Wildlife Program
1812 9th Street
Sacramento, CA 95811

Dear Ms. Comrack:

The Pacific Southwest Region of the USDA Forest Service is pleased to provide information in response to the January 13, 2012, Public Notice requesting data or comments on the taxonomic status, ecology, biology, life history, management recommendations, distribution, abundance, threats, habitat that may be essential for the species, or other factors related to the status of the Black-backed Woodpecker.

First, we have updated the information we sent to the California Fish and Game Commission in May 2011 related to clarifying factual errors and potential mischaracterizations presented in the 2010 "Petition to the State of California Fish and Game Commission to List the Black-backed Woodpecker (*Picoides arcticus*) as Threatened or Endangered under the California Endangered Species Act," the February 11, 2011, Evaluation of the Petition prepared by the California Department of Fish and Game (CDFG), and the subsequent additional letters from the Petitioners. **The updated document is enclosed,** and includes information and comments regarding (1) fire severity; (2) fire and climate change; (3) existing management under the Sierra Nevada Forest Plan Amendment (SNFPA); (4) immediacy of threats related to management; and (5) suggestions for future management. Please use this document in replacement of our May 2011 letter and enclosure.

In addition, the USFS and our partners have collected and developed valuable information and data related to the ecology, life history, distribution, threats, and habitat for the Black-backed Woodpecker in California that will be valuable to you in the development of your final report to the Fish and Game Commission.

In 2007, the USFS identified a number of birds, mammals, and other species as Management Indicator Species (MIS) for the ten National Forests in the Sierra Nevada (Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit); the Black-backed Woodpecker was identified as an MIS for the ecosystem component of snags in burned forests. A primary duty for the USFS related to most of these MIS in the Sierra Nevada, including the Black-backed Woodpecker, is bioregional monitoring of habitat and population distribution status and trend. This bioregional monitoring has provided valuable information on Black-backed Woodpeckers in California.

In 2008, we began a partnership with The Institute for Bird Populations (IBP) to conduct annual monitoring of Black-backed Woodpeckers within burned forest areas across the ten Sierra Nevada National Forests. The primary goal of this program is to monitor the trend in population distribution by monitoring trends in the amount of recently burned forest on the study area's ten national forests that is occupied by Black-backed Woodpeckers. Additional goals are to better understand Black-backed Woodpecker abundance, distribution, and habitat associations across the Sierra Nevada, to develop information that can inform effective conservation of the Black-backed Woodpecker in the Sierra Nevada, and to collect and interpret information on other bird species utilizing burned forests.

Annual reports are available for each year's monitoring effort (Siegel et al. 2008, Siegel et al. 2010, Siegel et al. 2011, Siegel et al. 2012a). In addition, a paper on occupancy modeling using the 2009 data was published in 2011 (Saracco et al. 2011). The 2011 monitoring report (Siegel et al. 2012a), in addition to analyzing the monitoring data collected in 2011, includes two separate analyses using the Black-backed Woodpecker data from 2009, 2010, and 2011: (1) exploration of annual changes in Black-backed Woodpecker occurrence within the sampling frame; and (2) assessment of occurrence dynamics over time. All the reports, as well as site-specific data, are available online: http://www.birdpop.org/Sierra/bbwo_results.htm, as well as on the disk mailed with the paper copy of this letter.

We encourage you to contact Dr. Rodney Siegel, Executive Director of The Institute for Bird Populations, directly if you have any questions or need more information regarding this monitoring project and associated analyses [(415) 663-2051; rsiegel@birdpop.org].

In 2009, we began annual monitoring of the avian MIS in unburned forests across the Sierra Nevada to track population distribution status and trend, in partnership with PRBO Conservation Science. This effort annually conducts point count and a playback survey at point count transects distribution across the 10 national forests (Roberts et al. 2011). PRBO Conservation Science recently analyzed the Black-backed Woodpecker detection data to determine occupancy patterns in unburned forest in the Sierra Nevada, using a Bayesian modeling approach (Fogg et al. 2012). Copies of both of these reports are included in the disk mailed with the paper copy of this letter. The data collected to date are also available online: http://data.prbo.org/partners/usfs/snmis/.

We encourage you to contact Ryan Burnett, Director of the Sierra Nevada Group of PRBO Conservation Science, directly if you have any questions or need more information regarding this monitoring project and associated analyses [(530) 258-2869, rburnett@prbo.org].

In addition to MIS-related monitoring, we are currently working with IBP on two efforts that provide additional important information related Black-backed Woodpeckers in California. The first is a two-year Administrative Study entitled "Assessing Home Range Size and Habitat Needs of Black-backed Woodpeckers in California." The first year of this administrative study was completed in 2011, and a very detailed Interim Report (Siegel et al. 2012b) is available on-line: http://www.birdpop.org/Sierra/bbwo_results.htm, as well as on the disk mailed with the paper copy of this letter. In addition to providing information on home range size and nesting and foraging habitat, this report includes information on nesting phenology. The field work for the second (and last) year of the study is under way.

The second effort is the development of a Partners in Flight Conservation Strategy for Black-backed Woodpeckers in California. A draft of the Conservation Strategy (Bond et al. 2012) is now available and undergoing peer review. The Strategy includes in-depth summaries of all the information available on Black-backed Woodpeckers in California, including summaries of unpublished data, such as a section by Dr. Kathryn Purcell on Black-backed Woodpecker use of, and reproduction in, unburned forests in the southern Sierra Nevada, based on census and nest data collected from 1995 to 2002 on the Sierra National Forest (Bond et al. 2012, pp.33-36). In addition, the Strategy includes science-based recommendations for conservation actions. If you need additional information or have specific questions regarding the information in this Draft Strategy, please contact Dr. Rodney Siegel, Executive Director of The Institute for Bird Populations, [(415) 663-2051; rsiegel@birdpop.org]. In addition, we encourage you to contact Dr. Kathryn Purcell directly if you need additional information or have specific questions regarding her work in the southern Sierra Nevada [(559) 868-6233; kpurcell@fs.fed.us].

Lastly, we wanted to make sure that you were aware of two studies that have occurred on individual national forests and include data on the Black-backed Woodpeckers. The first was part of the Plumas-Lassen Administrative Study, conducted on the Plumas and Lassen National Forests. In 2009-2010, the avian module of this study, which was conducted by PRBO Conservation Science, was expanded to assess post-fire habitat on the Storrie, Moonlight, and Cub fires areas, and data were collected on Black-backed Woodpeckers (Burnett et al. 2011). A copy of this report is on the disk mailed with the paper copy of this letter. We encourage you to contact Ryan Burnett, Director of the Sierra Nevada Group of PRBO Conservation Science, directly if you have any questions or need more information regarding this study and associated analyses [(530) 258-2869, rburnett@prbo.org].

The second was a woodpecker study was recently conducted on the Angora Fire area within the Lake Tahoe Basin Management unit; a thesis is currently available (Tarbill 2010) and a Report should be available in the next few weeks. We encourage you to contact Dr. Angela White directly if you need additional information or have specific questions regarding this study [(530) 759-1722; angelawhite@fs.fed.us].

Here is a listing of the complete citations for all of the papers referenced above; as noted above, electronic versions of all the cited documents are included on a disk mailed with the paper copy of this letter:

Bond, M.L., Craig, D., Siegel, R.B., editors. 2012. A Conservation Strategy for the Black-backed Woodpecker (*Picoides arcticus*) in California – Version 1.0 (Review Draft). May 2012. 103pp.

Burnett, R.D., P. Taillie, and N. Seavy. 2011. Plumas-Lassen Administrative Study 2010 Post-fire Avian Monitoring Report. PRBO Conservation Science Contribution Number 1781, January 2011. 45pp.

Fogg, A.M., R.D. Burnett, and L.J. Roberts. 2012. Occurrence patterns of black-backed woodpecker in unburned National Forest land in the Sierra Nevada. PRBO Conservation Science Contribution Number 1872, April 2012. 27pp.

Roberts, L.J., A.M. Fogg, and R.D. Burnett. 2012. Sierra Nevada National Forests Management Indicator Species Project 2011 Annual Report. PRBO Conservation Science Contribution #1849, March 2012. 45pp.

Saracco, J. F., R. B. Siegel, and R. L. Wilkerson. 2011. Occupancy modeling of Black-backed Woodpeckers on burned Sierra Nevada forests. Ecosphere 2:art31. [doi:10.1890/ES10-00132.1]

Siegel, R. B., R. L. Wilkerson, and D. L. Mauer. 2008. Black-backed Woodpecker (*Picoides arcticus*) surveys on Sierra Nevada national forests: 2008 pilot study. Report to USFS Pacific Southwest Region. The Institute for Bird Populations, Point Reyes Station, CA

Siegel, R. B., J. F. Saracco, and R. L. Wilkerson. 2010. Management indicator species (MIS) surveys on Sierra Nevada national forests: Black-backed Woodpecker. 2009 annual report. Report to USFS Pacific Southwest Region. The Institute for Bird Populations, Point Reyes Station, CA.

Siegel, R. B., M. W. Tingley, and R. L. Wilkerson. 2011. Black-backed Woodpecker MIS surveys on Sierra Nevada National Forests: 2010 annual report. Report to USFS Pacific Southwest Region. The Institute for Bird Populations, Point Reyes Station, CA.

Siegel, R. B., M. W. Tingley, and R. L. Wilkerson. 2012a. Black-backed Woodpecker MIS Surveys on Sierra Nevada National Forests: 2011 Annual Report. Report to USFS Pacific Southwest Region. The Institute for Bird Populations, Point Reyes Station, CA.

Siegel, R. B., M. W. Tingley, R. L. Wilkerson, and M. L. Bond. 2012b. Assessing home range size and habitat needs of Black-backed Woodpeckers in California: 2011 interim report. Report to USFS Pacific Southwest Region. The Institute for Bird Populations, Point Reyes Station, CA.

Tarbell, G.L. 2010. Nest Site Selection and Influence of Woodpeckers on Recovery in a Burned Forest of the Sierra Nevada. Thesis, Master of Science, California State University, Sacramento. Fall, 2010. 67pp.

We look forward to continued cooperation between our agencies to provide for conservation and management of wildlife and their habitats in California. If you have any questions or need additional information, please contact Diana Craig, Regional Wildlife Ecologist, at 707-562-8930 or dcraig01@fs.fed.us, or Donald Yasuda, Regional Analyst, at 916-640-1168 or dyasuda@fs.fed.us.

Sincerely,

for RANDY MOORE
Regional Forester

Enclosure

Attachment to the May 2012 USFS Letter information in response to the January 13, 2012, Public Notice requesting data or comments on the Black-backed Woodpecker

Note: This document is an update and replacement for the attachment that was submitted with the USDS Forest Service letter dated May 17, 2011. Information in the original document was updated and revised and new information related to the Public Notice request has been added.

Prepared by:

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Purpose

This document is prepared to provide data and comments in response to the January 13, 2012, Public Notice from the California Department of Fish and Game requesting data and comments on Black-backed Woodpecker (BBWO), and includes information and data related to BBWO habitat status and trend, as well as potential risk factors and management recommendations, including specific data and comments on (1) fire severity; (2) fire and climate change; (3) existing management under the Sierra Nevada Forest Plan Amendment (SNFPA); (4) immediacy of threats related to management; and (5) suggestions for future management. Specifically, this document focuses clarifying factual errors and potential mischaracterizations presented in the following documents:

> (1) Petition to the State of California Fish and Game Commission to List the Black-backed Woodpecker (*Picoides arcticus*) as Threatened or Endangered Under the California Endangered Species Act (the “Petition”, Center for Biological Diversity and John Muir Project, dated September 29, 2010);
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> (2) Evaluation of Petition from John Muir Project of Earth Island Institute and Center for Biological Diversity to List Black-backed Woodpecker (*Picoides arcticus*) as Threatened or

Endangered (the “Evaluation”, California Department of Fish and Game, dated February 11, 2011);

(3) John Muir Project letter to California Fish and Game Commission, dated March 24, 2011

(4) Center for Biological Diversity and John Muir Project letters to California Fish and Game Commission, dated April 15, 2011

(5) John Muir Project letter to California Fish and Game Commission dated June 17, 2011.

(6) Center for Biological Diversity letter to California Fish and Game Commission and California Department of Fish and Game, dated July 1, 2011.

Overall, we found the Department’s February 2011 Evaluation Report to be a very thorough and, for the most part, accurate assessment of the Petition and current science. However, we are concerned that the Report conclusions of general agreement with the Petition regarding (1) the Degree and Immediacy of Threat; (2) the Impact of Existing Management Efforts; and (3) Suggestions for Future Management, will be used out of context to imply full endorsement by the Department of the statements, conclusions, and recommendations in the Petition. This concern arises out of the Petitioner’s reference to the Evaluation report conclusions in their subsequent letters to the Commission, where they state: “We are pleased that the Evaluation agreed with many of the Petition’s points as noted below…” (Augustine, March 24 Letter, p. 1) and “Moreover, as the DFG Report acknowledges…” (Hanson, April 24 Letter, p. 3).

This document is an update to and replacement for the attachment that was submitted in our letter dated May 17, 2011. The information, data, and comments in this attachment are offered to assist the CDFG in evaluating the content of the Petition and the conclusions in the original Evaluation of the Petition and to aid in the 12 month evaluation of the Petition.

Items from Petition and Department Evaluation

1. Characterization of Sierra Nevada Fire Regimes and Fire Severity (Petition pp 49-53)

Recent monitoring for black-backed woodpecker in the Sierra Nevada shows that they do not exclusively occur in severely burned areas, but they also occur in moderately burned areas and at lower densities in low severity burned areas (Siegel et al. 2010; Saracco et al. 2011; Siegel et al. 2012). One difficulty in comparing the Petition information directly to other published literature is that instead of using fire severity maps with categories that match the sampling stratification used by most contemporary fire severity assessments, the Petitioners derived their own “intensity” maps that potentially resulted in less identified habitat (Miller et al. 2009a). Thus, caution must be used in translating the Petition’s use of the category “high intensity” to categories of “high severity” in the published literature and to acreage calculations of Forest Service fire severity mapping using the Rapid Assessment of Vegetation Condition after Wildfire (RAVG) (Miller et al. 2009a; USDA Forest Service 2011). A brief explanation of the differences between the various fire severity assessment approaches is provided at the end of this document (see “National Fire Severity Mapping Programs Overview”, p.22). Note that the Petition’s use of the term “high intensity” runs contrary to proper and standardized usage in fire science of the term "intensity" to refer to energy output and not effects of fire on the affected ecosystem (Sugihara et al. 2006; Keeley 2009).

The Petition's estimate of a 300 year "high-intensity" fire rotation may be low by a significant amount. The Petition bases its calculation on (1) a misrepresentation of Leiberg's (1902) study of northern Sierra Nevada forests, and (2) a paper (Beaty and Taylor 2001) which has no information about presettlement rates of high severity fire.

Leiberg (1902), in a study of 19th century fire and forests in the northern Sierra Nevada, attempted to reconstruct the occurrence of fire in his study area for the preceding 100 years using secondary "fire signs" (snag patches, obvious burned areas, plus assumptions that chaparral fields and many meadows were fire created). Leiberg estimated that 8% of the fire area he assessed had burned at stand-replacing severities (although his actual numbers – 214,000 out of 3.5 million acres – calculate out to about 6.1% of area), and a total of 26% of fire areas had burned with tree losses of 50% or greater. Assuming Leiberg's assessment techniques were reasonably accurate (McKelvey et al. 1996 suggested that Leiberg overestimated high severity area because he assumed all chaparral patches he saw and many meadows were generated by fire, which is demonstrably not the case), we can roughly gauge that somewhere between 6 and 13% of the fire area he assessed burned at high severity (>75% mortality). Dividing 6 and 13 by 100 (the length of the study period), we get an annual average of 0.06 and 0.13% of the area, which gives a high-severity fire rotation range of 769 to 1667 years for the 19th century in the northern Sierra Nevada.

Beaty and Taylor (2001) studied patterns of high severity fire in a small northern Sierra Nevada watershed in the period 1883-1926. This period coincides with intensive mining, lumbering, and grazing that accompanied Euroamerican settlement of the Sierra Nevada. Extensive high severity fires occurred throughout the Sierra Nevada in this period, driven by logging slash, grazing effects, and widespread use of fire by shepherds, hunters, and others (Sudworth 1900, Leiberg 1902). Thus, data from this period are highly unlikely to represent typical conditions in the Sierra Nevada before the arrival of Euroamericans and, even in this historic period, represent a substantially human-altered fire regime. The watershed Beaty and Taylor (2001) studied is also a very small sample (< 4,000 acres, or 0.03% of the Sierra Nevada National Forests) and caution must be used in extrapolating this study across the entire Sierra Nevada.

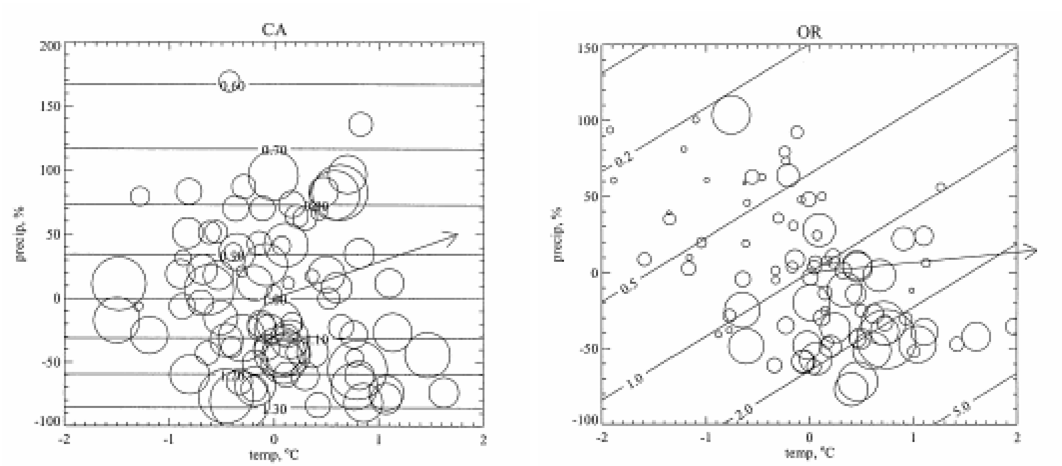
Curiously, the Petition cites Minnich et al. 2000 in support of the claim of a 300 year high-intensity fire rotation interval (Petition p. 51). The Minnich paper is based upon a study in Baja California of forest types thought to be similar to Sierra Nevada forests. This study found that "Stand-replacement burns (<10% surviving forest cover) were less frequent and even more localized, with patches cumulatively accounting for 16.2% of forests within perimeters" (Minnich et al. 2000, p 113). In addition, they found that trees were generally too widely spaced to support large stand-replacement burns and the stand-replacement burn patches were typically small. This study does not provide a similar example of the large contiguous areas of high severity fire that are currently occurring in the Sierra Nevada but rather supports the contemporary view that, historically, high severity fire occurred in smaller discontinuous patches distributed across burned areas.

2. Characterization of Changes in Fire Related to Climate Change (Petition pp 57-58)

The Petition's claim that there is likely to be a decrease in both fire activity and fire severity in the Sierra Nevada is surprising and contrary to the climate change and fire threat assessment literature. The Petition failed to acknowledge this robust contrary literature (for example, see Field et al. 1999; Flannigan et al. 2000 and 2005; Lenihan et al. 2003 and 2008; Running 2006; Westerling et al. 2006 and 2009; Westerling and Bryant 2008; Miller et al. 2009b; Spraklen et al. 2009; Gedalof 2011; National Research Council 2011; Pechony and Shindell 2010; etc.). Given the uncertainty in future climate modeling and the number of assumptions that must be made in making climate projections, a wide variety of modeling approaches and assumptions should be evaluated for convergence of outcomes as an indicator of robustness. The dominant published literature does not agree with most of the major findings regarding climate-fire relationships presented in the Petition.

The recently completed 2010 Assessment of California's Forest and Rangelands specifically evaluated climate change (California Department of Forestry and Fire Protection 2010). This assessment considered a variety of climate change scenarios and acknowledged the variability in global climate models (GCMs) regarding precipitation patterns, including the potential for an increase in precipitation through 2069 followed by a substantial decrease by 2099 (California Department of Forestry and Fire Protection 2010, p. 254 and 258). Their conclusion (p. 263), after considering the breadth of current climate science, is that "Recent research suggests that regardless of the climate model or emissions scenario an increase in wildfire is expected (Westerling et al., 2006). By mid-century the frequency of large wildfires is expected to increase by 30 to 50 percent, and could reach as high as 94 percent by 2085 under the A2 emissions scenario (Westerling, 2009)."

The Petition also appears to incorrectly interpret McKenzie et al. 2004 to indicate that an increase in summer precipitation will lead to "a likely overall reduction in fire in California's forests, even as temperatures increase (McKenzie et al. 2004 [Figure 1])" (Petition, p. 57). The methods used in the analysis by McKenzie et al. may not be particularly suited to evaluate climate-fire relationships in California as they used historical data to evaluate annual total acres burned by fires (1916-2002) and used statewide average summer temperature and precipitation anomalies for the period of June to August. Besides not differentiating between forest dominated fires of northern California from chaparral dominated fires in southern California, this method does not account for the autumn and winter Santa Ana wind anomaly which is not tied to summer temperature or precipitation. It is likely that the high variability across such a large state (over 9 degrees of latitude) resulted in the data in McKenzie's Figure 1 being "almost normally distributed" across the temperature and precipitation gradient (McKenzie et al. 2004, p. 894, see figures below). Note that for California, large fires (larger circles – but not scaled between states) have occurred in all quadrants around the centroid for temperature and precipitation, in contrast to Oregon where most of the larger fires have occurred under higher temperatures and lower precipitation. Contrary to the Petition's interpretation, McKenzie et al. simply found that using their analysis method, "fires in California and Nevada appear to be relatively insensitive to changes in summer climate and area burned in these states might not respond strongly to changed climate" (McKenzie et al. 2004, p 897). Even this conclusion by McKenzie et al. (2004) is erroneous, however. By combining northern and southern California data in their analysis, McKenzie et al. (2004) miss the very strong climate x fire relationships that exist in northern California (Miller et al. 2009b and 2012), and they cannot account for the extent of burning in southern California because they do not analyze fall climate conditions, which drive most large fire occurrence under the Santa Ana conditions.



Source: Figure 1 from McKenzie et al 2004 showing the distribution of annual area burned. Data for California is on the left and a comparison for Oregon is on the right. Each circle represents the area burned in 1 year positioned by the summer (June-August) temperature and precipitation anomaly (difference) for that year.

In addition, the Petition identifies a trend in increasing summer precipitation based upon historic weather observations using Western Regional Climate Center (WRCC) data (Petition, p. 57). While the trend is true, the Petition fails to indicate the magnitude of the increase. The table below shows the period change in recorded precipitation by month.

Normals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1931-60	4.07	3.79	2.93	1.69	.84	.32	.12	.17	.34	1.21	2.04	3.95	21.47
1941-70	4.16	3.25	2.76	1.83	.78	.31	.13	.22	.30	1.22	2.77	3.87	21.61
1951-80	4.35	3.32	2.72	1.67	.70	.28	.17	.29	.47	1.11	2.62	3.58	21.27
1961-90	3.77	3.28	3.13	1.52	.61	.27	.18	.35	.58	1.25	3.14	3.35	21.43
1971-00	4.15	3.95	3.55	1.40	.83	.32	.19	.30	.58	1.20	2.62	3.10	22.18

Source: Western Regional Climate Center: Average Statewide Precipitation for Western U.S. States, http://www.wrcc.dri.edu/htmlfiles/avgstate.ppt.html

While the trend does show a general increase in the July-Sept monthly statewide average, the general pattern of dry summer conditions prevails with no indication of fire "season-ending" rain events occurring during the summer months in the Sierra Nevada. The Petitioner focuses on the percent change in summer precipitation rather than the more important actual amount of precipitation. As anyone familiar with fire science knows, fire is affected by the live and dead fuel moisture levels. The marginal increase in actual precipitation in the summer months (0" in June, 0.07" in July, 0.13" in August, 0.24" in September) is likely to only affect fire behavior for hours to a few days following a precipitation event due to the overall drying of the larger dead fuels. This minimal increase in summer precipitation is insufficient to change the dominant Mediterranean climate pattern of hot and dry summers in California, particularly as the large fuels (100 hour and 1,000 hour fuels) continue to dry over the course of the summer. While these larger fuels do not directly contribute to the spread of fire, they contribute to the intensity (heat output), which can contribute to tree mortality and the large, dry down logs can become receptive to burning embers which start spot fires.

3. Characterization of Sierra Nevada Forest Plan Amendment (Petition pp 59-62; 64-69)

The Petition overstates the impacts of implementation of the Sierra Nevada Forest Plan Amendment (SNFPA) direction on National Forest System (NFS) lands. It overstates the difference between the 2001 SNFPA (USDA Forest Service 2001) and the 2004 SNFPA (USDA Forest Service 2004) by assuming maximal implementation of activities with the 2004 SNFPA rather than describing current rates of activity based upon actual implementation. The Petition also incorrectly assumes that the primary objective of the Forest Service is to eliminate all high-intensity fire. This is not true, but even if it was true, the petition illogically assumes that the Forest Service and our fire management partner agencies in California are likely to be successful at eliminating high severity fire in the near future.

Actual Implementation of Forest Management Activities Since 2000

The Forest Service annually records vegetation treatments in the nationally required **F**orest **AC**tivity **T**racking **S**ystem (FACTS) and the **T**imber **I**nformation **M**anager (TIM) and produces a Silviculture Accomplishment Report. A review of these data sources shows that from 2004 to 2010, the annual acres of vegetation management averages around 32,000 acres per year in the 10 National Forests in the Sierra Nevada portion of the Pacific Southwest Region (the Region). This work predominately includes a variety of forest treatment activities focused on removal of small and medium diameter trees as well as creation and maintenance of fuel breaks and does includes some post-fire salvage. This annual amount equates to 0.25 percent of the roughly 13 million acres of forested NFS land in the Region and is substantially less than the annual amount of treatment presumed to occur in both the 2001 and 2004 SNFPA decision documents.

These treatments removed approximately 193 million board feet of timber annually, which the Petition characterizes as “significantly increased logging.” However, this amount of timber harvest is similar to the amount that was presumed to be harvested under the 2001 SNFPA for the Sierra Nevada national forests, although the diameter of trees allowed to be removed is different between the two decisions as generally described in the Petition. Note, however, that the Petition’s portrayal of the 2004 SNFPA decision fails to recognize the additive and complementary nature of certain restrictions on allowable timber harvest prescriptions. The 2004 SNFPA decision is based upon a limiting factor approach to the parameters of basal area retention, canopy cover retention, canopy cover reduction, and upper diameter limit. Prescriptions are designed so that they meet the most limiting factor or combination of factors, with the end result that rarely is harvest to the maximum diameter of 30 inches dbh (76.2 cm) allowed (see Standard and Guideline #7, page 50 of the 2004 SNFPA Record of Decision for the list of design criteria that guide treatment prescriptions). The table below compares the acres and timber volume projected to be removed under the 2001 and 2004 SNFPA decisions with current and historic levels of activities. Importantly, the estimates of annual rates of timber harvest identified in the 2004 SNFPA are projections and neither authorizes nor compels any specific project to achieve it. From evaluating the actual implementation, the rate of timber harvest is less than half what it was prior to the 2001 SNFPA and is similar to the amount estimated for the 2001 SNFPA. Further, this amount of Annual Timber Harvest is expected to decrease somewhat with the expiration of the Herger-Feinstein Quincy Library Group Act in 2012, with those affected forests then following the same planning direction under the 2004 SNFPA that applies to the other forests.

SNFPA Projections	Average Annual Mechanical Treatment (Acres)	Average Annual Timber Harvest (Green and Salvage) (mmbf/yr)
Planned		
2001 FEIS, Mod 8	68,928	187
2004 SEIS, S1 (2001)	51,345	100
2004 SEIS, S2 (2004)	72,200	419
Actual		
LRMP (1990-2000)	88,524	556
2001 (2001-2003)	36,151	241
2004 (2004-2010)	32,287	193

Source: FACTS database (2004-2010); TIM reports; annual Silviculture Accomplishment Reports.

Extent of Post-fire Salvage Projects on National Forest System Lands

The 2004 SNFPA includes direction on evaluating and designing post-fire salvage projects in Standards and Guidelines (S&G) number 13 to 17 (USDA Forest Service 2004, ROD, pp 52-53). Specifically, S&G 13 calls for designing projects “to protect and maintain critical wildlife habitat” and provides a specific example of “(2) provide for sufficient quantities of large snags”. In addition, S&G 14 requires that on large fires (>= 1,000 acres of contiguous blocks of moderate to high tree mortality), "generally do not conduct salvage harvest on at least 10 percent of the total area affected by fire." As will be shown in the examples below, the percent of burned areas, including the percent of BBWO suitable habitat, actually left un-salvaged is typically much higher than 10 percent.

The Petition grossly overstates the extent of post-fire salvage harvest on National Forest System (NFS) lands by implying "100% removal of black-backed habitat 100% of the time on national forest lands outside of statutorily designated Wilderness Areas." From 2003 through 2010, about 294,000 acres of conifer forest types have burned on NFS lands in the Sierra Nevada in fires that were generally greater than 1,000 acres. Of these acres, approximately 30,000 acres (10 %) have had timber or salvage type activities after the fire. Further, when considering only high severity fire, about 20% of the approximately 109,000 acres have had post-fire timber or salvage type activities. About 6% of the approximately 76,000 acres of moderate severity fire areas had similar treatments. Therefore, the Petition is incorrect and the majority of burned areas on NFS lands are currently not salvage harvested. Note that vegetation burn severity records the difference in vegetation before and after the fire and generally shows areas of rock or unburnable fuels that are large enough to be captured by the sensor as unchanged.

Additionally, BBWO are a Forest Service Management Indicator Species (MIS) for the ecosystem component of snags in burned forest in the Sierra Nevada (USDA Forest Service 2007). As such, in addition to annual bioregional monitoring of BBWO habitat and population distribution, the National Forest Management Act (NEPA) documents for post-fire salvage and other post-fire vegetation management projects contain a discussion of the effects of the alternatives on BBWO habitat that will be directly affected by the management action (USDA Forest Service 2007, p.14).

Factual Errors Describing Moonlight-Wheeler, American River Canyon, and Angora Fires

Moonlight-Wheeler Fire (Plumas and Lassen National Forests)

The Petition makes factual errors in characterizing the Moonlight-Wheeler Fire Recovery and Restoration Project. The Petition incorrectly estimates that "about 61%" of the suitable BBWO habitat have been or will be salvage logged on public lands. The Revised Final Environmental Impact Statement (RFEIS) (USDA Forest Service 2009a) for the project includes a table and discussion (Table 67, pg 127) that clearly states:

> "Table 67 shows the cumulative amount of BBWO habitat remaining on public land. All proposed or ongoing fire-killed tree removal project acreage within the analysis area (**this project, two roadside hazard projects, and two smaller salvage projects) are accounted for in Table 67.** Approximately 12,397 of these acres under alternative A would become unsuitable after post fire-killed or roadside hazard tree treatments, leaving 20,172 cumulative acres of suitable BBWO habitat."

Thus, the project would affect 38% of the suitable black-backed woodpecker habitat on public lands and would leave approximately 62% un-salvaged, the opposite of what the Petition states. Additionally, although a total of 14,755 acres were authorized for salvage harvest in the Moonlight RFEIS, as of May 2012 (almost 5 years following the fire and almost 3 years following the project decision), only approximately 7,988 acres were actually salvage harvested, further increasing the amount of un-salvaged BBWO habitat over the estimates in the RFEIS (N. Francine, pers. comm.). The Petition also references a Frazier Fire Recovery and Restoration Project, but no such project existed in the Moonlight Fire area; although a 250-acre "Frazier Cabin Salvage" Categorical Exclusion (CE) was proposed at one time, it was dropped by the Forest (N.Francine, pers. comm.). The Moonlight RFEIS provides a history of post-fire planning that occurred in the fire area (USDA Forest Service 2009a, pp 4-5).

American River Complex fires (Tahoe National Forest)

A similar factual error occurs for the American River Complex fire. The 849 acres of suitable BBWO habitat proposed for salvage logging included the 164 acres that were part of a previous decision (Black Fork EA, USDA Forest Service 2009b, p. 76). Thus, the percentage of suitable habitat proposed to be affected was 39% rather than 46% as indicated in the Petition (p. 69). However, 226 acres proposed for salvage harvest were to be accomplished by skyline cable harvest methods. This portion of the project will not be completed, resulting in a reduced total of 623 acres (28%) of the 2,189 suitable habitat acres actually being salvage logged on public lands.

Angora Fire (Lake Tahoe Basin Management Unit)

The Petition incorrectly implies that the purpose for the Angora Fire Restoration Project is "for biomass production" (Petition, pg 68). The Environmental Assessment (EA) for the project provides two "Purpose and Need" statements for the project related to Fire, Fuels, Vegetation, and Forest Health: (1) Removing dead trees to reduce long-term fuel loading, and (2) reducing tree density to increase the resiliency of the remaining trees (Angora EA, USDA Forest Service 2010a, p. 1-11). The Angora EA (page 1-20) clearly states: "The prescriptions for dead tree removal and live tree thinning are based solely on fuels and forest health objectives as described in Chapter 2 and not on any value in the products removed." The entire fire area is in the Wildland Urban Interface, where management considers the short-term and long-term implications of vegetation, fuels, and habitat on fire threats to communities and critical infrastructure.

In addition, the Petition incorrectly states that "70% of all suitable black-backed woodpecker habitat on the Angora fire" will be removed "which equates to nearly all remaining suitable habitat on the entire LTBMU national forest currently…" The project EA discloses that 61.6% of BBWO habitat in the Angora fire area would be treated but when considering two other recent fires (Gondola and Showers) which were not treated, a cumulative amount of 53% of recently suitable habitat would be treated (USDA Forest Service 2010a, p 3.6-68). [*Note: BBWO were detected on both the Gondola and Showers fires by the BBWO bioregional monitoring in 2009 (Siegel et al. 2010) and in 2010 (Siegel et al. 2011); these fires were not part of the 2011 bioregional monitoring sample frame and, therefore, were not monitored in 2011*].

Further, the Petition incorrectly characterizes the treatments in the Angora Fire Restoration Project as "clearcutting (or close to it)" (Petition, p 68). The Angora Fire project EA clearly describes the retention standards for live trees and snags and discusses 12 Wildlife Snag Zones that are purposefully left untreated or with minimal treatment to provide for wildlife habitat. A simple visit to the Angora Fire area demonstrates that a very high density of snags has been retained for wildlife purposes.

Post-fire salvage in Inventoried Roadless Areas

The Petition states that the "Forest Service has often proposed, and occasionally implemented, intensive post-fire logging in Roadless Areas in California." (Petition, p. 69). A GIS query shows that there are 2.3 million acres of Inventoried Roadless Areas within the SNFPA plan area boundary. Since 2000, there have been around 251,000 acres affected by fires greater than 1,000 acres. The FACTS database (2004-2010) shows that there have been 3,700 acres of timber harvest type activities within the Inventoried Roadless Areas, with the majority (2,185 acres) being precommercial thinning activities, usually implemented in tree plantations. When specifically examining fires and FACTS data (2004-2010) in the Inventoried Roadless Areas, less than 300 acres have had timber harvest type activities following fires. The Petition is incorrect in suggesting that substantial portions of the Inventoried Roadless Areas have been subjected to post-fire timber harvest. Proposals to salvage burned areas in Inventoried Roadless Areas are evaluated on a case-by-case basis and would evaluate the impacts of salvage on BBWO. Proposals for salvage in roadless areas are unlikely as they are generally restricted to areas near existing roads (typically only along the perimeter as, by design, roadless areas generally do not contain roads) and the use of helicopter salvage harvest is unlikely due to economic costs. Roadless areas typically would have long haul distances to a mill, which, coupled with the high cost of helicopter logging, would generally exceed log values and would not likely be considered unless coupled with substantial adjacent salvage outside of roadless areas.

Timber Harvest Treatments in Old Forest Emphasis Areas (OFEAs)

The Petition characterizes that the 2004 SNFPA removed all protection for old forest emphasis areas and suggests that old forest emphasis areas (OFEAs) have little management direction or standards and guidelines that limit vegetation management. A simple geographic information system (GIS) query shows that in the 13.3 million acre Sierra Nevada Forest Plan area, there are 3.4 million acres identified as OFEA. Of the OFEA, 2.7 million acres are within the range map listed in the Petition for the BBWO. About 920,000 acres of this OFEA are in wilderness areas and an additional 710,000 acres of OFEA are in Inventoried Roadless Areas. Thus, despite the Petition's statement that few acres of the OFEA would have limitations on the harvest of trees, approximately 4.3 million acres (33 percent) are in wilderness and Inventoried Roadless Areas, where salvage is either prohibited (wilderness) or unlikely (Inventoried Roadless Areas).

The Petition states that "The 2004 SNFPA eliminated meaningful protection of OFEAs…" and presumes that substantial thinning projects have occurred in the OFEAs. Since 2000, there have been around 814,000 acres of NFS lands affected by fires greater than 1,000 acres. The FACTS database (2004-2010) shows that there have been about 115,000 acres of timber harvest type activities within the OFEAs, with the majority being of three activity types: 45,000 acres of pre-commercial thin (primarily used in tree plantations); 41,000 acres of commercial thin; and 11,000 acres of thinning for hazardous fuels reduction. An additional 14,000 acres are in activity types generally related to salvage, but could be a mixture of pre-fire salvage and post-fire salvage. When specifically examining fires in the OFEAs with FACTS data, about 45,000 acres have had salvage harvest type activities since 2004. Thus, approximately 1.3 percent of the OFEAs affected by fire have potentially had salvage harvest type activities since 2004.

Forest Service Emphasis on Ecological Restoration

The Petition incorrectly presumes that the objective of the Forest Service is to eliminate all high severity wildfire. Given the magnitude of the acreage managed by the Forest Service, as well as the practicality of accomplishing such an outcome, it is incomprehensible how the Petition can purport such a claim. In fact, there is ample evidence that the Forest Service recognizes that the desired fire regime for most of the Sierra Nevada includes a mixture of fire severity effects, including high severity fire (see for example, Sierra Nevada Ecosystem Project (SNEP) reports – especially Franklin and Fites-Kaufman 1996 and McKelvey et al. 1996 – and the 2001 and 2004 Sierra Nevada Forest Plan Amendments (USDA Forest Service 2001 and 2004)).

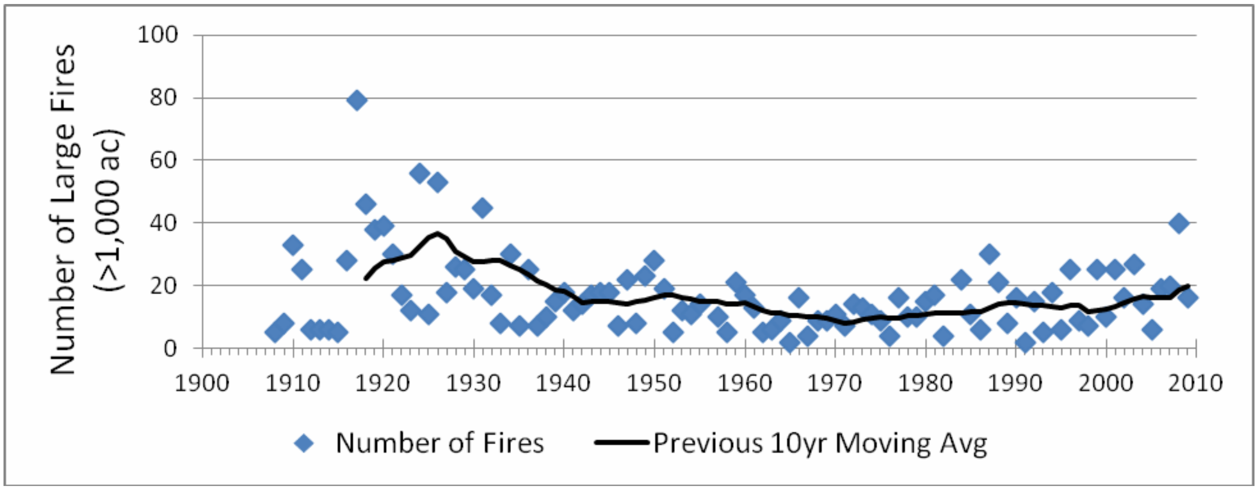
In addition, the Pacific Southwest Region of the Forest Service has recently issued a strong statement of Leadership Intent for Ecological Restoration (USDA Forest Service 2010b). The leadership intent outlines the expectations of the Regional Forester that all activities be anchored on maintaining and restoring ecosystems and key ecological functions. This includes considering the ecological role of fire and restoring fire to the landscape where practical and feasible. The Petition is correct that the Forest Service desires to reduce the impact of wildfires to communities and areas of human habitation. In addition, the Forest Service is concerned with the impact that large areas of high severity fire have to living old forest ecosystems. While the Petition is concerned with the creation of large areas of fire-killed old forest for habitat for the black-backed woodpecker, the petition fails to recognize the impact that large contiguous areas of high severity wildfire have on other species that are dependent upon living old forest conditions, such as the Pacific fisher, American marten, California spotted owl, and others.

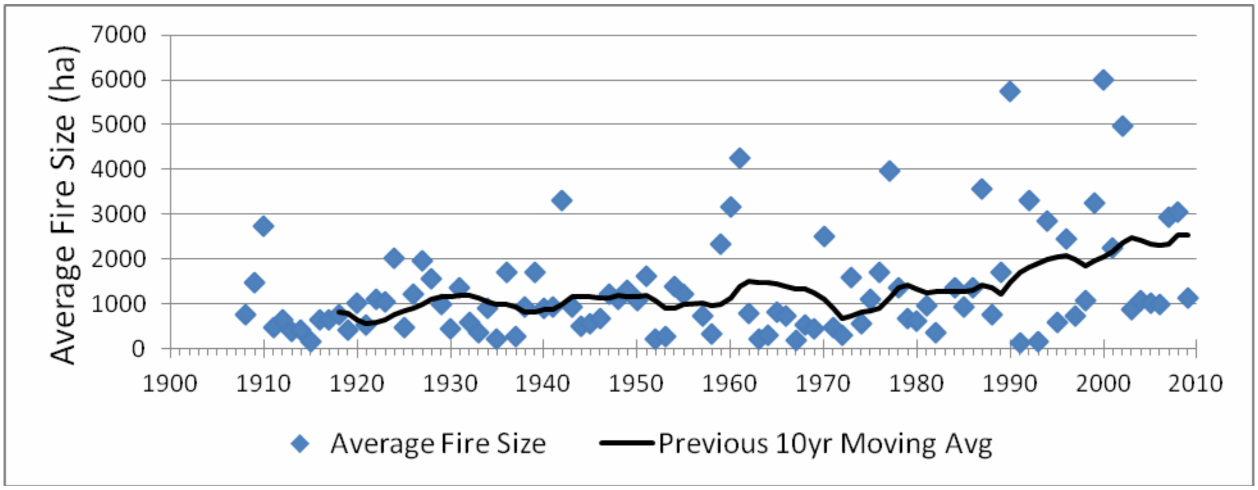
Forest Service 2010 Draft Supplemental Environmental Impact Statement (DSEIS)

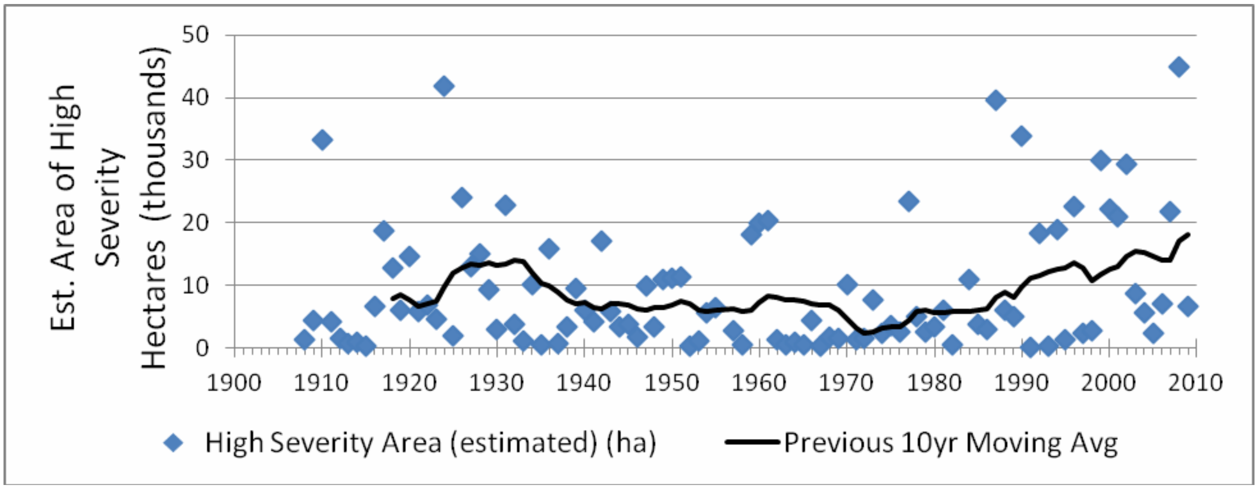
The Petition mischaracterizes the “Purpose and Need” and intent of the 2010 SNFPA DSEIS. The Purpose and Need is clearly articulated in the DSEIS as to “comply with two court orders” to “remedy a violation of NEPA relative to the analysis of alternatives presented in the 2004 Framework FSEIS by completing a narrowly focused SEIS by May 1, 2010” (USDA Forest Service 2010c, p 1). At the request of the Plaintiffs in that case, the District Court stayed the requirement that the Forest Service complete an SEIS by May 1, 2010. The 2010 DSEIS was primarily focused on evaluating modeling assumptions of the 2004 alternatives and equally comparing alternatives relative to several identified objectives. Contrary to the Petition statements, there is no “overt” “goal of eliminating high-intensity wildland fire” from the forested landscapes of the Sierra Nevada. Modeling for all alternatives indicate roughly between 45,000 acres to 75,000 acres of annual wildfire acres projected over time, with no alternative striving to achieve a goal of zero acres of wildfire. Besides being unrealistic and unattainable, a goal of zero acres of high severity wildfire contradicts abundant ecological knowledge recognized by the Forest Service on the ecological processes that are dependent upon a mixture of fire effects of various severities, including the necessity of the appropriate spatial and temporal distribution of patches of high severity fire. Thus, the Forest Service has no goal of eliminating high severity wildfire, except to the extent that the Forest Service does desire to reduce the risk and threat of adverse wildfire effects on the wildland urban interface and critical infrastructure.

4. Characterization of Immediacy of Threats from Management (Petition pp 46-54; 57-58)

The Petition expresses a concern that pre-fire thinning and active fire suppression is reducing the extent of high severity wildfire, which, if continued, will result in few, if any acres of forest land burning at moderate to high severity. This stated concern is not supported by the actual trends in number of fires, average fire size, and estimated area of high severity fire effects.







Source: Fire history database (fires >100 ha that occurred at least partially on National Forest System lands). Note that, since fire severity is only quantitatively mapped for fires in the last 30 years, the extent of high severity fire effects was estimated for all years as 37% of the fire area. This value is the average percent of high severity within National Forest boundaries for fires greater than 100ha that burned between 2000 and 2009. It provides a baseline for comparison but does not represent actual acres of high severity fire for any given year.

As can be seen, while the number of large fires per year has decreased from the period prior to 1930, the average fire size and the estimated amount of high severity fire has generally been increasing. Thus, despite a systematic change from intensive timber harvest to a program focused on fuels reduction since the early 1990's and an increase in fire suppression resources, trends in reduced wildfire effects are not yet apparent at the Sierra Nevada wide scale. This is due to the fact that a landscape change in fire behavior is not theoretically expected until fuels have been reduced on approximately 20-30 percent of the landscape, assuming a strategic pattern of treatments is employed (USDA Forest Service 2004). As shown in Section 3 above, for a variety of reasons, including delays in project planning and implementation from legal challenges, treatments across the Sierra Nevada generally remain well below 20 percent of the landscape.

Marlon et al. (2012) note that, given the levels of climate warming that have already occurred, it is remarkable how little wildfire is occurring in the western US. According to the authors, the contemporary disconnect between climate and fire activity – the product of fire suppression – is unprecedented in at least the last 1500 years (the time period of their sedimentary charcoal study), and they hypothesize that the success of suppression policies will erode as climates warm further and fuel continue to accumulate. Evidence documenting the eroding success of fire suppression is already apparent in much of the West, with multiyear patterns in fire activity, fire size, and total burned area all trending upward (Figures above; Westerling et al. 2006, Miller et al. 2009b, Dillon et al. 2011). Contemporary empirical data, patterns in the paleo-record during similar warming periods, and future modeling all suggest that tendencies toward increasing fire activity and impact will continue and perhaps accelerate, as both temperatures and fuel loads continue to increase (e.g., Miller and Urban 1999, Whitlock et al. 2003, Lenihan et al. 2003, 2008; Westerling et al. 2006, Westerling and Bryant 2008, Miller et al. 2009b, Gedalof 2011, National Research Council 2011).

5. Comments on Suggestions for Future Management (Petition p 70)

This section offers comments to the Suggestions listed in the Petition. Since the Suggestions are not fully developed, our comments are conceptual and not specific nor comprehensive. However, we feel it is important to clarify issues and concerns with these suggestions since CDFG's Evaluation report includes a conclusion that "generally agrees" that the suggested practices would benefit the species. As stated in the Purpose of this attachment, these statements of general agreement have the potential to be used out of context to imply full endorsement by CDFG of the statements, conclusions, and recommendations in the Petition. Given the difficulty of considering the stochastic and dynamic nature of fire and vegetation growth, there is considerable uncertainty whether the suggestions would provide a long-term sustainable supply of habitat for this species (e.g., by severely restricting post-fire management, particularly salvage harvest of mature and old forest stands burned at high severity, at what rate will these burned areas reforest and develop into replacement dense canopied mature forest habitat that can then re-burn to provide future BBWO habitat?). It is also problematic to evaluate suggestions for management for the black-backed woodpecker without considering how those practices might affect other wildlife species, including other federally and state listed threatened and endangered species. This is especially true given the habitat needs of other federally and state listed threatened and endangered species and state species of special concern that appear to depend upon large areas of living mature forest habitat, such as California spotted owl, Pacific fisher, and American marten.

Regarding Suggestions A, B, and C, decisions by land managers to leave burned areas and areas with insect-killed trees un-salvaged must be made at the site-specific level, considering the unique current and expected future conditions of the site and surrounding areas. This flexibility must exist because there are many considerations that the Forest Service and other land managers must take into account in making land management decisions, such as short-term and long-term safety to humans from falling trees required by the Occupational Safety and Health Administration (OSHA), as well as actions to trend burned or other snag dominated areas towards desired future conditions. Thus, Suggestions A, B, and C have practical and legal limitations that would make them difficult to implement in full on every acre of affected lands.

As the Evaluation notes, Suggestion D, to halt or greatly restrict fire suppression activities outside of the wildland urban interface, is unlikely to be implementable due to social and political resistance. In addition, the Forest Service must manage National Forest System lands considering a wide variety of resources. The impact of large areas of high severity fire on existing old forest habitat necessary for other wildlife species, such as the California spotted owl, northern goshawk, American marten and Pacific fisher, must also be considered when considering fire management strategies. In addition, concerns for firefighter and public safety and impacts on human health from smoke must weigh into strategic and tactical decisions on fire management.

The factors discussed above similarly influence Suggestion E, to halt fuels management not immediately adjacent to homes. Fuels management to influence the behavior and outcome of future fires is planned to achieve a variety of national forest management objectives, including the management of sustainable wildlife habitats and other ecosystem services. For example, fuels reduction is often planned adjacent to campgrounds and critical infrastructure like water canals and communication sites to reduce the threat and impacts from future wildfires.

Suggestion F, to prohibit insecticide use in forest habitats in the range of the species, does not link to an identified threat in the Petition and, as broadly described, could limit the ability to manage invasive or damaging species.

Thus, it is extremely difficult to make a blanket statement of agreement or disagreement with the Suggestions provided. While some of the suggestions could be incorporated on a site-specific basis, they would limit opportunities to provide for the broad suite of desired ecological conditions and ecosystem services if applied broadly. In addition, while some of the suggestions may be beneficial to BBWO in the short-term, they may be detrimental to the species in the long-term.

Items for March 24, 2011 letter

1. Classification of Mature Forest in California

Characterizing Sierra Nevada forests as “mature” based upon an 80 year age is problematic given the diverse tree species and forest types across the range of the Sierra Nevada. First, the definition of maturity for trees is highly contextual and could be taken to mean the age that a tree species generally begins reproducing or it could mean the age that a tree species generally begins to senesce where growth slows or elements of decadence begin to appear. Second, there is no direct relationship between the age of trees and use by BBWOs. While age class may be a general proxy for tree size, no study shows that BBWOs select for tree age independent of tree size.

2. Use of Unburned Forest

The intent here is not to debate the interpretation of scientific literature; however, the reliance on Hutto 2008 as a definitive study of burned and unburned forest use is improper. Hutto drew from a large landbird monitoring point count dataset and used about 13,000 point count sites supplemented with another 3,000 point count sites specifically within burned areas. Of these sample sites, about 3,000 sites that were “within and near sites that were burned in 2003 had an additional playback survey (Hutto 2008, pp 1828-1831)”. The paper does not disclose the distance that unburned areas were from burned areas but more importantly, it appears that only 20% of the sample (607 sites of 3,067 sites) was in the “unburned far” category. Thus, unburned areas were sampled much less than burned areas. The distance of unburned areas to the nearest burned areas and the year of that burned area could be important if individuals living in unburned forests are attracted to nearby burned areas as indicated in the Petition’s Migration section.

In addition, we now have data from California documenting BBWO use of unburned forests (Fogg et al. 2012).

3. Snag Levels in the Sierra Nevada

The letter on page 5 cites Christensen et al. 2008 for numbers of snags averaged across forested plots measured across the state. A more specific analysis for the national forests in the Sierra Nevada can be found in the Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report (USDA Forest Service 2010. In general, there has been a slight increasing trend in the number of medium and large snags (greater than 15 inches diameter at breast height).

Items from April 15, 2011 letter

1. Point Counts versus the "Callback" Method

The Petition fails to acknowledge the most recent published assessment of BBWO survey methodology and detection derived from the Forest Service monitoring data in the Sierra Nevada (Saracco et al. 2011). While acknowledging the potential drawbacks of the callback method, they state that their "analysis of detectability suggests that broadcast surveys may be important for reliably confirming the presence of Black-backed Woodpeckers at a survey point with any reliability" (Saracco et al. 2011, p. 14). They calculated that it would take at least nine visits to an occupied point to achieve a 90% change of detecting a BBWO using only a two-interval 5-min passive count technique compared to two visits using a callback or combination of passive and callback technique. The Petition relies on estimates of presence and absence from passive point counts in its calculations, which, based on the assessment from Saracco et al. 2011, may have not detected all BBWOs. The researchers conducting the Forest Service monitoring are currently exploring radio-telemetry studies to refine their analysis techniques using callback methods to be better able to extrapolate habitat use from callback detection data.

2. Green, Unburned Forest and Population Trend

As the CDFG Evaluation Report recognized, BBWO use of unburned forests must be considered in any analysis of population status and trend. PRBO Conservation Science recently analyzed BBWO detection data collected during 2009-2011 from unburned forests to determine occupancy patterns in unburned forest in the Sierra Nevada, using a Bayesian modeling approach (Fogg et al. 2012). Using occupancy results, they estimated that there are between 1398 – 6899 Black-backed Woodpecker uniquely occupied sites on unburned National Forest land in the Sierra Nevada (Ibid).

In addition, estimation of historic population status and trend related within burned forests should rely on scientifically valid fire data. The April 15 letter continues to erroneously compare the current area affected by high severity fire to an assumed historical amount based upon extrapolations and inferences from limited historical information rather than using trends in recorded fire severity data for the last 25 years. Further, the April 15 letter continues to erroneously presume that modern fire suppression is highly successful and is leading to a decline in high severity burned areas. As shown previously, the quantitative data shows that, despite modern fire suppression efforts, the area in of high severity fire in the Sierra Nevada continues to increase.

Finally, extreme caution should be used in simplistic estimation and extrapolation of potential population numbers and the extent of necessary habitat to support a viable population of this species given the paucity of biological data from the Sierra Nevada range. For example, using the parameters from the Petition for a minimum 1,250 pair population, and the Petition presumption about the density of BBWOs in high severity burned areas that declines over time, rough calculations show that on average over 53,000 acres would have to burn each year at high severity. Using the presumption of a 300 year high severity fire rotation interval from the Petition, this would require 16 million acres of forested land, an area larger than the forested area of the Sierra Nevada (13 million acres), especially considering that not all forested areas in the Sierra Nevada are in the contemporary species range or in potentially suitable vegetation types.

Items from June 17, 2011 letter

1. Role and Qualifications of Forest Service Employees

The June 17 letter infers that only individuals that publish original research on forest and fire ecology are working scientists, presumably to imply that the Forest Service employees may not be qualified to prepare agency reports. This notion of the lack of scientific publication by individuals diminishing their ability to interpret science and inform agency management is illogical and is contrary to common practice in both state and federal government.

2. Point by point rebuttals to items in the original May 11, 2011 Forest Service letter to the California Fish and Game Commission.

We have reviewed the comments and criticisms of our May 11, 2011, letter but, at this time, do not believe that providing additional comments on the points will be constructive to you given the stated intent of the Petitioners to respond to information you receive. Rather, we believe we have identified some of the differing interpretations regarding statements, opinions, and facts provided in the Petition as well as additional information we believe to be relevant to your evaluation of the status of the species.

Since many of the Petition concerns regarding threats to habitat involve Forest Service management direction, practices, and project planning and implementation, we offer to provide information from our various corporate data sources (vegetation and fuels treatments, project planning, fire severity, etc.) to facilitate your objective review of the habitat threats. We produce and make public an annual GIS file from our FACTS database of treatments, as well as an annual GIS file of fire severity for large fires (http://prdp2fs.ess.usda.gov/main/r5/landmanagement/gis). We can also provide reports on project planning from our PALS (Project Appeals and Litigation System) database upon request. Also, as the FACTS database contains many coded values, our staff can assist you with producing reports and queries and/or interpreting results upon request. Please feel free to contact Donald Yasuda (dyasuda@fs.fed.us, 916-640-1168) if you are interested in any of these reports or data layers.

In addition, we recommend that you consult with the expertise in fire ecology, fire science, and fire management that exists within the State in the California Department of Forestry and Fire Protection (CAL FIRE), particularly staff in the Forest and Resource Assessment Program (FRAP).

Summary

Given the Petition's substantial mischaracterization of (1) the threats to the black-backed woodpecker from potential reductions in high severity fire; (2) the management intents and actions on public lands managed by the Forest Service; and in particular, (3) the extent of public land post-fire treatments, we encourage the California Department of Fish and Game to carefully evaluate the information presented in the Petition related to the Degree and Immediacy of Threat (Petition, pp. 46-59) and Impact of Existing Management Efforts (Petition, pp. 59-69) and consider the information we have presented here in your 12-month review. Similarly, we encourage the Department to consider the balance between short-term and long-term consequences of the Suggestions for Future Management (Petition, p. 70) to more fully acknowledge that managing fire is highly complex. We also encourage you to evaluate the implementability and effectiveness of the Petition's suggestions for future management and consider the unintended or auxiliary consequences on other species and resources in the species range.

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National Fire Severity Mapping Programs Overview

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INTRODUCTION

Over the last decade or so, fire severity mapping through the use of satellite remote sensing has advanced from a research endeavor to being adopted as the primary methodology used operationally by the Federal land management agencies. This document provides an overview of the methods used by the three national programs that operationally produce fire severity map products and attempts to elucidate to the reader the differences between those map products. This document also provides an overview of the data collected by the US Forest Service (USFS), Pacific Southwest Region's landscape fire effects monitoring program, the only region-wide program of its kind in the USFS.

SATELLITE REMOTE SENSING OVERVIEW

First, a brief overview of satellite remote sensing technology and mapping methods used by the national fire severity mapping programs is necessary to provide the reader with a baseline of knowledge.

Attributes of Satellite Imagery

Due to the inherent nature of satellites, there are limitations to the types of fire effects that can be interpreted from satellite acquired images (Figure 1). The imaging sensors on satellites are similar to those found in typical consumer digital cameras. Just like digital photographs from consumer cameras, the resolution of satellite images is limited by the number and size of the sensor pixels. Pixel size of the satellite images most often used in fire severity mapping is 30 m, much too large to see individual trees. Therefore the satellite cannot distinguish between fire effects in the overstory and understory when tree canopies are sparse. On the other hand, since the satellite sensors are passive in nature and the images are acquired from overhead, the satellite cannot "see" under dense tree canopies (Key 2006). Finally, unlike consumer cameras that only record wavelengths visible to the human eye, the sensors aboard the Landsat satellites most often used for severity mapping also record near-infrared wavelengths that are sensitive to changes in chlorophyll, water content, soil substrate materials and ash cover. Preliminary image calculations for all three national fire severity mapping programs are identical. All fire severity map products are derived from combining wavelengths centered around two different near-infrared spectral regions in each image, and as a result the map products are primarily sensitive to changes in chlorophyll, but also soil substrate and ash cover (Key and Benson 2006a).

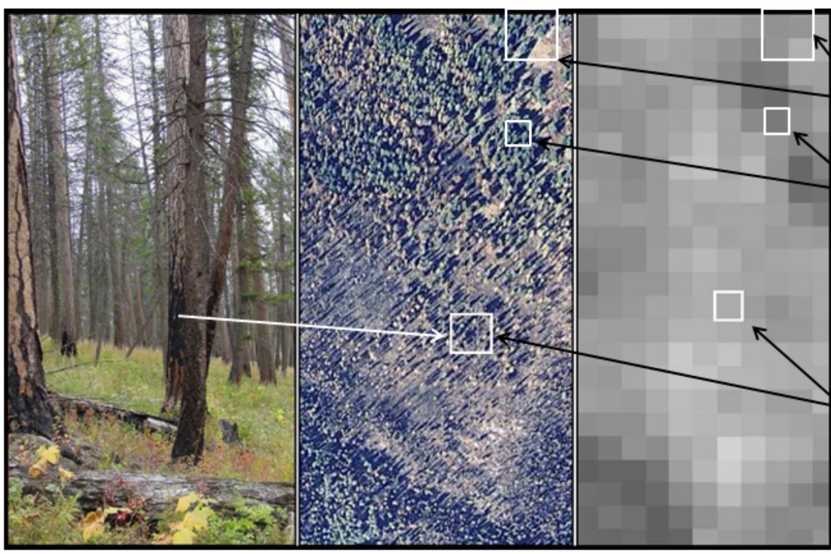

Figure 1. Satellite imagery limitations. From left to right, field photo taken about 1 year post-fire; color aerial photo 1 month post-fire; image using satellite data from1 month post-fire. White squares, denote approximate location of the site shown at left. (adapted from Key 2006).

Change Detection Mapping Methodologies

Each of the three national fire severity mapping programs primarily uses either an absolute or a relative change detection methodology to develop their maps. Change detection methodologies incorporate both pre- and post-fire imagery so that areas of little to no vegetation are not misinterpreted as high severity. Regardless of the change detection methodology used, resulting images have similar characteristics. Image values are positively correlated to "severity" (e.g. larger values indicate higher severity). However, image values in severely burned areas also vary in value depending upon ash cover and soil substrate material. Therefore when a manager is concerned with monitoring severity to vegetation, image values larger than that indicating total vegetation mortality are not necessarily meaningful.

Absolute change: the differenced Normalized Burn Ratio (dNBR)

Developed in the late 1990's, dNBR is an absolute change detection methodology (the resulting image is also referred to as a dNBR), calculated by subtracting a post-fire image from a pre-fire image (Figure 2; Miller and Yool 2002, Key and Benson 2006a). The most significant characteristic of data derived from the dNBR methodology is that they are correlated to the amount of pre-fire chorophyll (Miller and Thode 2007). For example, consider two different image pixels from regions that both experienced complete vegetation mortality, where one pixel was from an area with low pre-fire tree cover and the other from an area of high pre-fire tree cover (same species). The pixel where pre-fire tree cover was low would have a smaller value in the dNBR image than would the pixel from the area of high tree cover, yet both areas essentially experienced the same ecological effects (e.g. high severity). When a fire occurs in an area with relatively homogeneous live green vegetation cover this characteristic of the dNBR is not a problem. However, fires are not always that accommodating. The fact that the dNBR image is correlated to the amount of live pre-fire chlorophyll is a major disadvantage when deriving categorical maps (e.g. low, medium, and high categories) of severity to vegetation (Safford et al. 2008). Since the same dNBR value does not always represent the same level of severity between multiple fires due to differences in species and amounts of vegetative cover, each dNBR image must usually be individually interpreted. Although general image interpretation rules are followed, it is common practice for an image analyst to produce a categorical fire severity map by interpreting an image on a computer screen with no direct knowledge of ground conditions (MTBS methods at http://www.mtbs.gov/methods.html; Eidenshink, et al. 2007). As a result, dNBR derived categorical maps are subject to subjective evaluation and human error (Figure 3). Nevertheless, an experienced analyst can produce reliable and accurate severity to vegetation maps from dNBR in areas of homogeneous live green vegetative cover (e.g. Cocke et al. 2005, Wimberly and Reilly 2007, Picotte and Robertson 2011). In fires where vegetation is heterogeneous on the other hand, it is not always possible to produce an accurate map over the entire fire scar without first stratifying by a vegetation map (Miller and Yool 2002, Brewer et al. 2005, Miller and Thode 2007). Unfortunately, pre-fire maps that account for vegetation density do not always exist, and when they do they are not always used to develop severity maps.

The fact that dNBR is correlated to the amount of live pre-fire vegetation may be an advantage when mapping severity to soils. If the assumption can be made that fire intensity is higher in areas with higher vegetative cover, then the dNBR image may also be correlated to fire intensity and heating of soils (Parsons et al. 2010).

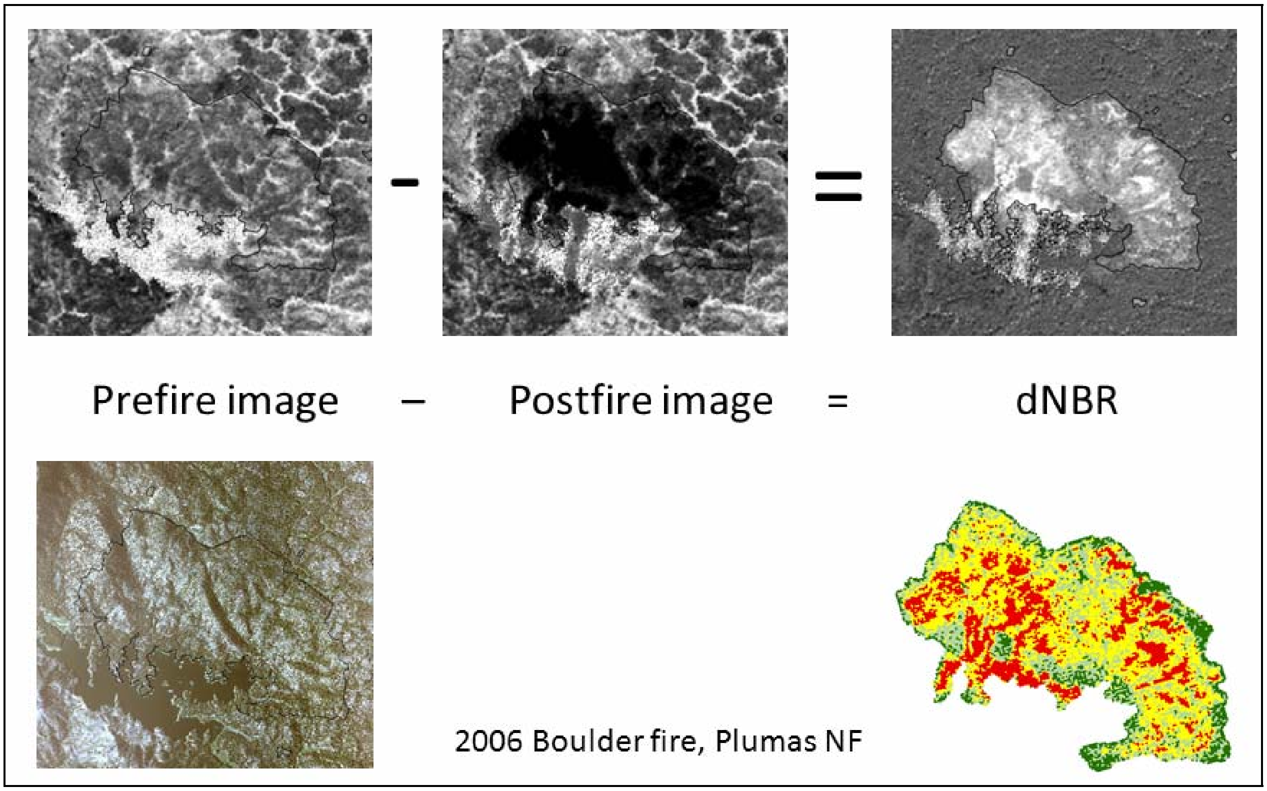

Figure 2. dNBR example: 2006 Boulder fire, Plumas National Forest, California. Images top left-to-right: pre-fire, post-fire and resulting dNBR image (small dNBR values are gray, large values representing higher severity are white). Bottom left image is a pre-fire aerial photo. Bottom right image is a categorical severity map derived from dNBR image at top right (green = unchanged/low severity, yellow = moderate severity, red = high severity; data from www.mtbs.gov published online Feb 2009, accessed Apr 2012). The Boulder fire occurred in conifer forest, primarily Douglas-fir and Jeffrey pine. Note the relationship of stand density in aerial photo to the pre-fire satellite image (top left), dNBR and categorical map.

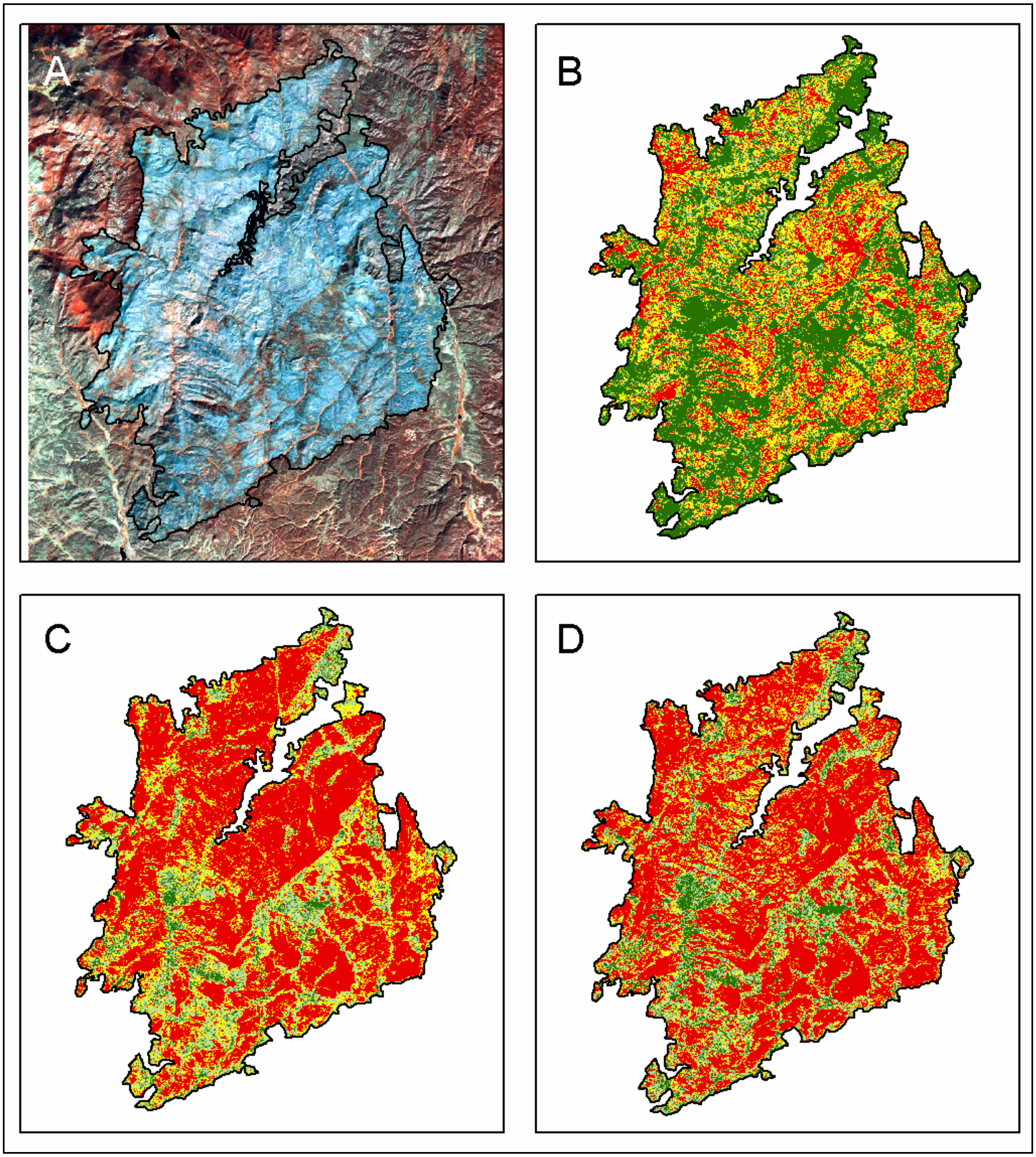

Figure 3. 2002 Hayman fire, Pike National Forest: Colorado's largest fire in modern history. A) Post-fire Landsat image dated Sept, 15, 2003. Live vegetation appears red, ash covered bare soil is blue. All categorical maps displayed are derived from this image. B) dNBR categorical map produced by the Monitoring Trends in Burn Severity (MTBS) program (www.mtbs.gov published online Oct. 2010, accessed Apr 2012). Severity categories based upon analyst

interpretation with a high severity threshold of 480 (values larger than the threshold are considered high severity). C) RdNBR categorical map (see following section) based upon regression analysis to field gathered plot data from California fires (Miller and Thode 2007) closely matches the actual severity seen in the Landsat image. D) dNBR map using a high severity threshold of 250 is more representative of the actual fire effects in comparison to B, and is similar to C.

Relative change: the Relative differenced Normalized Burn Ratio (RdNBR)

To solve the issue with using dNBR to map severity to vegetation in heterogeneous landscapes, Miller and Thode (2007) developed a relativized version of the dNBR (RdNBR). By dividing dNBR by a function of the pre-fire image, the dNBR image is converted into a ratio (Figure 4). As a result, RdNBR performs better than dNBR at depicting a consistent level of severity, e.g. stand-replacing fire will be classed as high severity regardless of stand density, or vegetation types of varying chlorophyll content (Figures 2 and 4). Image values between multiple fires also represent the same level of severity, allowing regional multi-fire assessments to be performed (Miller and Thode 2007, Miller et al. 2009a, Cansler and McKenzie 2012). Finally, since image values between fires represent similar severity conditions, calibrations to plot level severity measures can be made. Calibrations to RdNBR have been developed for the Composite Burn Index (CBI), percent change in canopy cover, and percent tree basal area using field data acquired in California (Key and Benson 2006b, Miller and Thode 2007, Miller et al. 2009a). The CBI, a field based protocol developed by the National Park Service and US Geological Survey to measure fire severity, relies exclusively on ocular estimates and as a result CBI estimates can vary depending on field observer (Korhonen et al. 2006). However, RdNBR calibrations based upon CBI plot data acquired in other locations across the western US are similar to those from California (Holden et al. 2007, Pabst 2010, Cansler and McKenzie 2012).

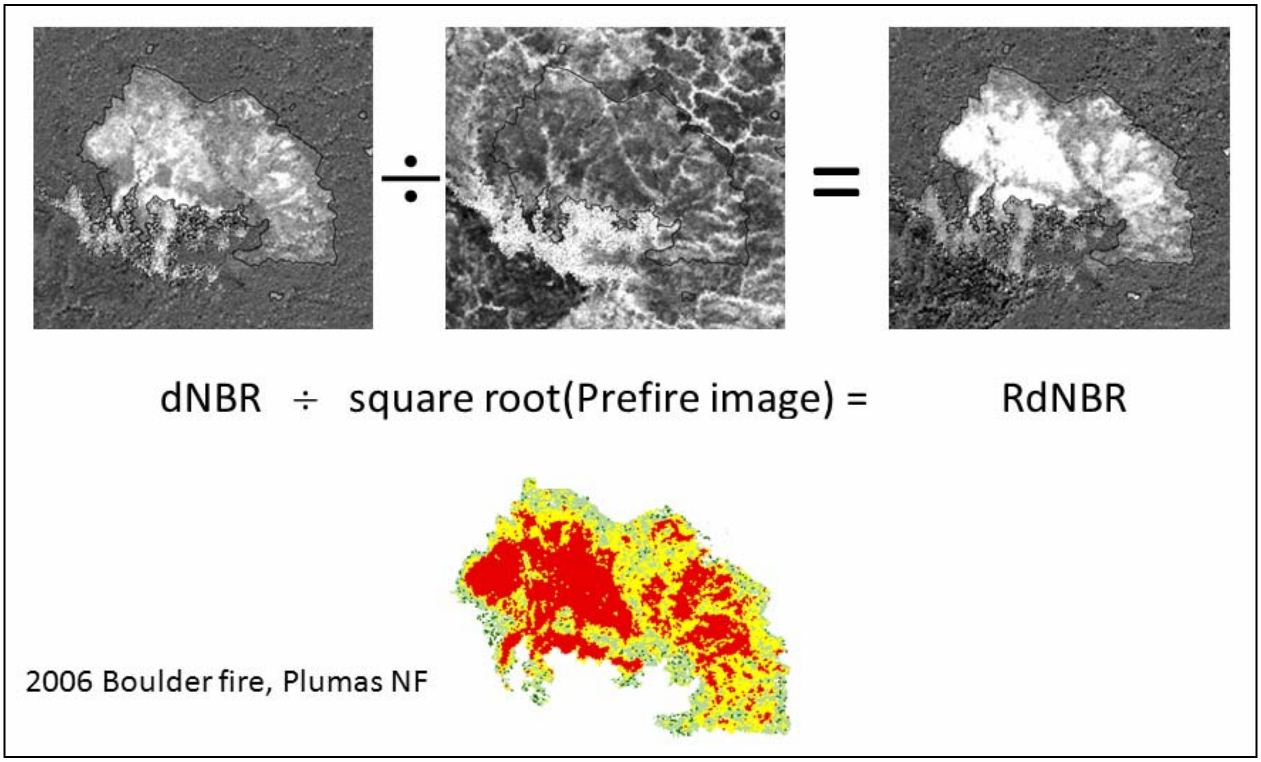

Figure 4. 2006 Boulder fire, Plumas National Forest RdNBR example. Images top left-to-right: dNBR, pre-fire image and resulting RdNBR image (dNBR and pre-fire images are same as Figure 2; small dNBR and RdNBR values are gray, large values representing higher severity are white). Bottom image is a categorical severity map derived from the RdNBR image at top right using thresholds based upon regression modeling to CBI field data [green = unchanged/low severity, yellow = moderate severity, red = high severity; the high severity threshold is approximately equal to 95% change in canopy cover ($R^2 = 0.56$, $P < 0.0001$; Miller et al. 2009a)]. Note the differences to Figure 2.

FIRE SEVERITY MAPPING PROGRAMS

Post-fire Image Timing

The missions of the three national level fire severity mapping programs are closely tied to the timing of the post-fire image acquisition in relationship to fire containment.

Rapid response

Post-fire imagery may be acquired before a fire's containment when the fire is still active and smoke is in the air. Due to the quick response time required for these types of assessment, Landsat imagery is not always available and imagery acquired by other satellites can be used. As a result, alternative methods may be used to produce a severity map.

Initial assessment

Post-fire imagery is acquired within the first couple of months after a fire's containment. These assessments are best for quantifying first order fire effects when final fire perimeters are most easily identified. These types of assessments are required when fires occur in areas of low and unpredictable precipitation, where vegetation is typically senescent or contains little chlorophyll (e.g. great basin) or areas where vegetation quickly recovers/resprouts after fire (e.g. chaparral systems). When containment dates are late in the calendar year (e.g. late September or later) satellite imagery may not fully capture fire effects in mountainous terrain due to low sun angles that leave north facing slopes in shadow. Therefore initial assessments do not always result in high quality severity maps.

Extended assessment

Post-fire imagery is acquired during the first growing season after fire containment. For most locations this equates to summer the year after containment. However, for areas like the southwestern US that experience late summer monsoons, imagery acquisition may be best in early fall. These assessments are generally preferred over initial assessments to allow for optimum image acquisition when sun angles are high and visibility is best. But, post-fire management actions, delayed mortality and/or vegetation recovery may be visible in the imagery, confounding the severity assessment.

Burned Area Emergency Response (BAER) – *Rapid response*

Within seven days of a wildfire's containment, BAER teams must produce a plan that assess immediate post-fire watershed conditions such as threats from flooding, soil erosion, and soil instability. A post-fire soil burn severity map is an important tool that assists BAER teams in prioritizing field reviews and locating burned areas that may pose a risk to critical resources within or downstream of the burned area (Parsons et al. 2010). BAER was the first national multi-agency fire severity mapping program to utilize satellite imagery and dNBR derived maps beginning in 2001 (Bobbe et al. 2003). The USFS Remote Sensing Applications Center (RSAC) produces dNBR maps for USFS BAER teams, while US Geological Survey's (USGS) Center for Earth Resources Observation and Science (EROS) datacenter produces maps for Department of Interior (DOI) agencies. Although dNBR maps theoretically have some correlation to severity to soils, maps produced by RSAC and EROS are not intended to be final soil severity map products. The map product provided to BAER teams by RSAC or EROS, referred to as a Burned Area Reflectance Classification (BARC), is not considered a soil severity map until it has been field verified by a BAER team and, if necessary, refined to better represent soil and ground conditions (Clark and Bobbe 2006, Parsons et al. 2010). BARC maps are archived and are available for download from the internet. However, final soil severity maps are usually only archived at the home units of where the fire occurred.

Rapid Assessment of Vegetation Condition (RAVG) - *Initial assessments*

The USFS in California began the Rapid Assessment of Vegetation Condition (RAVG) program in 2006 to support reforestation planning on USFS lands within the first 30 days of containment. Although the program is geared towards reforestation needs, the data produced by RAVG may also serve a variety of related agency objectives such as wildlife habitat analyses. Although the objective is to map fire effects to vegetation in fires that burn more than 1,000 ac of forested land on National Forest lands, special requests for smaller fires and other land ownerships are supported by special request. RAVG data products are RdNBR based severity to vegetation categorical and continuous map products calibrated to CBI, percent change in canopy cover, and percent change in basal area (Miller et al. 2009a). Summary statistics are generated through a geographical information system (GIS) process of overlaying severity data with terrain slope, vegetation type, and ownership and wilderness boundaries. In 2007 RSAC took California's methods and transitioned the program to a national scope and began mapping fires on all USFS lands across the US. All data are available and can be downloaded from the internet from either one of two websites: one website for California fires and another for the remainder of the US. Severity data from the two websites are processed using identical procedures, but the summary statistics are derived using two different vegetation datasets: CALVEG for California, and Landfire for the remainder of the US.

Monitoring Trends in Burn Severity (MTBS) - *Initial or extended assessments*

In 2005 the Wildland Fire Leadership Council sponsored the MTBS program as one element of a strategy for monitoring the effectiveness of the National Fire Plan and Healthy Forests Restoration Act (USDA-USDI 2000, Eidenshink et al. 2007). MTBS is jointly conducted by the USFS RSAC and USGS EROS. The project's original charter was to map the location, extent and burn severity of large fires on all lands (fires > 1,000 ac in the western US and fires > 500 ac in the eastern US), regardless of vegetation type, ownership or ignition source, throughout the United States from 1984 through 2010. Currently, funding is expected to continue into the foreseeable future. Severity data are primarily based upon extended assessments except grasslands, non-sprouting shrublands, and Florida forests are mapped with initial assessments. Categorical maps of severity are based upon the dNBR and are derived using the same methods as used for BAER (e.g. analyst interpreted categories). As a result MTBS categorical maps are subject to human judgment and may not present a reliable representation of fire effects to vegetation when fires occur in heterogeneous landscapes (Figures 2, 3 and 4). The non-categorical dNBR and RdNBR data produced by MTBS are also available from their website which advanced users can use to produce their own categorical severity maps.

USFS Pacific Southwest Region Landscape Fire Effects Monitoring Program

In 2002, the USFS Pacific Southwest Region initiated a landscape fire effects monitoring program (LFEMP) to support implementation of the 2001 Sierra Nevada Forest Plan Amendment, also known as the "Framework". The LFEMP's objectives were to monitor the status of wildland fires and fire regime parameters, such as severity, to answer specific questions posed by the Framework. The original charter of the LFEMP has since been expanded and currently the project's scope covers all USFS lands in California. Although the LFEMP has always worked closely with RSAC and their BAER and MTBS fire severity mapping programs, the LFEMP determined early on that the BAER and MTBS dNBR mapping methods were not adequate to fulfill requirements necessary for region-wide assessments in heterogeneous landscapes like the Sierra Nevada. As a result, the LFEMP developed the RdNBR methods (Miller and Thode 2007). The LFEMP currently maintains a GIS database for USFS fires in California by gathering data produced by the RAVG and MTBS programs at the end of each calendar year, and producing fire severity data calibrated from field data in units of CBI, percent change in canopy cover and percent change in basal area. As a result the LFEMP fire severity database contains initial and/or extended assessments for most USFS fires larger than 1000 ac since 1984. In addition, the LFEMP fire severity database contains many fires smaller than 1,000 ac and initial assessments of larger fires which were never mapped by either RAVG or MTBS. The severity data based upon the CBI calibration, which has been used by the LFEMP program in all of their published papers (e.g. Miller et al. 2009b, Miller et al. 2012), is available on the web at the USFS Pacific Southwest Region's geospatial data webpage.

RELAVENT WEBSITES

BAER: http://www.fs.fed.us/eng/rsac/baer/

USDA Forest Service Pacific Southwest Region Rapid Assessment of Post-Fire Vegetation Conditions (RAVG): http://www.fs.fed.us/r5/rsl/projects/postfirecondition/

USDA Forest Service National Rapid Assessment of Post-Fire Vegetation Conditions (RAVG): http://www.fs.fed.us/postfirevegcondition/index.shtml

Monitoring Trends in Burn Severity (MTBS): http://mtbs.gov/

USDA Forest Service Pacific Southwest Region's geospatial data: http://www.fs.usda.gov/wps/portal/fsinternet/main/r5/landmanagement/gis

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6/1/12

California Department of Fish and Game
Nongame Wildlife Program
Attn: Ms. Lyann Comrack
1812 9th Street
Sacramento, California 95811
Email: BBWO@dfg.ca.gov

Dear California Department of Fish and Game,

On behalf of the Center for Biological Diversity and the John Muir Project of Earth Island Institute I am submitting the following comments in support of the Petition to list the Black-backed Woodpecker (*Picoides arcticus*) as threatened or endangered under the California Endangered Species Act. I have a Ph.D. in Ecology from the University of California at Davis with a research focus on forest and fire ecology in Sierra Nevada forests, and a particular focus on Black-backed Woodpeckers.

<u>Dangerously Small Size of the California Population</u>

Burned Forest Habitat

According to the data from the U.S. Forest Service's own report, based upon extensive field surveys in post-fire habitat within the Black-backed Woodpecker's range in California, "approximately 37,183 ha [hectares] (i.e., 20.5%) of the 181,381 ha of burned forest on the ten national forests within our sampling frame were occupied by Black-backed Woodpeckers in 2011..." (Siegel et al. 2012a). This is based upon hundreds of point counts and playback surveys, and includes not only unlogged moderate- and high-severity fire areas, but also low-severity fire areas, as well as moderate- and high-severity fire areas that have been subjected to post-fire logging, for fires spanning a 12-year post-fire period, 1999-2011 (Siegel et al. 2012a). Within occupied post-fire forest, Black-backed Woodpecker nest density averages 10 pairs per year across 60 plots, each of which is 20 hectares in size, i.e., approximately one pair per 120 hectares, according to data from another U.S. Forest Service report (Burnett et al. 2011, pp. 9 and 13, and p. 26 Table 2). Adjusting for an estimated 20% rate of missed nest sites (Burnett, pers. comm. 2010), there is approximately one Black-backed Woodpecker pair per 100 hectares of post-fire forest. This figure is likely to be optimistic, and the true density may be significantly lower than this, given that the data is heavily weighted toward very recent fires (45 of 60, or 75%, of plots occurring in recent fires, 2-year and 3-years post-fire, at which peak Black-backed Woodpecker density is found [Saab et al. 2007, Siegel et al. 2011]) that have not been subjected to post-fire logging (50 of 60 plots, or 83%, unlogged) (Burnett et al. 2011). Thus, even using figures that are likely to be unrealistically optimistic (i.e., likely to overestimate Black-backed Woodpecker numbers), within the 37,183 hectares of occupied post-fire forest in California, there are only 372 pairs. This is based upon the same methodological approach used by the report for the U.S. Forest Service in 2010 (Siegel et al. 2010)—i.e., occupied post-fire area divided by pair density per unit of area—but is updated to include the current total of post-fire area and post-fire nest density figures from the Sierra Nevada, which were not available at the time Siegel et al. (2010) was released.

Unburned Forest

A report for the U.S. Forest Service on Black-backed Woodpecker occupancy in unburned forests of the Sierra Nevada, using an approach similar to that used for the U.S. Forest Service's monitoring of this species in post-fire forest (i.e., a combination of point counts and playback surveys), concluded that 5% of unburned montane conifer forests are occupied by Black-backed Woodpeckers in the Sierra Nevada, based upon observed data from thousands of field surveys (which found about 1% occupancy per survey) after being adjusted dramatically upwards by a series of modeling assumptions (Fogg et al. 2012, p. 16). As discussed below, there are reasons to believe that the untested modeling assumptions used to make the large upward adjustment in annual occupancy up to 5% are unrealistic, resulting in a substantial overestimation of occupancy in unburned forest. However, even if we assume that this modeling reflects biological reality, and that 5% of unburned forests are occupied by Black-backed Woodpeckers, this is still a very small portion of the unburned forest landscape, which would support a very small number of Black-backed Woodpecker pairs. For instance, there are approximately 2,742,664 hectares of montane conifer forest and subalpine forest in the Sierra Nevada (USDA 2001, Volume 2, Chapter 3, Table 3.1f), and 5% of this total is only 137,133 hectares. In occupied unburned forests, even with extraordinarily high levels of snag density, Black-backed Woodpecker home ranges are very large—far larger than they are in occupied burned forest. Radiotelemetry data gathered by a study conducted for the U.S. Forest Service in 2011 found that the two Black-backed Woodpecker home ranges that were mostly in unburned forest (B777 and B222) were far larger than the home ranges in burned forest (Siegel et al. 2012b). Specifically, the average of the best result from three different methods used to estimate home range size for these two territories was 596 hectares per home range, with only about 5% average overlap between the two (Siegel et al. 2012b, Figure 9 and Tables 1 and 2). Adjusting for this small overlap, the result is 566 hectares. Thus, in the 137,133 hectares of unburned forest that the large upward modeling adjustment estimates is occupied by Black-backed Woodpeckers, there would be only 242 pairs (137,133 hectares divided by 566 hectares).

However, the large departure of the modeling estimate of occupancy in unburned forest from the observed data suggests a need for empirical testing of modeling assumptions in order to avoid potential overestimation of occupancy in unburned forest. For example, in the Black-backed Woodpecker surveys in unburned forest, there were 472 transects in 2011, with 5 point count stations and one playback survey in each transect—and each survey point location was visited about 1.5 times in 2011 (Fogg et al. 2012, pp. 4-5), for a total of 3540 individual point counts and 708 playback surveys. Yet, in well over 4,000 individual surveys, there were only 44 total detections in 2011 (Fogg et al. 2012, Appendix 1), only about 1% overall per survey, and about three-quarters of these were within 3,000 meters of a fire area (Fogg et al. 2012, Appendix 1)—well within the distance that equates to a home range width for a Black-backed Woodpecker that is nesting within a fire area, but which has a home range that extends mostly beyond the fire perimeter (Siegel et al. 2012, Fig. 9). The increase in estimated occupancy caused by the modeling assumptions resulted in large part from the assumptions made regarding detection probability, which the model assumptions estimated to be low—only about 18% and 32% for point counts and playback surveys, respectively, in unburned forest (Fogg et al. 2012, p. 11). Thus, in essence, the model assumes that, for every Black-backed Woodpecker detected, there are several that are present but elude detection. No doubt there is always some percentage of birds that are missed. However, such a small detection probability, which leads to such a large disparity between observed and modeled results, is cause for concern. This would not be an issue if there were empirical data indicating the proportion of birds missed in surveys despite their presence, but such empirical data were not gathered to calibrate the model in Fogg et al. (2012), or in Saracco et al. (2011), which was relied upon by Fogg et al. (2012). Rather, probability of detection was based upon assumptions regarding detection versus non-detection (Saracco et al. 2011, Fogg et al. 2012); thus, even if, in reality, over 80% of the present birds were in fact detected, the model would nevertheless still indicate that most birds were being "missed" by surveyors, creating the potential for substantial overestimation of Black-backed Woodpecker numbers. This is exacerbated by the fact that the model used assumed that lower detections for point counts, relative to playback surveys, were the result of far lower detection probability for point counts (Saracco et al. 2011, Fogg et al. 2012). However, the model used did not account for the fact that point count detections operate only within a maximum feasible radius of about 130 meters, while playback surveys (loud recordings of Black-backed Woodpecker calls) draw Black-backed Woodpeckers to the observer from several hundred meters away (Siegel et al. 2008, Saracco et al. 2011). Because playbacks draw birds from a much larger area than point counts, it is necessarily true that more birds would be detected through playbacks per individual survey—even if the actual (not modeled) probability of detection was the same for each type of survey.

Moreover, the great majority of detections in the U.S. Forest Service's surveys discussed above, in both burned and unburned forest, are auditory, rather than from visual confirmation, which can cause an overestimation of birds through misidentification, particularly for rare species (Farmer et al. 2012). This is exacerbated by the fact that the Forest Service's surveys have an unlimited distance for detections (Saracco et al. 2011, Siegel et al. 2011, Fogg et al. 2012, Siegel et al. 2012a), and misidentification of species increases dramatically beyond 70 meters from the observer, particularly for species with similar calls (Simons et al. 2007 [Fig. 5B]), such as the Hairy Woodpecker, which is far more numerous than the Black-backed Woodpecker (Burnett et al. 2011 [Table 1], Siegel et al. 2010 [Table 5]). Since Hairy Woodpeckers are far more numerous than Black-backed Woodpeckers, species misidentification of each at increasing distances from the observer would heavily result in overestimation of Black-backed Woodpeckers (e.g., if the actual number of Black-backed Woodpeckers and Hairy Woodpeckers present is 10 and 100, respectively, a 20% species misidentification rate for each—i.e., if Black-backeds are misidentified as Hairies 20% of the time, and Hairies are misidentified as Black-backeds 20% of the time—would result in observers recording a total of 28 Black-backed Woodpeckers—i.e., a nearly three-fold overestimate relative to actual—and 82 Hairy Woodpeckers). This is a particular concern with regard to the Forest Service's surveys in unburned forest, given that observers actually conducted a Hairy Woodpecker playback survey prior to conducting Black-backed Woodpecker surveys, thus drawing Hairy Woodpeckers into the area (Fogg et al. 2012, pp. 4-5).

Overall Population—Burned and Unburned Combined

In summary, even using estimates that are likely to be unrealistically optimistic, there are approximately only 372 pairs of Black-backed Woodpeckers in burned forest and only 242 pairs in unburned forest in California (and, as mentioned above, most of the detections in unburned forest are within a home range width of a fire perimeter), for a combined total of only 614 pairs. This is far below the minimum population threshold needed to avoid a significant risk of extinction (3400 adults, or about 1700 pairs), as identified by the most recent conservation biology meta-analyses (Traill et al. 2007, Traill et al. 2010).

Moreover, we know from recent genetic analyses that the geographically isolated Black-backed Woodpecker population in the Oregon Eastern Cascades and California is genetically distinct from the Rocky Mountain/boreal population, and that this distinction is at the level of subspecies (Pierson et al. 2010). However, there are also significant gaps in habitat between the Oregon Eastern Cascades and California, including large areas of lava fields, pinyon/juniper forest (which is not used by Black-backed Woodpeckers [Siegel et al. 2008]), and huge meadow/wetland areas—often 10-20 miles across each. Therefore, there is reason to believe that the California population may also be genetically distinct from the population in the Oregon Eastern Cascades, but that data and analysis is not final yet. Even if there is no significant gene flow barrier between Oregon Eastern Cascades and California, this would change things little with regard to the dangerously small population size, since there are only 52,681 hectares of post-fire forest in the Oregon Eastern Cascades over the past decade within the range of the Black-backed Woodpecker, and only about 21%, or 11,063 hectares, can be expected to be occupied by Black-backed Woodpeckers (Siegel et al. 2012a), equating to only about 111 pairs of Black-backed Woodpeckers, using our optimistic estimate above of one pair per 100 hectares. And, there are 2,288,217 hectares of unburned forest in the Oregon Eastern Cascades within the Black-backed's range. So, even if the optimistic modeling assumption of 5% occupancy in unburned forest is used, as discussed above, this equates to only 114,411 hectares of occupied unburned forest, or only about 202 pairs of Black-backed Woodpeckers, using the optimistic estimate above of one pair per 566 hectares in occupied unburned forest. So, even if the Oregon Eastern Cascades population is considered, this wonld still bring the cumulative total in both states, in both burned and unburned forest, to a little over 900 pairs—far below the minimum thresholds needed to avoid a significant extinction risk (Traill et al. 2007, Traill et al. 2010).

Unburned Forest—Purcell Data

In its initial review of the Black-backed Woodpecker petition, the California Department of Fish and Game (DFG) cited unpublished data from Kathryn Purcell, who found several active Black-backed Woodpecker nests in a small area of unburned lodgepole pine and red fir forest during several years of surveys (1995-2002). However, Kathryn Purcell did not gather forest structure data in her surveys. I digitized her map of the locations of these Black-backed Woodpecker nest sites in unburned forest near Courtright Reservoir on Sierra National Forest, and I surveyed these locations on May 30, 2012. I found that these sites are old-growth/ancient red fir and lodgepole pine forest with extraordinarily high basal area of both live trees (200-400 square feet per acre, and higher on some sites, which I measured in periodic 1-acre square plots, using a laser hypsometer to gauge distance, and counting the number of live trees 12-24, 24-40, and 40-60 inches in diameter at breast height) and snags (averaging 63 square feet per acre, with a range of 21 to 105 square feet per acre, in Decay Class 2 through 4 alone, which I measured in periodic 0.70-acre circular plots, using a laser hypsometer to gauge distance, and counting the number of Class 2 through 4 snags 12-24, 24-40, and 40-60 inches in diameter). I restricted my assessment of snags to Decay Class 2 through 4 in order to exclude the recent (Class 1) and very old (Class 5 and 6) snags that did not yet exist (Class 1) or were already too old and decayed to likely be relevant and useful to Black-backed Woodpeckers (Class 5 and 6) at the time Kathryn Purcell's surveys were conducted in 1995-2002 (Raphael and White 1984). I used U.S. Forest Service Forest Inventory and Analysis (FIA) fixed field plot data (http://www.fia.fs.fed.us/tools-data/) to assess the rarity of such high snag basal area levels across the unburned forest landscape of the Sierra Nevada within montane conifer forest types used by Black-backed Woodpeckers. Less than 4% of the FIA plots had snag basal area over 30 square feet per acre—even including all Decay Classes. None of the unburned forest plots had snag basal area over 50 square feet per acre. To be clear, this does not mean that there are no stands with over 50 square feet per acre of snag basal area in unburned montane conifer forests of the Sierra Nevada; rather, it means that it is so extremely rare on the landscape that it is not represented in FIA plots, which have a frequency of roughly one plot per 6,000 acres of forest. Given the extraordinarily high levels of snag basal area in this very rare type of unburned forest, which is clearly related to competition mortality from extraordinarily high live tree basal area in these old-growth/ancient stands, it is little wonder that some Black-backed Woodpeckers were nesting there. This is so because the levels of snag basal area in these rare ancient forest stands surveyed by Kathryn Purcell are as high as the snag basal area levels in some of the mature forests that recently burned at moderate- to high-severity levels, and in which Black-backed Woodpeckers have been found successfully nesting (Siegel et al. 2012b). However, any attempt to extrapolate these high-density old-growth/ancient forest conditions, with their extraordinary snag basal area levels, to the rest of the unburned forest landscape would be a serious misrepresentation of current unburned forest conditions. I have included some photos of these unburned sites near Courtright Reservoir as **Appendix A**.

Lack of Protection for Black-backed Woodpeckers and Their Habitat

Extreme Rarity of Moderate to High Quality Black-backed Woodpecker Habitat on the Landscape

I used the U.S. Forest Service's own fire severity data (www.mtbs.gov; http://www.fs.fed.us/postfirevegcondition/) to determine the proportion of the Sierra Nevada forest landscape that is currently moderate to high quality Black-backed Woodpecker habitat, based upon the amount of recent moderate- to high-severity fire in montane conifer forests (using a lower RdNBR threshold of 574, which equates to approximately 40-100% mortality, from Hanson et al. 2010). I found that only 1.2% of the montane conifer forests of the Sierra Nevada have such post-fire habitat for fires 1-10 years post-fire. However, as Siegel et al. (2011 [Fig. 15a]) found, Black-backed Woodpecker occupancy declines dramatically after about 5 years post-fire. Focusing only on moderate- to high-severity fire that is no more than 5 years post-fire, such habitat comprises only 0.6% of the Sierra Nevada forests; moreover, only 12% of this habitat is within the protected forest landscape (Wilderness Areas, National Parks, Inventoried Roadless Areas, and Wild and Scenic River Corridors). Therefore, a significant portion of the recent moderate- to high-severity fire areas have already been severely salvage logged, and are no longer habitat; thus, the actual figure for current moderate to high quality habitat is significantly lower than 0.6% of the landscape. As the Petition discusses in detail, there is a profound lack of regulatory protections currently for such habitat on both national forest lands and private lands.

Logging of Active Nest Stands, with Chicks in the Nest, in the Angora Fire Area, 2012

Illustrating not only the profound lack of protection for Black-backed Woodpeckers and their habitat, but also the U.S. Forest Service's disregard for this species, the Forest Service began its 2012 logging operations to complete the Angora post-fire logging project in mid-May of 2012 within the southern portion of the Angora fire area, just southwest of Lake Tahoe. Environmental plaintiffs (John Muir Project and Center for Biological Diversity) in the legal case against the Forest Service over the logging project (a decision is currently pending in the U.S. Ninth Circuit Court of Appeals) notified the Forest Service that they had found two active Black-backed Woodpecker nest sites in the largest unit remaining to be logged—a unit that the Forest Service had begun logging just days earlier. Plaintiffs asked the Forest Service to delay logging for several weeks—at least until the chicks in the nests could fledge (fly) and escape the logging. The Forest Service refused and continued logging closer and closer to the nest trees. Only after environmental groups had begun calling the Forest Service to oppose this, and after the Associated Press ran a story (on May 31, 2012, story by Scott Sonner) exposing this mercenary tactic, did the Forest Service begin to equivocate somewhat. Even then, though, as of this afternoon the Forest Service said that the most it is willing to do is to temporarily forego logging in 10-12 acres surrounding nest trees, and an additional 25 acres within 1/4-mile of the nest tree—a mere 35-37 acres per pair of nesting Black-backed Woodpeckers. This is far less than the amount of post-fire habitat needed to sustain a pair of Black-backed Woodpeckers (Siegel et al. 2012b), which means that there is a high likelihood that, if the extreme noise and disruption of ground-based logging within 100-200 meters of the nest trees does not cause nest abandonment (which it very well could), there is likelihood that the logging will cause subsequent nest failure, and starvation of the chicks, due to lack of food, as the woodpeckers will not have enough beetle larvae to survive due to removal of most snags in their home ranges. Indeed, the Forest Service already knows that leaving only islands of 40-60 acres of unlogged post-fire habitat will not provide nearly enough suitable habitat to maintain Black-backed Woodpecker presence, given that this was attempted in the post-fire logging of the 2004 Freds Fire on the Eldorado National Forest (USDA 2005), and all subsequent surveys, including my own each year since the logging, have failed to find any Black-backed Woodpeckers (Siegel et al. 2010). I have attached photos of the Black-backed Woodpeckers at the nest tree that we have located thus far in the current logging unit—i.e., the nest tree closest to the ongoing logging (**see Appendix B**).

The John Muir Project informed the Forest Service that we will attempt to find the nest tree of a second pair of Black-backed Woodpeckers in the unit scheduled for logging currently, but the Forest Service's response was to implement a "closure order", threatening to arrest me or any other JMP staff or volunteers who attempt to find any more Black-backed Woodpecker nests.

Greatly exacerbating this threat is the fact that, as of the summer of 2011, the Forest Service is now claiming that its existing forest plans in the Sierra Nevada do not require the agency to maintain viable populations of native vertebrate species—even Management Indicator Species like the Black-backed Woodpecker. The Forest Service is arguing that it can, through its logging projects, remove suitable habitat without determining whether the amount of habitat retained is enough to maintain viable populations and, even if it is not, the Forest Service claims that it can log the habitat anyway. In short, the Forest Service is now refusing to uphold this vital safety net to prevent extinction of wildlife species. The Forest Service argued this new legal position in the summer of 2011 and received a district court ruling in its favor. *Earth Island Institute v. Gibson*, 2011 WL 2746115 (E.D. Cal. 2011). However, the court did *not* find that the Forest Service was maintaining a viable population but, rather, *deferred* to the Forest Service's new argument that it is *not required to do so*, despite a clear forest plan mandate that: "The Forest Service must manage habitat to, at the least, maintain viable populations of existing native...species". *Id.* (the court found that "the Forest Service did not make a clear error in judgment in concluding that the Lake Tahoe Basin Management Unit National Forest (LTBMU) Forest Plan did not require it to assess the viability of the Black-backed Woodpecker in accordance with the 1982 rule's viability requirement", and noted that "the Forest Service further argues that the provisions of the LTBMU Forest Plan cited by Plaintiffs are 'descriptive rather than prescriptive'" and, therefore, are not enforceable—an interpretation to which the court deferred). The Forest Service made this argument with regard to the Angora post-fire logging project on the Lake Tahoe Basin Management Unit National Forest. The agency admitted that: a) only about 1% of the LTBMU National Forest was comprised of suitable Black-backed Woodpecker habitat before the post-fire logging in the Angora fire area; b) their proposed post-fire logging project would remove the *majority* of the little remaining Black-backed Woodpecker habitat on the entire LTBMU National Forest, and would remove 70% of all remaining high-quality Black-backed habitat; c) the post-fire logging would not effectively reduce future fire severity relative to taking no action, but would produce thousands of tons of commercial product for biomass energy plants, as well as large sawtimber; d) the Forest Service had not determined whether the remaining Black-backed habitat on the LTBMU would be sufficient to maintain viable populations; and e) argued that, even if remaining habitat is not enough to prevent extirpation of Black-backeds, the agency can and will nevertheless move forward with the logging project. The Forest Service is now making the same argument, as of October 2011, with regard to Black-backed Woodpecker habitat on the Plumas National Forest, claiming that, under its new interpretation, there is no longer any requirement to ensure viable populations of wildlife species, even indicator species, on national forests, and thus that there is no limit to how much of a given species' habitat the agency can log and destroy. *Earth Island Institute v. Carlton*, 2:09-cv-02020-MCE-EFB (Dkt. 94) (Forest Service Brief in Support of its Motion for Summary Judgement); *see also Earth Island Institute v. Carlton*, 2:09-cv-02020-MCE-EFB (Dkt. 105) (district court decision deferring to the Forest Service's new interpretation of their forest plan). Moreover, the Forest Service has announced, in 2011, its "Region 5 Ecological Restoration Leadership Intent" management blueprint, which it states will guide all national forest management for at least the next two decades, including all upcoming forest plan revisions. The "Leadership Intent" document from the Regional Forester states emphatically that the Forest Service does not recognize any ecological value for high-intensity fire areas, describing it only in extreme negative terms (p. 2), and states that the Forest Service will embark upon an intensive landscape-level management program of an "unprecedented scale" to further decrease the occurrence of high-intensity fire (p. 3). *See* www.fs.fed.us/r5/EcologicalRestoration/pdfs/LeadershipIntent.pdf.

Climate

Though it is often popularly assumed that climate change will result in more fire, and more intense fire, in conifer forests of the western U.S., the scientific evidence does not clearly support that assumption and in fact may contradict it. The warming climate more likely will lead to vegetation changes that will reduce the abundance of pyrogenic vegetation, leading to a fire "retreat" (reduced fire activity) in the forests of the Sierra Nevada and eastern Cascades, while desert areas, and the Great Basin areas to the east of the Sierra Nevada and eastern Cascades, will see fire increases (Krawchuk et al. 2009 [Figure 3]). While some climate models predict increased overall fire by about 10–20% in montane forests by 2099 relative to the 20th century fire-suppressed extent of fire, in terms of average annual area burned (all fire, not high-intensity fire), the models predict much larger *decreases* in the upper elevation forest types inhabited by the Black-backed Woodpecker as the climate warms (Lenihan et al. 2008 [Fig. 1 through 3]), indicating a substantial overall loss of habitat even if fire increases somewhat. One modeling study, using a hypothetical scenario in which summer precipitation was assumed to be on a substantial decreasing trend, projected a near doubling of total annual area burned (all fire intensities combined) by 2080 in the eastern Oregon Cascades (Littell et al. 2010). However, actual precipitation data shows that summer precipitation has been progressively increasing substantially, and continues to increase, in western North America, and in Oregon and California specifically, since at least the early 20th century (Mote 2003, Hamlet et al. 2007, Girardin et al. 2009).

Moreover, summer precipitation may be a more powerful predictor of fire behavior than temperature, as the former reduces fire while the latter increases it (Parisien and Moritz 2009), and summer precipitation is increasing in forested regions of the U.S. West within the range of the Black-backed Woodpecker. Though, in any given one or two decades, precipitation may increase or decrease somewhat, often depending upon warm or cold phases of the Pacific Decadal Oscillation (PDO), actual data from weather stations over the past *several* decades shows an overall progressive pattern of increases in precipitation, especially summer precipitation (which tends to reduce wildland fire occurrence and intensity) in California (WRCC 2010 [http://www.wrcc.dri.edu/], Crimmins et al. 2011) and in the eastern Oregon Cascades (Mote 2003). Similar increases in summer precipitation in Canada's boreal forests have led to a progressive decline in high-intensity fire occurrence and, consequently, a decline in Black-backed Woodpecker habitat over the past 150 years (Girardin et al. 2009). Further, comprehensive data from the U.S. Forest Service's research branch and the U.S. Geological Survey conclude that, since 1984, there has been no increase in fire intensity (Schwind 2008) (all vegetation types combined). Specifically in forests, Hanson et al. (2009) found that fire intensity has not increased since 1984 in the eastern Cascades, including the southern Cascades in California; and Collins et al. (2009) found no increase in fire intensity in a forested study area in Yosemite National Park. Lutz et al. (2009) modeled fire intensity in Yosemite National Park, comparing 1985–2006 to 2020–2049. Their data show that the high-intensity proportion is projected to remain at about 16% in both the current and future time periods (Lutz et al. 2009 [Table 1]).

Miller et al. (2009) reported an increase in summer precipitation in the Sierra Nevada over the past several decades, but also reported an increase in fire intensity in *some* forest types since 1984 in the Sierra Nevada. However, they excluded 40% of the available fire intensity data, including the largest and most intense fire in the early years of the data set (the 1992 Fountain fire), which led to a substantial underrepresentation of high-intensity fire in the earlier years, and the incorrect impression of an increasing fire intensity trend. Also, they used current GIS layers for vegetation to exclude shrubs, which can lead to a disproportionately large exclusion of conifer forest that burned at high intensity in the earlier years of the data set, and which was more recently re-classified as shrub habitat (more recent high-intensity patches still appear as forest in remote sensing, whereas older high-intensity patches, due to snag attrition and shrub maturation, appear as shrub habitat). This leads to the appearance of an upward trend in fire intensity where none actually exists. Using complete fire data, and using pre-1984 GIS layers for vegetation (in order to avoid excluding more high-intensity fire in conifer forest in the earlier years), Hanson and Odion (in review 2012) found no increase in fire intensity in forests of the Sierra Nevada since 1984 (which is when accurate fire intensity satellite imagery data became available), consistent with all other current research on this subject in California's forests (Schwind 2008, Collins et al. 2009, Lutz et al. 2009, Hanson et al. 2009, Hanson et al. 2010, Miller et al. 2012).

Sincerely,

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CENTER *for* BIOLOGICAL DIVERSITY

June 1, 2012

SENT VIA EMAIL

California Department of Fish and Game
Nongame Wildlife Program
Attn: Ms. Lyann Comrack
1812 9th Street
Sacramento, California 95811
Email: BBWO@dfg.ca.gov

Re: BBWO Status Review

Dear California Department of Fish and Game:

The Center for Biological Diversity and John Muir Project submit the following information regarding the Department's Black-backed Woodpecker ("BBWO") status review. The below discussion briefly addresses the legal parameters of CESA listing decisions, and attached to this is an additional letter from Chad Hanson regarding the substantive scientific issues. We appreciate the opportunity to submit this information.

Unsurprisingly, the purpose of the California Endangered Species Act ("CESA") is "to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat." CFGC § 2052. "These species of fish, wildlife, and plants are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of [California], and the conservation, protection, and enhancement of these species and their habitat is of statewide concern." CFGC § 2051.

CESA is modeled on the federal ESA ("FESA"), and the two statutes contain very similar substantive and procedural provisions. For instance, under CESA, as under FESA, listing decisions must be based on the best available science. CFGC §§ 2072.3, 2074.6; 16 U.S.C. § 1533(b)(1)(A). The California Courts have explained that "it is a basic premise of statutory construction that when a state law is patterned after a federal law, the two are construed together." *NRDC v. California Fish & Game Comm.* (1994) 28 Cal. App. 4th 1102, 1118). Specific to the situation currently faced by DFG and the Commission, a federal district court has stated the following:

> The [FESA] contains no requirement that the evidence be conclusive in order for a species to be listed. Application of such a stringent standard violates the plain terms of the statute . . . Congress repeatedly explained that it intended to require the FWS to take preventive measures before a species is 'conclusively' headed for extinction. The purpose of creating a separate designation for species which are

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'threatened', in addition to species which are 'endangered', was to try to 'regulate these animals before the danger becomes imminent while long-range action is begun.'

> The FWS itself has taken the position that it need not, and must not, wait for conclusive evidence in order to list a species. For example, in its decision to list the northern spotted owl, it explained that because the agency had 'used the best data available to prepare the proposed rule', it was 'not obligated to have data on all aspects of a species biology prior to reaching a determination on listing'. Moreover, the agency concluded that 'to withdraw the proposal and conduct additional research would not improve the status of the [species] and would not be in keeping with the mandates of the Endangered Species Act.' More recently, the FWS decided to list the California red-legged frog, even though many aspects of the species' status were 'not completely understood', because 'a significant delay in listing a species due to large, long-term biological or ecological research efforts could compromise the survival of the [species].'

Defenders of Wildlife v. Babbitt, 958 F.Supp. 670, 679-81 (D.D.C. 1997) (internal citations omitted).

Furthermore, as part its status review obligations, the Department is required to "seek independent and competent peer review of the department status report whenever possible." 14 CCR § 670.1. "[P]eer review is defined as the analysis of a scientific report by persons of the scientific/academic community commonly acknowledged to be experts on the subject under consideration, possessing the knowledge and expertise to critique the scientific validity of the report." Id. In light of the problems associated with the fisher peer review process in 2010, it is important that this time around the Department ensure that the peer reviewed status report contains the listing recommendation (and the analysis and reasoning used to reach that recommendation).

Finally, per 14 CCR 670.1 (h), we intend "to submit a detailed written scientific report to the commission on the petitioned action" and must do so "not later than the time the department submits its report pursuant to Section 2074.6 of the Fish and Game Code." We therefore are requesting "a preliminary estimation of the date the [DFG's] status review report will be submitted to the commission." In addition, per 14 CCR 670.1 (h), we will "coordinate with the department during its review period and share scientific information useful to the department in its review." We request that the Department reciprocate.

Sincerely,

Justin Augustine

Justin Augustine

CALIFORNIA FORESTRY ASSOCIATION

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June 1, 2012

Ms. Lyann Comrack
California Department of Fish and Game
Nongame Wildlife Program
1812 9th Street
Sacramento, California 95811

Subject: Black-backed woodpecker listing data and comments

Dear Ms. Comrack,

The California Forestry Association (CFA) wishes to submit the following comments to the Department of Fish and Game (Department) with regards to the possible listing of the Black-backed woodpecker (BBWO) by the California Fish and Game Commission (Commission). The Department has asked for additional data and comments by June 1, and CFA believes it is imperative that we bring forward a number of important issues.

First, as the state agency charged with preparing important evaluations and recommendations to the Commission on any possible listing action, CFA believes that it is paramount that the Department carefully reviews the data and science behind the listing petition. With regards to the listing petition of the BBWO, CFA was dismayed by the amount of poor information or half-truths that were presented by the listing petitioners, namely the Center for Biological Diversity and the John Muir Project of Earth Island Institute.

In the Department's "Evaluation of Petition" presented to the Commission on February 11, 2011, we believe the Department did an admirable job of disclosing and discussing these data gaps and falsehoods. Most notably, the following excerpts from the Department's Evaluation highlight the poor science and falsehoods put forth by the petitioners:

- The importance of unburned (green) forest habitat may be understated in the Petition (page 8).
- The Department believes the Petition's discussion of the negative impact on BBWO from the loss of old forests due to past logging is not supported by available information (page 8).
- A primary concern in this evaluation is the lack of information about estimates of BBWO populations in unburned forests. The resulting uncertainty hampers the ability of scientists and managers to accurately estimate statewide BBWO population levels. Consequently, our understanding of the extinction/extirpation threat to the species is deficient (page 8).
- The Department believes further study of the genetic structure of California's BBWO population is warranted (page 9).
- The current range of the BBWO in California is similar to the historic range; however, recent locality records extend the range southward to the southern Sierra Nevada (page 12).
- The Petition concludes that BBWO may rely on old-growth conifer forests when burned forests are unavailable. The Department believes this conclusion is not well supported (page 13).

In response to the Department's Evaluation report, the petitioners subsequently submitted additional comments to the Department. In their letters dated March 24, 2011 and April 15, 2011, the petitioners raised several points regarding BBWO population densities, nesting densities in salvage logged stands, and additional information on habitat needs. From our review of this information, there was no new informational of significance provided in these letters. Rather, they merely reiterated some previously stated information, and then made some conclusions that could be easily categorized as dubious.

We hope that the Department continues to take a critical look at the information presented by the petitioners, and that the Department continues to recommend that the Commission oppose the listing of the Black-backed woodpecker.

Thank you for the opportunity to provide input on this important matter.

Sincerely,

David A. Bischel
President

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June 5, 2012

Sonke Mastrup, Executive Director
Department of Fish and Game Commission
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Sacramento, California 94244-2460

Subject: Public Notice regarding Petition to List Black-backed Woodpecker

Dear Mr. Mastrup:

Attached are the Department of Forestry and Fire Protection's (CAL FIRE) comments on the January 13, 2012 Public Notice requesting information concerning the petition to list the Black-backed Woodpecker under the California Endangered Species Act. Comments of CAL FIRE are focused on information which the petitioner's have included in the petition as a basis for listing which relate directly to CAL FIRE's expertise in fire related matters and our role in regulating timber harvesting on private timberlands.

Comments are grouped into the four following areas as follows:

1) Fire suppression impacts to high severity patch size;
2) Fire rotation length;
3) Impacts of climate change on fire behavior; and
4) CAL FIRE's regulatory program.

In general, as it relates to the three areas of fire behavior, CAL FIRE notes that literature used by the petitioners is not complete, conclusions reached are not consistent with the preponderance of readily available scientific literature, and that key literature has not been reviewed.

If you have questions about the Department's observations and conclusions regarding the petition included or would like additional technical information or assessment, please contact David Passovoy, Environmental Scientist, Fire and Resource Assessment Program, Department of Forestry and Fire Protection, at (916) 445-4301.

Sincerely,

William E. Snyder

WILLIAM E. SNYDER
Deputy Director
Resource Management

cc: Duane Shintaku
Dennis Hall
Chris Browder
Bob Motroni
Mike Bacca
Chris Keithley
David Passovoy

California Department of Forestry and Fire Protection

Comments on January 13, 2012 Petition to List Black-backed Woodpecker under the California Endangered Species Act

Background for the Black-backed woodpecker candidacy:

This bird inhabits montane and boreal forest in North America. In California it has been found in Sierra Nevada, Warner and Cascade mountains.

It is a difficult species to detect leading to great uncertainty regarding abundance. Recent surveys in California, of preferred habitat (post wildfire forest) found few individuals. The Black-backed Woodpecker appears to be a species whose population levels fluctuate in response to availability of prime habitat created in forests that experience high severity fire.

While Black-backed Woodpecker populations are potentially vulnerable to management actions that might eliminate or degrade important habitat, the Department of Forestry and Fire Protection does not concur with Petitioner's general assertions regarding fire severity and frequency. Given the Department's review of the literature and noted trends in fire behavior over the past decade, it is our conclusion that fire severity and patch size will increase which will contribute to creation of habitat for this species.

Issues Raised by Petitioners

The petitioners claim there is a significant amount of high severity fire missing in montane forests (due to fire suppression) which has caused a decline in the bird's population.

The petitioners also claim that California Forest Practice Rules do nothing to protect the bird, nor its prime habitat on private land. The Department offers the following comments for your consideration:

1) Fire Suppression effects on Fire severity and Patch Size

Before Euroamerican settlement in California, the mean fire size was likely less than 200 ha in montane and upper montane forests (Taylor and Skinner 1998, Taylor 2000, Taylor and Solem 2001, Collins et al. 2007, Scholl and Taylor 2010). The average fire size in Black-backed Woodpecker home range in the last 50 years has climbed every decade from 762 ha to 974 ha (based on Intra-agency fire perimeter data). This can be attributed to an increase in forest fuels and stand densities, decreases in the size and occurrence of forest gaps and average tree size and a change in forest composition (Kilgore and Taylor 1979, Agee 1993, Skinner and Chang 1996, and Sugihara et al.

2006). The smaller fires that occur in areas managed without exclusion of naturally ignited fire, such as the wildland fire use areas of the Sierra National Parks (e.g., Illilouette Valley, Yosemite NP; mean = 456 ha for fires >10 ha, mean = 61 ha for all fires; Collins et al. 2007), or the Sierra San Pedro Mártir of northern Baja California (mean = 221 ha for fires >10 ha, much lower for all fires; Minnich et al. 2000) demonstrate the role of these altered forests in causing larger fires in the Sierra Nevada.

The patch size of high severity fire in the range of the Black-backed Woodpecker in California is also trending upwards since Euroamerican settlement (Miller et al 2009). Prior to Euroamerican settlement, analysis of stand ages, fire history and forest structure indicate that patches of high severity fire were rarely more than a few hectares in size (Kilgore 1973, Stephenson et al. 1991, Weatherspoon et al. 1992, Skinner 1995, Skinner and Chang 1996, Weatherspoon and Skinner 1996). Conversely, Miller et al (2009) found that the mean maximum high severity patch size among fires in any given year rose from 50 to 118 ha in their study of fires in the Sierra Nevada between 1984 and 2006.

As patch size increased, so has total area burned at high severity. LANDFIRE (1999) and Stephens et al. (2007) estimate, an average of 3-10% of fire area within mixed conifer and yellow pine forests in the Sierra Nevada burned at "high severities" (more than 75% canopy mortality) pre-settlement. Using Relative Differenced Normalized Burn Ratio data in fires from 1984-2010, within the California range of the Black-backed Woodpecker, the department found 26% of the acres occupied by conifers burned at moderate severity and 25% at high severity. Results in Lutz et al (2009) and Miller et al (2009) echo these findings. So it appears that more habitat is being created.

2) High Severity Fire Frequency and Return Intervals

A 300 year rotation of "high intensity" fire pre-Euroamerican contact in the Sierra Nevada Mountains may be significantly low. The basis for this figure comes from 1) Beaty and Taylor 2001, which was not about pre-Euroamerican rates of "high intensity" fire and 2) a Leiberg (1902) documentation of northern Sierra Nevada vegetation conditions which makes assumptions that are unreasonable (McKelvey et al. 1996).

(Beaty and Taylor 2001) *Spatial and temporal variation of fire regimes in a mixed conifer forest landscape* is a questionable source for determining the pre-Euroamerican contact high fire severity rotation of all the Sierra Nevada for two reasons. The area in the study (less than 4,000 acres or .03% of the Sierra Nevada ecoregion) is so small that any extrapolation from it must be taken with caution. In addition, the time period of the study covered 1883-1926, not the presettlement period.

In his 1902 attempted reconstruction of fire and forests in the northern Sierra Nevada, Leiberg used signs of fire including burned areas, snag groups, and most questionably the assumption that all meadows and chaparral patches were created by fire to define the fire history for the previous 100 years. This overassumption was first put in doubt by McKelvey et al. in 1996. Further, Leiberg estimated that 26% of fire areas burned with a tree loss of 50% or greater and that stand-replacing fires consumed 8% of the area assessed (despite his actual numbers equaling just over 6% or 214,000 of 3.5 million acres). If Leiberg's methods are accepted, estimated results indicate that between 6 and 13% of the burned area burned at high severity (greater than 75% mortality). When applied to the study area for the 100 year period, Leiberg's estimates lead to an unrealistically long fire rotation interval of between 700 and 1666 years.

3) Role of Climate Change on Fire Behavior

The Petition's assertion that Global Climate Change (GCC) will probably decrease both fire severity and fire activity in the Sierra Nevada is possible, but it conflicts with a great deal of GCC and fire threat assessment publications. It is disappointing that the petition overlooked the sound conflicting literature (ex. Field et al. 1999; Flannigan et al. 2000 and 2005; Lenihan et al. 2003 and 2008; Running 2006; Westerling et al. 2006 and 2009; Westerling and Bryant 2008; Miller et al. 2009; Spraklen et al. 2009; Pechony and Shindell 2010). Future climate modeling is filled with assumptions and uncertainty, so the modeling methods and expectations must be varied and should be examined for similarity of results as a sign of strength. Most of the major findings regarding climate-fire relationships stated by the petition are not in agreement with the leading literature.

Said literature regarding climate-fire relationships is summarized in the following material from the Forestry chapter of the California Adaptation Strategy Report in this excerpt:

> Climate change research predicts increased numbers and acres of wildfire. Fire severity is also predicted to increase as a result of more frequent severe fire weather (Miller, J.D., and H.D. Safford 2009). The wildfire season already appears to be starting sooner, lasting longer, and increasing in intensity (Keithley, C., and C. Bleier 2008). Burned wildland acreage has increased in the last several decades (CAL FIRE 2010, Westerling et al 2006). Over 48 million acres, or nearly half of the state, is at a high to extreme level of fire threat (CDF 2003).
>
> Climate change will greatly influence the size, severity, duration, and frequency of fires. Rising temperatures will produce drier fuel conditions and increase moisture stress, likely impacting forest health and increasing susceptibility to pathogens and insects. These stressors, in turn, will further increase fire hazard. Fuel buildup from years of fire suppression and past management practices, in concert with changing climate, can contribute to increasing fire hazards, threatening life and property, air quality, watersheds and water quality, terrestrial and aquatic habitats, recreation and tourism, timber resources and other goods and services.

Increases in the frequency and intensity of wildfires will make forests more susceptible to vegetation conversions from trees to brush or grasslands (Keeley et al 2009). In order for trees to reestablish after wildfires, patches of living trees must be left to provide seeds for the recruitment of new seedlings. As wildfires increase in size, they can result in "stand replacing" burns that are too big for natural regeneration. More frequent fires may also result in vegetation conversion by repeatedly killing regeneration.

The petition also argues that the trend of increasing summer precipitation is another reason that there will be less fire in the future (based on Western Regional Climate Center historic data below). Realistically, the size of the increase is not significant and doesn't change the Mediterranean climate pattern that ensures a summer/fall burning season. Note that these are statewide averages and that they don't represent a change in the dominant dry summer conditions or the sign of an earlier "season ending" rain event. The marginal increase in actual precipitation in the summer months (0" in June, 0.07" in July, 0.13" in August, 0.24" in September) will only functionally affect fire behavior for a few hours to a few days post precipitation because of its inability to change the moisture content of large dead fuels. 100 and 1000 hr fuels do not directly contribute to fire spread, but they do contribute to the intensity of (heat output) and are very receptive to embers thus likely to start spot fires.

Normals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1931-60	4.07	3.79	2.93	1.69	.84	.32	.12	.17	.34	1.21	2.04	3.95	21.47
1941-70	4.16	3.25	2.76	1.83	.78	.31	.13	.22	.30	1.22	2.77	3.87	21.61
1951-80	4.35	3.32	2.72	1.67	.70	.28	.17	.29	.47	1.11	2.62	3.58	21.27
1961-90	3.77	3.28	3.13	1.52	.61	.27	.18	.35	.58	1.25	3.14	3.35	21.43
1971-00	4.15	3.95	3.55	1.40	.83	.32	.19	.30	.58	1.20	2.62	3.10	22.18

Source: Western Regional Climate Center: Average Statewide Precipitation for Western U.S. States, http://www.wrcc.dri.edu/htmlfiles/avgstate.ppt.html

4) **California Forest Practices Rules**

The petition misrepresents the California Forest Practices Rules both with regard to its ability to maintain habitat and its favoring of harvest/site preparation methodology

The California Forest Practices Rules (hereafter referred to as "the Rules") are the main regulations that manage wildlife habitat on private lands. The Rules provide for timber harvest and site preparation practices to occur. Contrary to the petition, The Forest Practice Act requires a registered professional forester to prepare a timber harvesting plan (THP) (PRC § 4581), and then a licensed timber operator conducts the timber operations outlined in the plan (PRC § 4571(a)). The THP process is the functional equivalent of the CEQA environmental impact report process. Therefore, it contains a complete description of the proposed project and thorough analysis of impacts associated with the project. Any identified impacts must be avoided or mitigated to a level less than significant. The THP undergoes a multi-disciplinary review, which includes the opportunity for the Department of Fish and Game biologists to review the plan. Their review focuses on impacts to biological resources. (PRC § 21080.5, 14 CCR §§ 15250, 15251, 1037.4). The majority of the plans are not exempted from the THP process; however, certain ministerial notices are exempted from the requirement to prepare a THP. These include the harvesting of dead, dying trees and diseased trees and areas that have been subject to damage from fire. All such notices must follow applicable Forest Practice Rules and other laws. In addition, such notices are subject to restrictions meant to minimize impacts, thus allowing the filing of a notice and not discretionary review by a State agency (14 CCR §§ 1038(b), 1052).

Also contrary to petition, the Rules do contain specific protection for snags and late successional habitat (14 CCR §§ 919.1 and 919.16). Degradation and destruction of any such existing habitat is unlikely under a THP or a dead, dying and diseased exemption (14 CCR 1038(b)). The rules do not favor any certain type of harvesting. All of the silvicultural prescriptions allowed in California are restricted for use in forest stands of a certain structure, age, site classification and acreage. If a forest stand does not meet the age, site classification, structural and area requirements for a given silvicultural prescription, then it cannot be applied to that stand. Some other, more appropriate prescription must be used (14 CCR § 913). For example, some uneven-age regeneration prescriptions, including transition, selection, and group selection logging methods leave continuous forest cover and are not likely to eliminate high densities of trees, large trees and snags (F.P.R. 14 CCR Ch. 4 § 913.1, 913.2). Commercial thinning is an intermediate treatment that is meant to reduce stocking on young, even-aged stands. Removal of most of the tree does not necessarily occur, and large snags may not be a component of the pre-harvest stand (14 CCR § 913.3(a)).

The petition correctly states [the Forest Practice Rules provide no explicit protection for the Black-backed Woodpecker and its habitat, the Rules do require that where significant impacts to nonlisted species may result, the forester "shall incorporate feasible practices to reduce impacts" (F.P.R. § 919.4, 939.4, 959.4)]. But, if significant adverse impacts to Black-backed Woodpecker are identified as part of the plan (or notice) preparation or review, then appropriate mitigation or avoidance measures will need to be incorporated. Additionally, the rules generally do not require surveys for listed or non-listed species. The specific project and associated impacts should determine the need for surveys, if any. When a project will not avoid a species' habitat, then a survey may happen (depending upon the kind of impacts to habitat, timing of impacts, etc.) as determined in the plan review. The only species that has habitat "thresholds" associated with it is the northern spotted owl. No other listed or non-listed species has had significance thresholds developed for it. Site specific circumstances drive the assessment of impacts to most species. The Rules are set up to identify significant adverse impacts through an analysis and review process and any implication that reduction of impacts is optional and not necessary is false. CEQA and the Forest Practice Rules require the project proponent to identify such impacts and to avoid or mitigate them. Plan review is meant to identify such impacts. In the case of ministerial notices, built-in restrictions and the requirement to follow applicable law requires the project proponent to identify potential impacts and to mitigate them, if necessary.

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June 21, 2012

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P.O. Box 944209
Sacramento, CA 94244-2090

Dear Mr. Richards,

We the Forest Landowners of California (FLC) are concerned that the black back wood-pecker (BBWP)(Picoides arcticus) has not been scientifically proven to be a threatened nor an endangered species, nor do we believe that the habitat of this species has been on the decline. In California this species is also known to be located at its extreme southern edge of its normal range and if there is a trend towards a warmer climate, this species will most likely drift northward. It has been shown to us by numerous statistics from the USFS and CDF that there have been an increasing number of large damaging forest fires during the last several decades. It is clearly evident from our observations, field trips, and the statements from many RPFs and the media that more and more BBWP habitat is being created by these fires and this habitat is being left untouched, particularly on Federal lands.

These large expansive fires have often burned into isolated areas and wilderness areas, where salvage harvesting is prohibited. Additionally during the last decade timber prices have dramatically dropped, making it uneconomical to salvage much of the burned throughout private lands. This, coupled with the recent increase in activity of bark beetle infestations, has not only caused an ever-increasing supply of BBWP habitat, but has severely increased the hazardous fire fuel loads and the potential of continued severe fires. This is not the time to prolong, nor an appropriate reason to continue this neglect of our private and public forests.

Evidence exists to support the conclusion that BBWP select forest stands with larger trees and higher tree densities, in both burned and unburned forests; however, the claim that BBWP rely on old growth forest is unsupported by the existing body of literature. Post-fire Salvage: Dixon and Saab (2000), state that BBWP are vulnerable to local and regional extinction as a result of post-fire salvage logging (p .46). However, the California Department of Fish and Game finds there is considerable uncertainty associated with this statement when considering the potential role of unburned forests and insect-infested forests in sustaining the species, as well as documented instances of BBWP nesting in salvaged stands, even at reduced levels relative to salvaged stands (Saab and Dudley 1998, Cahall and Hayes 2009, Saab et al. 2009).

Sincerely,

Jim Little
President

cc: Charlton H. Bonham, Director, California Department of Fish and Game
John Laird, Secretary, California Natural Resources Agency

P.O. Box 697
Cedar Ridge, CA 95924
Tel: 530-273-9290
Fax: 530-273-9260

8/21/12

Lyann Comrack
California Department of Fish and Game
Nongame Wildlife Program
1812 9th Street
Sacramento, CA 95811

Dear Ms. Comrack and Department of Fish and Game,

On behalf of the John Muir Project of Earth Island Institute and the Center for Biological Diversity, I am submitting the following scientific information in support of the Petition to list the Black-backed Woodpecker (*Picoides arcticus*) as threatened or endangered under the California Endangered Species Act. I have a Ph.D. in Ecology from the University of California at Davis with a research focus on forest and fire ecology in Sierra Nevada forests, and a particular focus on the Black-backed Woodpecker (BBWO). My comments below address three topics: population size; population trend; and current fire science as it relates to BBWO habitat.

<u>Population Size</u>

In our initial comments on the Petition, dated June 1, 2012, I discussed an unpublished report, Fogg et al. (2012), which was prepared for the U.S. Forest Service regarding Black-backed Woodpecker (BBWO) populations in unburned forests of California. In these additional comments, I specifically address Appendix 2 of Fogg et al. (2012), which extrapolates their results to estimate that 3,980 sites (range of 1,398 to 6,899) on unburned forest could be occupied by BBWOs in the Sierra Nevada management region (Sierra Nevada, southern Cascades, and Modoc region in California—essentially the BBWO's range in California). For the following reasons, however, the estimate in Fogg et al. (2012) very likely dramatically overestimates the BBWO population in unburned forests of California, due in large part to assumptions that depart significantly from the existing data. Because, as explained below, Fogg et al's estimate does not rely on the best available science, and relies upon unsupported assumptions unconnected to data, and directly contradicted by widely available data, it should not be relied upon. Instead, the numbers are likely 200-300 pairs at most in unburned forest in California, using a data-based estimate.

Underestimation of Home Range Size

Fogg et al. (2012), on p. 26, divide the portion of the unburned forest landscape that they estimate to have some BBWO presence into 1 square-km (100 hectares [ha], or 247 acres) cells, and then "assume" that each cell is an occupied BBWO territory. However, Fogg et al. (2012) do not provide citations to any data sources to support this assumption of a BBWO density in general/typical unburned forest that is equal to or considerably higher than that documented in moderate/high-quality recent burned forest habitat (i.e., peak densities in high-quality post-fire habitat) (Siegel et al. 2012b). For example, Burnett et al. (2011) conducted extensive BBWO nest surveys in 98 unlogged burned forest plots in 2009 and 2010 (combined) in the northern Sierra Nevada and southern Cascades in California (p. 77 of Burnett et al. 2011), with each plot being 20 ha in size (Burnett et al. 2011, p. 82), and found a total of 20 BBWO nests, or about one nest per 98 ha of burned forest (and most of these plots were surveyed at peak densities, in terms of time since fire: 2-3 years post-fire). Siegel et al. (2012b [p. 32]) found BBWO home ranges generally exceeded 200-300 ha in recent (2-3 years post-fire) post-fire habitat, with an average of 27% overlap—i.e., approximately 200 ha of post-fire habitat per BBWO pair at peak post-fire density, based upon the most reliable and accurate methods of estimating home range size. In addition to the data regarding burned forest habitat, the existing data indicate that BBWO home ranges in unburned forest are far larger than the 100 ha assumed by Fogg et al. (2012), even when the recent snag basal area found in the unburned forest is much higher than the average in the unburned forests surveyed in Fogg et al. (2012). For instance, Goggans et al. (1989), in a radiotelemetry study of BBWOs in dense, old forests of the eastern Oregon Cascades with very high levels of snag basal area due to recent beetle mortality, found an average home range size of 557 acres, or 225 ha, for BBWOs, with 0% overlap in home ranges (Goggans et al. 1989, pp. 24, 27). This was in an area in which 28% of the trees had been killed by pine beetles—94% of which were stage 1 (very recent) snags (Goggans et al. 1989, p. 34)—and where the forests had an overall basal area of approximately 400 square feet per acre, or about 92 square meters per hectare (Goggans et al. 1989, p. 33). In other words, in this area, recent snag basal area was about 26 square meters per hectare. Similarly, Bonnot et al. (2008) found 0.13 BBWO nests per 40 ha (Bonnot et al. 2008, p. 453), or one nest per 308 ha, in an area of unburned forest of the Black Hills with very recent snag levels often reaching 200-490 per ha (Bonnot et al. 2008, p. 451). In a recent radiotelemetry study of BBWOs in the Sierra Nevada management region, the two territories which were primarily outside of the fire perimeter (but which had nests inside the fire perimeter) had home ranges of approximately 729-796 ha, using the two more common methods of estimating home range size, and 266-287 ha using the most restrictive and conservative method, which tends to significantly underestimate true home range size (Siegel et al. 2012b, p. 32, Table 1). The overlap in these two home ranges was only about 5% (Siegel et al. 2012b, p. 26, Fig. 9). Thus, the best available science indicates that, even with extraordinarily high and uncommon snag densities in unburned forest, the density of BBWOs in areas known to be occupied is one pair per 225-800 ha—not one pair per 100 ha, as Fogg et al. (2012) assume, without citation to any data source, for unburned forests. This alone results in a three-fold or greater overestimation of BBWO density in unburned forest by Fogg et al. (2012). Further, as discussed below, the extent of the overestimation is much larger than this once we account for the fact that the great majority of the unburned forest surveyed by Fogg et al. (2012) has far lower snag densities than the unburned forests in which BBWOs have been found nesting in the literature discussed above.

Kathryn Purcell, in unpublished data, found several active Black-backed Woodpecker nests in a small area of unburned lodgepole pine and red fir forest during several years of surveys (1995-2002). However, no forest structure data was presented from these surveys. As I discussed in greater detail in my June 1, 2012 comments, I digitized her map of the locations of these Black-backed Woodpecker nest sites in unburned forest near Courtright Reservoir on Sierra National Forest, and I surveyed these locations on May 30, 2012. I found that these sites are old-growth/ancient red fir and lodgepole pine forest with extraordinarily high basal area of both live trees (200 to 400 square feet per acre, or about 46 to 92 square meters per hectare) and snags (averaging 63 square feet per acre, or about 14 square meters per hectare, in Decay Class 2 through 4 alone). I excluded Class 1 snags which likely resulted from trees dying since the Purcell data was gathered, and excluded Class 5 and 6 snags, which may have already been too old to be useful for BBWOs when the Purcell data was gathered. Thus, my figures on snag density are conservative. I then used U.S. Forest Service Forest Inventory and Analysis (FIA) fixed field plot data (http://www.fia.fs.fed.us/tools-data/) to assess the rarity of such high snag basal area levels across the unburned forest landscape of the Sierra Nevada within montane conifer forest types used by Black-backed Woodpeckers. In my June 1, 2012 comments, I discussed a more limited and preliminary analysis of FIA data. For these comments, I conducted a far more extensive and comprehensive analysis, including lower/mid-montane forest types, such as ponderosa pine, mixed-conifer, and white fir, as well as upper montane and subalpine forest types, such as red fir, Jeffery pine, eastside pine, lodgepole pine, and western white pine, for a total of 522 FIA plots in forest unburned since 1984 in these forest types within the Sierra Nevada management region. Only 19 plots, or 3.6% of the total 522 plots, contained >60 square feet per acre (>13.7 square meters per hectare) of snag basal area from recent (5 years previous or less) mortality due to insects or disease. An additional 20 plots (3.8%) contained 40-60 square feet per acre (9.2-13.7 square meters per hectare) of snag basal area from recent (5 years previous or less) mortality due to insects or disease. FIA plots have a frequency of about one plot per 2400 hectares of forest. Thus, these 39 plots represent only about 93,600 hectares of unburned forest. As discussed above, the data on forest structure where BBWOs have actually been documented nesting in unburned forest indicates not only extremely high levels of snag density, but also very recent tree mortality—i.e., the great majority of snags are generally 5 years old or less (Goggans et al. 1989, Bonnot et al. 2008).

In short, if Fogg et al. (2012, Appendix 2) had used the best available science regarding BBWO nest density in unburned forest, rather than an unsupported assumption, this alone would reduce Fogg et al's estimate of 3,980 BBWO territories in unburned forest by a factor of at least three (i.e., the equivalent of dividing Fogg et al's estimate by three). In addition, as discussed above, less than 4% of the unburned montane conifer forests in the Sierra Nevada contain levels of snag density consistent with the levels in unburned forests where BBWOs have actually been found successfully nesting in the scientific literature (and in unburned forests in the Sierra Nevada where some BBWOs have been found nesting in recent years, based upon my snag density surveys there). If Fogg et al. (2012, Appendix 2) had used the best available science on this key factor as well, it would have reduced their estimate of BBWOs in unburned forest much more—by a factor of 20 or more, reducing the estimate to less than 200 pairs. Additional unsupported assumptions in Fogg et al. (2012, Appendix 2), which are also inconsistent with the best available science, are discussed below.

Unsupported Assumption that BBWO Presence in Unburned Forest Equates to BBWO Nesting

Appendix 2 of Fogg et al. (2012), on p. 26, assumes that 100% of BBWO detections >1.5 kilometers (km) from fires occurring since 2001 represent BBWOs nesting in such areas, as opposed to BBWOs nesting in fire areas and occasionally foraging well beyond the fire perimeters. However, this assumption is contradicted by recent BBWO radiotelemetry data finding two BBWO territories wherein the nests were within the fire area, but the birds actively foraged up to 4-6 km from the fire perimeter (Siegel et al. 2012b, p. 26, Fig. 9), likely taking advantage of some delayed tree mortality that often radiates outward from a fire perimeter in the years following fire, as beetles move outward in search of new habitat. These two territories, which were primarily outside of the fire perimeter, had home ranges of approximately 700-800 ha, using the two more comprehensive methods of estimating home range size (Siegel et al. 2012b, p. 32, Table 1). This indicates that many of the BBWO detections used for the estimate of population in unburned forest in Fogg et al. (2012) are likely birds nesting in fire areas, but foraging several km outside of fire perimeters—well beyond the 1.5 km zone used by Fogg et al. (2012).

This is a fundamental problem with Fogg et al. (2012 [Appendix 2]). Within each transect, an average of 8 point counts (5 point count locations per transect, and each visited about 1.6 times per year) and 1.5 playback surveys (one playback location in each transect, visited 1.5 times per year on average in each transect) were conducted per year, and any BBWOs believed to be detected (nearly all detections were auditory, and unconfirmed) at unlimited distances from the observer were recorded as "occupied" in each transect. Because BBWOs nest at the edge of burns and have territories of 800 ha which extend for several kilometers from the fire edge (Siegel et al. 2012b, p. 26, Fig. 9), any transects within such territories will likely detect BBWOs at some point, erroneously assuming that because the birds are seen in the area, they are therefore nesting there, leading to a large overestimate of BBWO population in unburned forest. To illustrate this problem, imagine that 8 transects of 100 ha each were surveyed multiple times each year (point counts and playback) within an 800 km BBWO territory wherein the nest is at the edge of a fire area, but nearly all of the territory is in the unburned forest (e.g., Siegel et al. 2012b, p. 26, Fig. 9). In such territories, the Fogg et al. (2012) approach would likely detect BBWOs passing through each transect at some point during the year, and would mistakenly assume that all transects are "occupied" by BBWO pairs when, in fact, there is only one pair and it is not nesting within the unburned forest at all.

For this reason, Fogg et al. (2012, Appendix 2) does not represent the best available science on this subject. Indeed, this is why researchers in the published, peer-reviewed scientific literature regarding such surveys in unburned forest tracked any BBWOs that they detected to the birds' nests – it is the only way to confirm actual nest density, which is synonymous with actual population density (Russell et al. 2009). Fogg et al. (2012) did not do so. This protocol from the published scientific literature (i.e., not merely assuming that any bird heard or seen is a bird nesting in the immediate vicinity but, rather, confirming nest presence and density) is particularly important for a species, such as the BBWO, whose habitat is ephemeral, thus requiring the birds to disperse across the unburned forest in search of new post-fire habitat whenever a given fire area becomes too old to be suitable, or is salvage logged.

Overestimation of Spatial Extent of Unburned Forest in Which BBWOs Have Been Detected

The BBWO population estimate in unburned forest from Appendix 2 of Fogg et al. (2012) is based upon the assumption of BBWOs being present across 18,494 cells of unburned forest, each of which is 1 square-km in size—i.e., 1,849,400 ha, or about 4.57 million acres (Fogg et al. 2012, p. 26). However, as discussed above, this figure substantially exaggerates the amount of unburned forest that might potentially be inhabited by BBWOs. Nonetheless, even if the assumptions relied upon in Fogg et al. (2012) are used, the spatial extent of BBWO presence in unburned forest is still substantially overestimated. I obtained the coordinates of each BBWO survey location, and detection location, for 2009-2011 from the authors of Fogg et al. (2012). Using these locations, I determined the 100% minimum convex polygon area of unburned montane conifer forest (to err on the side of being inclusive, I included all forest types from lower montane hardwood-conifer forest up to subalpine forest types, on both the western and eastern slopes of the Sierra Nevada management region) in each of four equal latitudinal sections (spanning the southernmost and northernmost detections) wherein Black-backed Woodpeckers have been detected at any location during 2009-2011 in the unburned forest surveys conducted for Fogg et al. (2012). These surveys included five point count stations at each of an average of 450 transect locations per year, with an average of 55% of point count stations visited twice per year (a total of approximately 10,463 individual point counts 2009-2011), plus BBWO playback surveys at 472 locations, with an average of 1.5 playbacks per location, in 2011 (Fogg et al. 2012, pp. 4-5). Again, my analysis followed the criteria used by Fogg et al. (2012) for their unburned forest population estimate—specifically, areas >1.5 km from fires that have occurred since 2001. The total area of "unburned" forest in the 100% minimum convex polygon is only 436,260 ha, not the 1,849,400 ha reported by Fogg et al. (2012 [Appendix 2]). The 100% minimum convex polygon represents the extreme outer spatial boundaries of detected BBWO presence in unburned forest—i.e., the maximum area in which BBWOs have actually been detected in unburned forest after thousands and thousands of surveys over the course of three years throughout the Sierra Nevada. In other words, within the 100% minimum convex polygon, some BBWO detection has occurred (though it may be very low and, as discussed above, cannot be assumed to represent a BBWO territory occupied by a nest), and outside of the 100% minimum convex polygon, zero BBWO detections have been recorded at any time in any of the three years of survey effort and thousands of surveys. Thus, in making their BBWO population estimate in unburned forest, Fogg et al. (2012 [Appendix 2]) erroneously extrapolated BBWO presence across an area more than 4 times larger than the area of unburned forest in which BBWOs have actually been detected. This, again, does not represent the best available science, and caused an additional overestimation of BBWOs in unburned forest beyond the overestimations caused by the problems discussed above.

Even if an unrealistically optimistic level of occupancy of these 436,260 ha of unburned forest is assumed, e.g., 50% (which is markedly higher occupancy than that found in recent burned forest habitat by Siegel et al. 2011 and Siegel et al. 2012a), this yields only 218,130 ha of occupied unburned forest. As discussed above, regarding the findings of Goggans et al. (1989), a density of nearly one pair per 200 ha may be expected in unburned forest with extraordinarily high levels of very recent snag basal area—over 25 square meters per ha of recent snag basal area, specifically. However, the FIA data discussed above indicate that only 8 of 522 plots (only 1.5%) have snag basal area >25 square meters per ha from recent (5 years previous or less) mortality due to insects or disease. Thus, such a density would be highly unrealistic for the great majority of the 218,130 ha in question. Nevertheless, even if we unrealistically assume one pair per 200 ha for 10% of the 218,130 ha, that would yield only 109 pairs. For the remaining 90%, using the figure of one pair per approximately 750 ha from the two BBWO territories in Siegel et al. (2012a) which were mostly in unburned forest, there would be an additional 262 pairs, for a total of 371 pairs in unburned forest in California. Again, however, this is very likely to be a substantial overestimation, given that it likely overstates BBWO occupancy and density, and assumes BBWOs found foraging in unburned forest 1.5-5 km from fire edges are nesting in the unburned forest, as opposed to nesting in the nearby burned forest and occasionally foraging outward from the burn, as found by Siegel et al. (2012b). Thus, a more realistic estimate would be much lower—200 to 300 pairs at most in unburned forest in California.

Moreover, because Fogg et al. (2012) do not account for the much larger BBWO home ranges in unburned forest, relative to burned forest, they also do not account for the lower fitness of territories with much larger homes ranges—reflective of the fact that the birds are working much harder, and expending far more energy, in order to obtain food, corresponding to lower reproduction and survival levels that are associated with non-viable "sink" populations (see, e.g., Carey et al. 1992, Ward et al. 1998).

Probability of Detection

Appendix 2 of Fogg et al. (2012) reports very low probabilities of detection for BBWOs in unburned forest at the transect scale used for Appendix 2, and this fact results in the modeled proportions of the unburned forest landscape being much higher than the observed proportions. Adjusting for probability of detection is important, and scientifically supportable. However, as discussed in my June 1, 2012 comments, the formula used to make this adjustment in Fogg et al. (2012), and Saracco et al. (2011), was not based upon any empirical data on the actual probability of detecting BBWOs known to exist in a given area. Fogg et al. (2012) used the same formula as was used in Saracco et al. (2011). However, though no empirical data was used for the formula in Saracco et al. (2011) regarding probability of detection either, the probability of detection in the burned forests studied in Saracco et al. (2011) were much higher (and the difference between observed results and modeled results was relatively minimal overall; see also Siegel et al. 2011), and may be more reflective of biological reality (Russell et al. 2009). It may be that the formula, which is based upon detections and non-detections, without regard to known presence, creates a greater disparity between observed and modeled results in landscapes in which the birds are even rarer than usual, such as unburned forests. For example, in Fogg et al. (2012), at the transect scale, Appendix 1 shows detections at 21 transects over 2000 m from fire in 2011, or about 8.3%, whereas the modeled result used in Appendix 2 of Fogg et al. (2012) is 22%, which is a large proportional increase over the observed data.

Whatever the case, no data were gathered in Fogg et al. (2012) to determine the actual detected presence relative to known presence. For adjustments for probability of detection to be valid and accurate, they should be made based upon empirical data (Russell et al. 2009 provide a nice example)—a point that extends to all modeling, in fact, unless the goal of a model is to merely explore a "what if" scenario. Because Fogg et al. (2012) did not base this adjustment upon empirical data, the model is not calibrated in a way that can be assumed to reflect biological reality. This can lead to large overestimates—essentially multiplying the actual observed data by several times. And, these overestimates would be in addition to those already described in the subsections above.

Summary

In summary, the Fogg et al. (2012) report's population estimate does not rely on the best available science because it: a) assumes one BBWO territory per 100 ha of unburned forest, without citation to data, despite the fact that the existing data indicate far lower BBWO densities in unburned forest even where the recent snag basal area per ha is far higher than the great majority of current unburned forest in California; b) extrapolates BBWO detections in unburned forest across 1,849,400 ha of forest when BBWOs have only been found in 436,260 ha of unburned forest over three years of surveys (despite thousands of surveys across the 1,849,400 ha area); c) assumes BBWOs detected 1.5-5 km from fires are nesting in unburned forest, despite clear recent evidence of BBWOs nesting within fire areas and regularly foraging up to 6 km from the fire perimeter into the unburned forest, and d) likely over-adjusts for probability of detection.

Population Trend

In assessments of population trend, it is important to take into account broader temporal scales. In order to further explore the issue of the extent to which higher-intensity fire has been reduced by fire suppression, relative to its historic extent within the Black-backed Woodpecker's range, I assessed the rate of initiation of new stands of trees over time, using U.S. Forest Service stand age data from the agency's Forest Inventory and Analysis (FIA) data base (http://www.fia.fs.fed.us/tools-data/). I restricted this analysis to unmanaged forests (Inventoried Roadless Areas, Wilderness Areas, National Parks, and Wild and Scenic River Corridors) in order to eliminate stand initiation from logging from the analysis. I found that the rate of new stand initiation has declined substantially in all areas since the early 20th century, but that the decline has been the most severe within the California and eastern Oregon Cascades populations, which have seen a fourfold decline in habitat since the early 20th century, equating to a substantial lengthening of the rotation interval for stand-initiating natural disturbance (e.g., fire sufficiently intense to kill most or all of the overstory trees, thus initiating a new stand, and re-setting the stand age to zero) (see Figure 1 below).

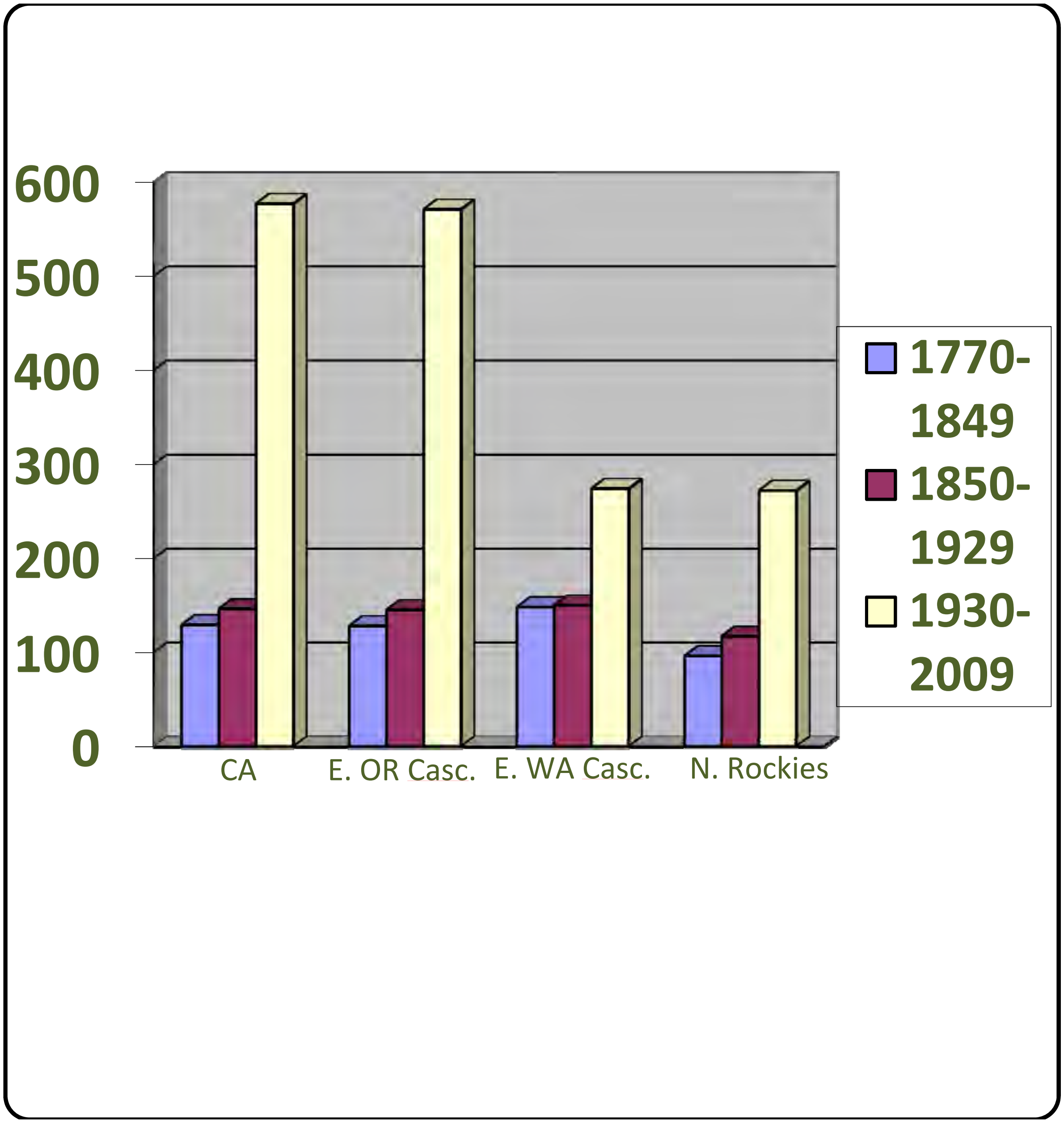

Figure 1. Rotation interval of high-intensity natural disturbance in years (y-axis) since the 19th century in unmanaged conifer forests within the range of the Black-backed Woodpecker in California, eastern Oregon Cascades, eastern Washington Cascades and northern Rockies.

Because of the extremely close association between Black-backed Woodpeckers and higher-intensity fire, the large decline in high-intensity fire since the early 20th century can be expected to correspond to a similar decline in Black-backed Woodpecker populations within their range in California. Any assumption to the contrary would depart dramatically from the known data about population densities in burned versus unburned forest (see, e.g., Russell et al. 2009). This decline in habitat created by fire is exacerbated by post-fire logging, which further widens the gap between historic and current amounts of Black-backed Woodpecker habitat, and populations.

Climate and High-intensity Fire and BBWO Habitat Trends in California

Historic Data

To expand upon the analysis above (Fig. 1) comparing current to historic high-intensity fire extent, I used standard U.S. Forest Service satellite imagery data (RdNBR data; see www.mtbs.org), with the same RdNBR threshold (641) to define high-intensity fire as that used by the Forest Service (Miller and Thode 2007) – a threshold that defines high-intensity fire broadly and inclusively such that it equates to approximately 60-70% basal area mortality (i.e., significant amounts of moderate-intensity fire are also included) – and found that the current high-intensity fire rotation interval for middle/upper montane westside forests and eastside forests combined is 791 years since 1984. This is longer than rotations prior to the influence of fire suppression based on available research that allows calculations of historic rotations. Bekker and Taylor (2001), in a remote unmanaged area of mixed-conifer and upper montane forest in the southern Cascades of California, found that 50-60% of these forests experienced high-intensity fire over a 76-year period prior to effective fire suppression. Baker (2012), using U.S. Government field plot data from the mid/late 1800s, found a high-intensity fire rotation of 435 years in dry mixed-conifer forests of the eastern Cascades of Oregon, and a mixed/high-intensity rotation of about 165 years. Minnich et al. (2000) studied fire intensity patterns in mixed-conifer forests of northern Baja California, Mexico within an area that had not been logged or subjected to fire suppression. In these forests, similar in most important respects to the mixed-conifer forests of the Sierra Nevada, Minnich et al. (2000) found a natural high-intensity fire rotation of 300 years. In a modeling study reconstructing historic fire patterns, Stephens et al. (2007) estimated a high-intensity fire rate, prior to 1850, of 5% every 12 to 20 years for ponderosa pine and mixed-conifer forests of the Sierra Nevada (rotation of 240 to 400 years), and shorter rotations for upper montane fir forests. In another study, Collins and Stephens (2010), an average of 15% high-intensity fire was found in reference mixed-conifer forests with overall fire frequencies that were similar to those used in Stephens et al. (2007), suggesting similar, or slightly shorter, high-intensity fire rotations relative to those modeled in Stephens et al. (2007). In short, the multiple sources of data strongly indicate that there is substantially less high-intensity fire now than there was historically.

Current Climate and Fire Trend Data

As discussed in my June 1, 2012 comments, only one study, Miller et al. (2009), reported increased fire intensity in Sierra Nevada forests since 1984, but this study did not include 40% of the fire intensity data available at the time the study was prepared, and did not provide a methodology explaining why some data were included and some excluded. Hanson and Odion (revision in review 2012) conducted the first comprehensive assessment of fire intensity since 1984 in the Sierra Nevada, using 100% of available fire intensity data, and, using Mann-Kendall trend tests (a common approach for environmental time series data), found no increasing trend in terms of high-intensity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion (revision in review 2012) checked for serial autocorrelation in the data, and found none, and used pre-1984 vegetation data (1977 Cal-Veg) in order to completely include any conifer forest experiencing high-intensity fire in all time periods since 1984 (the accuracy of this data at the forest strata scale used in the analysis was 85-88%). The results of Hanson and Odion (revision in review 2012) are consistent with all other recent studies of fire intensity trends in California's forests that have used all available fire intensity data, including Collins et al. (2009) in a portion of Yosemite National Park, Schwind (2008) regarding all vegetation in California, Hanson et al. (2009) and Miller et al. (2012) regarding conifer forests in the Klamath and southern Cascades regions of California, and Dillon et al. (2011) regarding forests of the Pacific (south to the northernmost portion of California) and Northwest.

All studies in California's forests have found unequivocally that increasing time since fire, typically used as a proxy for increased fuel loads, is not associated with increased fire activity or severity and, in fact, is generally associated with decreased fire severity, due to a reduction in pyrogenic shrubs and an increase in cooling shade and fuel moisture as canopy cover increases with increasing time since fire (Odion et al. 2004, Odion and Hanson 2006, Odion and Hanson 2008, Odion et al. 2010).

While temperature has increased somewhat, precipitation, including summer precipitation, has also been on an increasing trend for decades—a more substantial upward trend, in fact (Mote 2003, Hamlet et al. 2007, Gonzalez et al. 2010 [Fig. 1b], Crimmins et al. 2011). This factor, increasing summer precipitation, has a profound suppressing effect on fire activity (even with relatively small increases), one that may well outweigh temperature (Krawchuk and Moritz 2011). Numerous studies project a decrease in future fire in California's forests, while in some cases projecting an increase in desert areas and the Great Basin (see, e.g., Krawchuk et al. 2009 [Fig. 3], Gonzalez et al. 2010 [Fig. 3b], Liu et al. 2010 [Fig. 1]).

Some modeling studies predict that fire will increase in California's forests in the future, but the modeling assumptions chosen by the authors of these studies are based upon the presumption of substantially decreased precipitation, including summer precipitation, in the future, despite a century-long trend of increasing precipitation with climate change, and these studies do not explain why they believe that this longstanding precipitation pattern will reverse itself, and decrease substantially, in the future under the same climate change trend conditions under which precipitation has increased for the past several decades. For example, the projected potential increases for biomass burning in Marlon et al. (2012) are based upon modeling that assumes hotter and drier (drought) conditions (see Fig. 2 of Marlon et al. 2012), rather than the warmer and wetter trend that has actually been occurring in most western U.S. forests, including California, as discussed above. Further, the increases in fire that these studies project, under the assumption of decreased precipitation, are quite modest—generally in the range of 10-20% by the end of the century (see, e.g., Lenihan et al. 2003, Lenihan et al. 2008; see also Moritz et al. 2012)—and such an increase, if it occurred, would not even come close to making up the dramatic current fire deficit relative to natural historic conditions (see, e.g., Stephens et al. 2007).

In addition, Audubon (2009) and Stralberg and Jongsomjit (2008) predict substantial range contractions for the BBWO in the coming decades due to a large-scale loss of middle/upper montane and subalpine conifer forests from climate change. Moreover, the studies that project a modest increase in fire behavior in the future, based upon the assumption that the longstanding trend of increasing precipitation will reverse itself, also project a much larger overall loss of montane conifer forest types, such that the net effect is a dramatic reduction of the intersection of wildland fire and montane conifer forest (see, e.g., Lenihan et al. 2003, Lenihan et al. 2008 [Figs.

1 through 3]; see also Gonzalez et al. 2010 [Figs. 1 through 3—reporting an actual long term trend of increasing precipitation, assuming a future trend of decreasing precipitation, and projecting slight increases in fire in the southernmost Sierra Nevada, and no change or decreases in fire in the northern Sierra Nevada, but also projecting a 80-90% loss of montane conifer forest in the BBWO's range in California]). These results indicate the likelihood of a dramatic contraction of the BBWO's range in the coming decades due to anthropogenic climate change.

Sincerely,

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APPENDIX 4.

PEER REVIEWERS

AND

PEER REVIEW LETTERS

Peer Reviewers:

Dr. Scott Stephens

Dr. Rita Dixon

Mr. Ryan Burnett

Dr. Rodney Siegel

Dr. Kathryn Purcell

PRBO Comments on Black-backed Woodpecker Status Evaluation

General Comments

The status evaluation is thorough and mostly well written. I ignored a few areas where clarity/sentence structure could be improved due to not reviewing in track changes. I also spent little time considering document overall structure as I presumed this followed a template. I think in general the level of certainty about existing information on the species is represented conservatively by the authors. Of course we can always learn more but I think we know quite a bit about this species especially due to Vicky Saab's work and recent studies in California by IBP and PRBO. My opinion on the species is that they are a rare bird (<10,000 in California) and salvage logging, climate change, and ongoing fire suppression are real threats. However, I don't think the species is imminently at risk of extinction but improved management of post-fire areas to reduce salvage operations – especially on private land along with a greater appreciation of the importance of fire to the forested ecosystems of California is warranted to ensure habitat for this species and the myriad of other wildlife dependent on post-fire habitat is maintained. Continued monitoring of the species across its range in burned and unburned habitat in California would be prudent.

Specific Comments

Page 3 2nd paragraph – this is exaggerated they are not silent throughout much of the year – I would say no more than other woodpecker species and they do vocalize in winter – they also give other calls that readily identify them throughout the year. Thus not sure this is necessary to point out as I don't think they are that unusual for a woodpecker in forested habitat.

Page 4 under **Nests** 1st sentence add Seavy et al. 2012

Page 4 **Food Habits** – they do forage on live trees based on Bull and my personal observations

Page 7 **Range and Distribution** 2nd paragraph consider adding citations from Saracco et al. and Fogg et al. for the best current information on the species elevation range

Page 8 **Range Isolation** – consider adding the word "geographically" between be and isolated in 1st sentence

Page 8 **Habitat Essential**…. 1st paragraph - lodgepole was included in saracco and sample was very small but showed some evidence for a disproportionate number of detections in that habitat type - also cite fogg et al. which shows selection for Red Fir and Lodgepole pine forest types (CWHR) in the Sierra Nevada. Delete 2nd sentence here referring to individual tree species as the rest of paragraph is about habitat types but include under nesttin that we found little evidence of selection for specific nest tree species, size, diameter, etc. (Seavy et al. 2012).

2nd paragraph add Fogg et al. 2012 to citations in 1st sentence

Throughout document consider replacing intensity with severity when referring to fire effects
Page 9 1st paragraph last sentence - can also cite Seavy et al. 2012 for a reference from the Sierra on snags density selection around nests - but interesting Saracco et al. found no real pattern with pre-fire canopy closure and weak with snag density but this may be a result of their sample being limited to areas that burned a substantial number of acres at moderate to high severity – the seavy and russell studies looked at nests vs. just detections so that may be an important distinction

Page 9 **Nesting Habitat** - Seavy et al. shows no preference for tree size using slightly smaller than available on average - this is from a much larger sample size than Raphael and White - add this paper to this section and look at Siegel et al. IBP report or Conservation strategy for the size snags they found nests in – very similar to Seavy et al. They don't appear to select for nest tree size and nest in smaller snags than any other woodpecker species they occur with.

2nd paragraph 3rd sentence - add Seavy et al. 2012 - also this section needs better definition of what stand is - area that burned at high severity? It is not clear from just the definition of a stand what this means and how stands are defined pre-fire may differ considerably post-fire

3rd paragraph – I would not advise directly comparing these studies that all used different methods to estimate density - especially the last sentence – naïve detection rate and occupany derived density are not comparable at all. Consider using comparisons we made in Fogg et al. 2012 to Saracco et al that are appropriate. We also have a manuscript from this work that just is being submitted this week that we would be happy to share with you guys

4th paragraph – need to add Fogg et al. 2012 to 2nd sentence

Foraging Habitat – page 9 2nd paragraph consider changing words from "encourages" to allows or uses as a management tool

Page 12 **Roosting Habitat** – how did they use logged vs. unlogged stands for roosting?

Home Range – change few in 1st paragraph to one and highlight in this section how the Dudley and Saab estimate equates well with Siegel et al.

Population Abundance page 13 1st sentence
this statement doesn't seem appropriate to introduce a paragraph on the species relative abundance as poorly known and elusive don't describe abundance – I think we know more about this species than many

2nd sentence – consider replacing temporarily with locally

Current Abundance – page 14 last paragraph – the Fogg et al. estimate assumes that each 100 ha grid square could be occupied which may be an overestimate of actual densities and that should be stated here – we suggested a 200 ha uniquely occupied area might be more appropriate in which case our estimate would be ½ of that reported

Degree and Immediacy of Threats page 17 – consider citing Stralberg et al. here and Gardali et al. in the introduction which directly show expected range shift and threat of climate to the species in California

Page 18 1st paragraph – I think the threat of salvage logging it pretty clear – this may be how you define threat the OED defines it as "a person or thing likely to cause danger or damage" – I would say the impact of salvage logging on the species viability is not clear but the threat of salvage logging is exceedingly clear.

Page 18 2nd to last paragraph – I found significantly lower snag retention levels in National Forest as has a recent report from QLG (Bigelow, Dillingham, et al.) – I find it hard to believe that private land has equally as high snag densities based on active salvage operations in green forest and overall management strategy – I would at least address the uncertainty of this data

Page 18 last paragraph – while this trend has reversed in recent years the point should be made that we are still not close the acreage reported in Stephens et al. 2007

Page 19 **pre-fire treatments**
Last sentence – consider deleting as treatments are not primarily occurring in the WUI areas in National Forests and certainly not the intent in SNFPA

Page 21 – bark beetles – not sure this exhaustive of a treatment of bark beetles is necessary considering the literature showing their limited importance to the species?

Page 23 final paragraph - could use some expansion here on our green forest study showing they prefer high elevations such as lodgepole pine and red fir and especially in far north these habitat types may disappear - that seems like what Gardali et al. was getting at and what PRBO climate models show (Stralberg et al.)

Page 24 US **Forest Service management** 2nd sentence needs rewording to make sense
This paragraph also has a type change SNFA to SNFPA

Management Recommendations – these could use some work to focus and specify and expand them. For example, specific recommendations for private land and specific snag densities and patch sizes. Also if promoting prescribed fire as creating habitat for the species (which I think it can) then limiting snag retention to large fires that burned hot seems counter to this – I think even low to moderate severity fire of small size (50 acres) can support this species. Finally, as this document frequently states a lack of information on especially trends – and uncertainty surrounding climate impacts, fire trend effects, and salvage logging – recommendation to continue existing monitoring and expand it seems logical. Any negative impacts to the species habitat could quickly result in the species being at risk of extirpation in California.

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February 25, 2012

Mr. Daniel Applebee
Staff Environmental Scientist
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Sacramento, CA 95811

Dear Mr. Applebee:

Thank you for the opportunity to review the California Department of Fish and Game's *Report to the Fish and Game Commission: DRAFT for peer review: A Status Review of the Black-backed Woodpecker (Picoides arcticus) in California*. It is clear that Department staff conducted an extensive and thorough review of the most current peer-reviewed literature on this species, as well as sought out agency reports and unpublished sources relevant to the status and ecology of the Black-backed Woodpecker.

I have reviewed all materials included with the packet provided to me for this review, including not only the status review itself, but supporting documentation. My comments primarily reference the Status Review, but also include comments on some of the supporting materials. My experience with this species includes work in the central Oregon Cascades (Goggans et al. 1988) as well as incidental to my work with other woodpecker species, most notably White-headed Woodpecker. I also coauthored the Black-backed Woodpecker species account for The Birds of North America series.

The Department's assessment of the status of this species, i.e., that our current knowledge does not warrant listing as endangered or threatened under the California ESA is well supported by evidence and I support this conclusion. I provide clarifying comments below regarding specific aspects of the review as well as elaborate on certain points.

Feel free to give me a call at (208) 287-2735 or email me at rita.dixon@idfg.idaho.gov if you have further questions. Thank you again for the opportunity to provide comments.

Sincerely,

Rita Dixon PhD

c: Eric Loft PhD, Chief, Wildlife Branch, California Department of Fish and Game

A Status Review of the Black-backed Woodpecker (*Picoides arcticus*) in California

p. 3 italicize *Picoides*

p. 3–4: ". . . degree of connectivity to Oregon's black-backed woodpecker population as well as the genetic variation and population structure within California is unknown."

I agree with the Department's assertion that California Black-backed Woodpecker populations are likely aligned with Oregon's. This is a vagile species and dispersal distances for woodpeckers can be substantial. For example, a juvenile Red-cockaded Woodpecker (*Picoides borealis*) was recorded to disperse (in this case an interpopulation movement) 287 km from its banding site (Ferral et al. 1997). Ferral et al. (1997) cited these interpopulation movements as important in maintaining genetic exchange among Red-cockaded Woodpecker populations. Conner et al. (1997) suggested that long-distance dispersal may occur on a fairly regular basis in this species and cited a 338 km dispersal of a female originally banded in Arkansas and subsequently recaptured in Louisiana (Montague et al., pers. commun. to Conner et al. 1997). It's plausible that Black-backed Woodpeckers are capable of similar movements. That said, I suspect that the distribution between Oregon and California Black-backed Woodpecker populations is likely continuous but deserves further study.

p. 4: Demography: You might also include that documented White-headed Woodpecker life span is ≥9 y (Dixon 2010). It is reasonable to assume that Black-backed Woodpecker life span would be similar to both American Three-toed Woodpecker and White-headed Woodpecker.

p. 4 Food Habits: The statement that "Snags and downed logs rather than live trees provide forage sites" isn't entirely accurate. Snags and downed logs definitely comprise foraging substrates for Black-backed Woodpecker, but so do live trees. For example, Black-backed Woodpeckers in ne. Oregon favored live lodgepole pine trees 54% of the time—presumably because the trees were infested with mountain pine beetle (Bull et al. 1986).

p. 5: top paragraph: "*Dendroctonous*" should be spelled *Dendroctonus*. Also correct "Goggins" to (Goggans et al. 1988). Note: I have the original Goggans et al. report, which was published in 1988. But I noticed that in the draft review, as well as supporting documentation, that whenever this report is cited, it gives the date as 1989. So you must have a different copy than I have because the page numbers are different as well. Go ahead and use the citation you have.

p. 5: Forest Beetle Ecology: 3rd line from bottom should read "lightning."

p. 6: citation spellings are incorrect: "Ferris" should be "Farris" and "Zach" should be "Zack." Be sure to reconcile these with the literature cited section.

p. 6: See the literature on dispersal for Red-cockaded Woodpecker, e.g., Conner et al. (1997); the authors provide some interesting discussion on "barriers." For example, in the case of one female RCWO, the authors suggest that if she traveled in a straight line, her dispersal path would have crossed a 5-km wide portion of the Sam Rayburn Reservoir; had she avoided the reservoir, her minimal-distance dispersal path would have crossed more than 20 km of agricultural lands, several major highways, and been in excess of 80 km. During my research on White-headed Woodpeckers in Oregon, I have observed them routinely flying across large expanses of clearcuts to move from one old growth stand to another. Considering that Black-backed Woodpeckers locate early post-fire communities, and likely cross diverse habitats in the process, I doubt that a forest gap would create an actual dispersal barrier.

p. 7: Range and Distribution: BBWOs occur in both *central* and eastern Washington.

p. 8: Habitat Essential for the Continued Existence of the Species: the last sentence states that lodgepole pine *may* be important to BBWOs as unburned habitat. I would argue that it *is* important; see Bull et al. (1986) and Goggans et al. (1988).

p. 8: last paragraph and p. 9: top paragraph: The prevailing dogma for explaining the relationship between Black-backed Woodpecker and burned forest is that the species *prefers* intensively burned forests. An alternative hypothesis is that the species merely opportunistically exploits an ephemeral habitat. Black-backed Woodpeckers (or any woodpecker species) are far more conspicuous in open, recently burned environments. They necessarily will not be at the same densities in unburned habitat because of the difference in prey availability.

p. 9 last paragraph: There is no citation for Bock and Lynch (1970) in the literature cited section.

The following sentence "Based on studies outside of California, black-backed woodpecker nest success was higher in burned forest compared to beetle-killed forests (Goggans et al. 1989, Bonnot et al. 2008 . . . .)" implies that all of the studies cited found this to be the case. We did not report this in the Goggans et al. 1988 report. What we did report was that nest success in *unburned* forest with a bark beetle epidemic was higher in logged areas than in unlogged. The sentence should be rewritten with citations placed appropriately in terms of what the respective study found.

p. 12: top paragraph: "Ferris" should be Farris.

Roosting Habitat: Just a note for your interest—in my work on White-headed Woodpeckers in central and s.-central Oregon, during the summer months the birds roosted in a variety of situations. Yet come winter, they all roosted in cavities. I suspect this would be true for Black-backed Woodpeckers too if we followed them into winter.

p. 14 bottom paragraph: what does this statement mean: ". . . uniquely occupied black-backed woodpecker sites . . ."? Does that mean number of pair territories, individual territories, home range, number of locations of birds? It isn't clear.

p. 15 top paragraph:

Regarding the discussion in the Sierra Nevada paragraph: not necessary for the current draft but worth thinking about…could you correlate the BBS trend data with fire and precipitation data?

Lake Tahoe Region: re: the statement "The first documented black-backed woodpecker nests in Nevada were found in 2002 in the Lake Tahoe Basin (Richardson 2003)." In the BBWO BNA account on p. 2 (Dixon and Saab 2000), we reported that the BBWO breeds in the ". . . Carson Range of w.-central Nevada (sw. Washoe Co.; T. Floyd. pers. comm.)." So I'm surprised to hear that the first breeding record for this species was in 2003. Does the Nevada Natural Heritage Program have any nesting records for BBWO in their database that were documented prior to 2003?

p. 16: 2nd paragraph. I agree with CDFG's assessment regarding that it's unlikely the California BBWO population is isolated from populations in Oregon. From my point of view, this is a vagile species that exploits a wide range habitats in terms of tree species composition (e.g., ponderosa pine, lodgepole pine, Engelmann spruce, etc.), condition (e.g., burned, unburned, beetle outbreaks, logged and unlogged, etc.), and elevational range. I would expect there to be interpopulation movements.

p. 21: I would spell out "GAM" for those not familiar with the acronym. Likewise, you might want to include maximum entropy method for Maxent.

Bottom paragraph: In the transition to the last paragraph, you were talking about beetles in the next-to-last paragraph but in the final paragraph where you talk about phenology, you just use the term species. Are you talking about species in general (which I assume) or insect species? It could be interpreted both ways.

p. 22 top paragraph: given the propensity of BBWOs to exploit early post-fire habitats, do you think that over time they wouldn't be able to shift their breeding phenology? What are the habitat requirements of the Eurasian TTWO?

2nd paragraph: the statement ". . . negative effects fire . . ." should be *affects* in this context.

p. 23: Take out comma after Westerling et al.

Bottom paragraph under Climate Vulnerability Assessment: I would argue that BBWOs are more flexible in habitat as exemplified by the variety of forest types and elevational ranges they occupy as well as their use of post-fire habitats. As per the statement about "extensive gaps in forest cover" acting as a barrier to dispersal, I doubt this would be the case. I've seen White-headed Woodpeckers fly across large clearcuts. I see no reason why BBWOs wouldn't do the same.

p. 24: 2nd paragraph on ectoparasites: I suspect that hippoboscid flies would occasionally be found on BBWOs but I don't have records of this for BBWOs specifically. Although rare, I have found hippoboscids on other woodpeckers and Western Screech-Owl (*Megascops kennicottii*)—also a cavity-nester.

Predation: I would add Great Horned Owl and Northern Goshawk as likely predators of BBWOs.

p. 25 bottom paragraph: “goshawks” should be northern goshawk; “marten” should be American marten (*Martes americana*).

p. 28 Non-governmental Organization Designations: Note: NatureServe assigns global (rangewide) ranks only. Each state’s (or province’s) respective Natural Heritage Program assigns the rank at the subnational level. The way the paragraph is written, it implies that NatureServe also assigns state ranks, which isn’t the case.

p. 31: Re: “Extensive gaps in forest habitat may impede movements.” Again, I doubt this is going to pose a barrier to BBWO dispersal.

p. 29: Paragraph 1: Although the use of tape playbacks can improve detectability, it can also have unintended consequences, i.e., prompt an individual to refrain from calling or drumming. For example, during my White-headed Woodpecker work, I had an individual that I had detected prior to playing the tape playback, but when I played the tape, the bird stopped calling and drumming in direct response to the tape playback. In my experience working with woodpeckers, if one conducts surveys during the appropriate season (i.e., breeding), even rare woodpeckers are easily detected. Granted, species at low densities will require greater coverage.

p. 30: 100 ha seems like a small annual home range, and one that would require optimal habitat.

p. 36: Economic Considerations. What is the rationale for not providing an analysis of economic impacts? For example, since logging (especially salvage-logging) is often cited as one of the primary threats to Black-backed Woodpecker, and is driven by both economics and forest health, I would think economic considerations would be considered with respect to the conservation of this species.

<u>Literature Cited Section</u>

In general, check to make sure that you have in-text citations for each citation that appears in the lit cited and vice versa.

p. 38: need to insert citation for Bock and Lynch 1970

I didn’t see an in-text citation for Bonnet et al. 2009. You might want to double-check to make sure you cited this.

p. 39: I don’t recall having seen in-text citations for CDF, Christensen et al. 2008, or Clements et al. 2011 either.

p. 40: Do you have an in-text citation for Comrack and Applebee 2011? Dixon 1943?

Correct citation for Dixon and Saab is:

Dixon, R. D., and V. A. Saab. 2000. Black–backed Woodpecker (*Picoides arcticus*). *In* A. Poole and F. B. Gill [eds.], The Birds of North America, No. 509. Philadelphia (PA): The Birds of North America, Inc.

p. 41: I didn’t see an in-text citation for eBird.

Make sure your in-text citations for Farris et al. are consistent for the citations in the lit cited. Also, Pat Heglund's initials in the Farris et al. 2002 citation are P. J. Heglund and Oz Garton's initials are E. O. Garton. Also, Steve Zack spells his name with a "k" instead of an "h." You've got a duplicate "in" on the second line of the Farris et al. 2002 citation.

p. 42: Did you cite Franklin and Fites–Kaufmann 1996 in an in-text citation?

p. 43: You must have a different version of the Goggans et al. report than I do, but just leave your citation as it is. If you have an electronic copy, could you send it to me so that I can compare it to the version I have?

p. 44. Last citation: should be Corvallis.

p. 45: Marlon et al. 2012 citation is out of order.

p. 46: Make sure you cited the Modoc County Fish, Game and Recreation Commission 2012 in the text.

p. 50: Safford is out of sequence.

p. 53: Townsend is out of sequence.

Figure 4: Is there a reason for not representing private lands on the map? Also, by "non-profit," do you mean nongovernmental?

Figure 6: Need legend for the following acronyms: PCM1-A2, GFDL-B2, and GFDL-A2.

News Release (January 13, 2012): re: statement about ". . . species apparently prefers intensively burned forests over unburned forests . . ." I think the dogma surrounding this species (i.e., that of its *preference* for burned forests) fails to recognize the importance of unburned forest habitat to the Black-backed Woodpecker. I would argue that this species functions in a matrix of burned and unburned, insect-infected and non-insect-infected.

Modoc County Fish, Game & Recreation Commission document p. 4: second to last line: see Murphy and Lehnhausen (1998) regarding the typical occupation of BBWOs post-fire.

Murphy, E. C., and W. A. Lehnhausen. 1998. Density and foraging ecology of woodpeckers following a stand–replacement fire. Journal of Wildlife Management 62:1359–1372.

p. 5 I would agree with the statement ". . . petitioner may have also understated the importance of unburned forest habitat." So much emphasis is placed on burned forest for this species that I think we fail to recognize the importance of unburned forest. This is a species that has evolved with fire and created a unique niche. Yet it is equally adept at nesting and foraging in unburned forests.

Attachment to the May 2012 USFS letter information in response to the January 13, 2012, Public Notice requesting data or comments on the Black-backed Woodpecker

The copy of this document that I received is missing all even-numbered pages. If you send this out again, make sure all the pages get scanned.

<u>The John Muir Project comments dated 6/1/12</u>

p. 3: re: statement about feasible radius of detection of 130 m. Woodpeckers are easily detected beyond 100 meters by drum and call.

I disagree with the author's assumption that more birds would be detected through playbacks per individual survey. This isn't necessarily true.

Re: statement about misidentification: Although I agree that anyone can misidentify species by calls or drums, Black-backed Woodpecker has a distinct call easily distinguished from sympatric species.

p. 4: statement about "significant gaps." What defines a significant gap? I disagree that lava fields and pinyon/juniper forests pose barriers to woodpecker movements. See literature on woodpecker dispersal referenced in my comments above.

p. 5: re: argument about snag basal area levels. Black-backed Woodpeckers readily nest in live trees (e.g., Bull et al. 1986, Goggans et al. 1988) so I wouldn't place undue emphasis on snag basal area.

<u>The John Muir Project comments dated 8/21/2012</u>

p. 3: Hanson emphasizes snag basal area but seems not to acknowledge the importance of live trees for nesting Black-backed Woodpeckers. In our central Oregon study, 65% of BBWO nests were in live trees. Of those in snags, 7 out of 12 were in recently dead trees (Goggans et al. 1988) [note your citation says 1989 because you must have a different version].

Re: Hanson's statement about "Unsupported Assumption that BBWO Presence in Unburned Forest Equates to BBWO Nesting." We know that BBWOs nest in both burned and unburned forests so I'm not sure why Hanson considers this an invalid assumption. One of the problems with locating BBWO nests in unburned forests is that nearly any tree is a potential nest tree because this species nests in live and dead. Locating nests in unburned forests is far more challenging than in early post-fire environments.

p. 4: re: statement that BBWOs nest at the edge of burns. Although sometimes they do, they also nest within interior forest.

Statement near bottom of page re: "habitat is ephemeral." Early post-fire habitats are ephemeral; other BBWO habitat is not.

p. 5: re: reference to Goggans et al. (1989) suggesting that a density of nearly one pair per 200 ha may be expected in unburned forest . . . . I'm not sure where Hanson got this. We recommended 387 ha per pair of BBWOs.

p. 6 first paragraph. Hanson's assumption that BBWOs found foraging in unburned forests implies that they're nesting in burns lacks evidence.

Second paragraph: re: assumption that large home range size results in reduced fitness. In my work on White-headed Woodpecker in central and s.-central Oregon, I saw no difference in fitness between pairs with large home range sizes and small home range sizes.

<u>Supporting references for my comments:</u>

Bull, E. L., S. R. Peterson, and J. W. Thomas. 1986. Resource partitioning among woodpeckers in northeastern Oregon. Res. Note PNW–RN–444. Portland (OR): US Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Conner, R. N., D. C. Rudolph, R. R. Schaefer, and D. Saenz. 1997. Long-distance dispersal of Red-cockaded Woodpeckers in Texas. Wilson Bulletin 109:157-160.

Dixon, R. D. 2010. Status and conservation of White-headed Woodpecker (*Picoides albolarvatus*) in the Interior West, USA: a metapopulation approach [dissertation]. [Moscow (ID)]: University of Idaho.

Dixon, R. D., and V. A. Saab. 2000. Black–backed Woodpecker (*Picoides arcticus*). *In* A. Poole and F. B. Gill [eds.], The Birds of North America, No. 509. Philadelphia (PA): The Birds of North America, Inc.

Ferral, D. P., J. W. Edwards, and A. E. Armstrong. 1997. Long-distance dispersal of Red-cockaded Woodpeckers. Wilson Bulletin 109:154-157.

Goggans, R., R. D. Dixon, and L. C. Seminara. 1988. Habitat use by Three-toed and Black-backed Woodpeckers, Deschutes National Forest, Oregon. Nongame Project Number 87-3-02. Bend (OR): Oregon Department of Fish and Wildlife.

Review of ‘A status review of the Black-backed Woodpecker (*Picoides arcticus*) in California.
Kathryn Purcell, Research Wildlife Biologist, USDA Forest Service, Pacific Southwest Research Station
19 February 2013

I have very few comments specifically tied to page numbers. I found the status report to be well written, using the best available science. Although the lack of published literature on black-backed woodpeckers in California limits the ability to make conclusions, the recent increased focus and research on the species is important and should not be ignored. Bond et al. (2012) represents the current state of the knowledge of the species for the state and should not be discounted.

Key points to consider, and that the report highlights nicely, are that the current range is similar to the historic range, and there is no evidence that populations have declined. The species has probably always been uncommon in the state. That does not mean, however, that we should not be concerned about a species that is not common anywhere except in fairly recent intensive burns.

Page 8 (and throughout): ‘No particular coniferous tree species appears to be preferred (Dudley et al. 2012)…’ Be wary of citing information from the Rockies, especially when referring to habitat requirements. Forest types, including tree species and structure, forest configuration issues such as fragmentation and edges, and fire history in the Rockies differ substantially from those in the Sierra Nevada. When necessary due to the scarcity of published literature on the species in the Sierra Nevada, be careful to point that out.

Pages 16 & 32, relating to the following two sentences: “Management activities designed to reduce the frequency, spread, and severity of wildfires, such as forest thinning and fire suppression, may therefore reduce the amount of burned forest habitat available to black-backed woodpeckers in California.” “Fire suppression and fuels management have been, and continue to be the dominant management goals on most California forests resulting in reduced area of burned forest compared to historic times. However, in recent decades, fire frequency, intensity, and extent have increased despite fire prevention and suppression efforts.” The former is unlikely, while the latter is a very important point. While low-intensity prescribed fire is an important management tool in reducing fire risk, a recent paper suggested it is generally too limited to affect fire severity and that the current pattern and scale of fuels reduction treatment is insufficient to return current forests to pre-suppression fire regimes (North et al. 2012. Forest Ecology 110:392-401). Considering the increase in fires, prescribed fire is not a threat to BBWO habitat availability.

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January 22, 2013

Eric Loft, Ph.D.
Wildlife Branch Chief
California Department of Fish and Wildlife
1812 9th Street
Sacramento, CA 95811

Dear Dr. Loft,

Thank you for the opportunity to review the Department's November 27, 2012 Draft Status Report on the Black-backed Woodpecker. I generally found it to be both comprehensive and accurate in its summary of current knowledge about the Black-backed Woodpecker, and I was particularly satisfied to see that it appropriately acknowledges areas of ongoing scientific uncertainty. In most regards I believe the authors have done an excellent job of summarizing knowledge of the status of Black-backed Woodpecker in California, including assessing the specific population and life history categories prescribed in CESA. Nevertheless, I found numerous instances where I believe the scientific literature has been somewhat mischaracterized or relevant information has been inadvertently omitted. Most of these issues are minor, but a few are more substantial; all are enumerated under "Specific Comments" at the end of this letter.

More generally, in my view there are two primary factors that may make Black-backed Woodpecker vulnerable in California: a) small population size, and b) reliance on a habitat (recently burned forest) that has little to no regulatory protection and is frequently targeted with management activities that reduce habitat suitability for Black-backed Woodpeckers and sometimes even remove the habitat altogether. I think both these factors merit further analysis in the Status Report before a determination is reached about whether the species is likely to be at serious risk of becoming extinct throughout all or a significant portion of its range in California.

a) Small population size

The authors summarize recent population estimates for Black-backed Woodpeckers in California, none of which, it should be noted, have been through rigorous peer review. The population estimates range from relatively small (as many as perhaps 8,000 pairs, adding the upper confidence limits of the highest estimates for burned and unburned forests) to extremely small (fewer than 400 pairs, adding the lower confidence limits of the lowest estimates for burned and unburned forests). Much of the determination about whether Black-backed Woodpecker is at risk of extinction in California, or likely to become so in the near future, must hinge on an assessment of whether the population is indeed small enough to be at risk of extinction due to stochastic events (e.g., several successive years without large fires in the species' range), perhaps in combination with deleterious habitat management (e.g., widespread salvage logging). However, on page 17 the Status Report rather cursorily dismisses the possibility that California's Black-backed Woodpecker population is subject to the kinds of widely acknowledged risks that accompany small population size. The rationale for this conclusion is not clear to me, especially since the authors acknowledge that a) the population is small, and b) *"...the degree of connectivity to Oregon's black-backed woodpecker population as well as the genetic variation and population structure within California is unknown"* (page 3-4). Population size is an important factor governing the vulnerability of populations; I think the Status Report therefore needs a more explicit discussion of the risks faced by small populations and specific reasons why the authors believe Black-backed Woodpeckers in California are not subject to those risks.

b) Reliance on a habitat that is often targeted with management activities incompatible with its persistence in that habitat.

The Status Report says, *"There is uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging"*(page 33), but in reality there is a strong scientific consensus from many studies in many places that post-fire salvage logging reduces various aspects of habitat suitability for Black-backed Woodpeckers, and the magnitude of that reduction is concomitant with the extent and intensity of the post-fire salvage logging. In light of the threat that salvage logging and other management prescriptions involving post-fire snag removal do indeed pose to Black-backed Woodpeckers, I am concerned that the Status Report may not fully convey the extent to which recently burned forest in California is modified by post-fire management activities that reduce habitat suitability for the species. Factors that should be noted, clarified, or given more attention include:

i. The portions of burned areas that are most suitable for Black-backed Woodpeckers tend to be the particular areas that are subject to salvage logging or other management activities involving post-fire snag removal. For logistical and economic reasons, post-fire timber harvest operations tend to target the portions of fire areas where snag density, and the occurrence of relatively large snags, are greatest. However those are generally the same areas that are most likely to be occupied by Black-backed Woodpeckers. While the proportion of burned conifer forest on National Forests in California that has been treated with post-fire snag removal during the past decade is estimated to be around 10% overall and 20% for high-severity areas, the effect of this habitat alteration or removal on Black-backed Woodpeckers may be substantially greater than the percentages might suggest, because the activities tend to occur in the particular stands that would otherwise be most likely to support Black-backed Woodpecker occupancy and reproduction – the stands with higher densities of larger snags.

ii. In summarizing post-fire forest management on National Forests, the Status Report does not address cumulative impacts of small-scale wood-cutting. Many burned areas, including areas where salvage logging or other post-fire snag removal have not been prescribed by Forest Service land managers (and which are therefore not included in the summary statistics indicating the amount of burned forest subject to salvage logging or other treatments involving post-fire snag removal), are subject to small-scale wood-cutting by permit-holders. In some locations, particularly where Forest Service road density is high, the cumulative activity of many wood-cutters may be substantial. In the last two years, in two of the three intensive study areas where my research group has conducted Black-backed Woodpecker research and been present in the fire area daily throughout the summer, the drone of wood-cutters' chainsaws was a constant presence. Stumps of snags cut post-fire were abundant (including in stands where post-fire logging was not prescribed or conducted by the Forest Service) and in two instances, snags within 20 m of active Black-backed Woodpecker nests that we were monitoring were removed by wood-cutters. Taken together, the cumulative effects of many small-scale wood-cutters may represent a significant threat to Black-backed Woodpeckers, one that extends well beyond the footprint of salvage logging and other prescribed forest management actions that remove snags.

iii. Pervasiveness of post-fire snag removal on private lands. Although it is alluded to in the Status Report, it is worth emphasizing that most burned forests on private lands, particularly commercial timberlands, within the Black-backed Woodpecker's California range are salvage logged shortly after fire, and the logging usually involves removal of nearly every snag – making the habitat completely unsuitable for Black-backed Woodpeckers. The Status Report provides estimates of the percentage of burned forest on National Forests that is salvage-logged, but it would be more informative to know the percentage of burned forest on all lands – public and private – that has been subject to post-fire snag removal.

Regardless of whether Black-backed Woodpecker is ultimately judged to warrant listing as Threatened or Endangered, I believe the species faces real threats in California due to the factors described above – a small population and substantial reliance on a habitat that is not only unprotected, but often targeted with management that heavily modifies or even removes it altogether – and I urge the Department to consider what actions it can take to help conserve Black-backed Woodpecker and its early post-fire habitat. As a starting point, I hope you will consider the recommendations my colleagues and I provide in Bond et al. (2012).

Again, thank you for this opportunity to review the Draft Status Report. My more specific comments are enumerated in the pages that follow.

Sincerely,

Rodney Siegel, Ph.D.
Executive Director
The Institute for Bird Populations

<u>Specific Comments</u>

Page 3, "Species Description", 2nd paragraph: The authors write, *"The species is generally silent throughout much of the year, and therefore difficult to detect. They are most vocal during the early breeding season when both sexes drum to establish a territory and attract a mate, during excavation of the nest, and when chicks are begging for food at the nest (Dixon and Saab 2000).* While Black-backed Woodpeckers may indeed be more vocal during the early breeding season than at other times of the year, compared to other woodpecker species in California they remain relatively quiet and inconspicuous **throughout the entire year, including throughout the breeding season**. This distinction is not merely academic, but rather is important because it explains why detection probability may be quite low using passive, multi-species survey methods such as point counts, even during the breeding season.

Page 4, "Breeding phenology": The information presented is accurate, but neglects to mention that Siegel et al. (2012c) reports initiation of incubation occurring as early as May 7 at a study site on Lassen National Forest. Additionally, we have unpublished observations from 2012 of incubation at a study site on Plumas NF beginning as early as April 28 (Siegel, unpublished data).

Page 4, "Nests": The authors write, *"As is typical for all woodpeckers, the black-backed woodpecker excavates its own nest cavity, typically building a new nest each year (Dixon and Saab 2000, Forristal 2009) although Hutto and Gallo (2006) reported 50% of black-backed woodpecker nest cavities were reused in Montana."* This is a misinterpretation of the information reported in Hutto and Gallo (2006). Hutto and Gallo report that 50% of the Black-backed Woodpecker nests they monitored were subsequently used again **by another bird species**, but in no case in their study was a Black-backed Woodpecker nest re-used by Black-backed Woodpeckers.

Page 4, "Food habits": The authors write, *"Snags and downed logs rather than live trees provide foraging sites (Murphy and Lehnhausen 1998, Hanson 2007)."* Black-backed Woodpeckers forage preferentially on snags (and, to a lesser degree, logs), but not exclusively. A more accurate statement would be "Snags and downed logs rather than live trees are the most frequently used foraging sites (Murphy and Lehnhausen 1998, Hanson 2007) but the birds also forage on live trees, particularly trees that appear to be in poor health and have been colonized by beetle larvae (Siegel et al. 2012c)."

Page 5, "Forest beetle ecology", 3rd full paragraph,: The authors write, *"The reliance of black-backed woodpeckers on bark beetles and bark beetle-killed forest is unknown, and requires further study (Bond et al. 2012)."* I suggest emphasizing that the degree of reliance on bark beetle-killed forests **in California** is unknown. Ecology of Black-backed Woodpeckers in beetle-killed forests has been described elsewhere (e.g., Goggans et al. 1989 in Oregon, Bonnot et al. 2008 in the Black Hills; both studies are cited later in the Status Review); what is unknown is whether the generally smaller patches of beetle-killed trees within the Black-backed Woodpecker's range in California support Black-backed Woodpecker occupancy and reproduction, and perhaps explain patterns in the species' occupancy of unburned forest.

Page 6, "Dispersal: the authors write: "*Hoyt and Hannon (2002) measured dispersal distance to a newly burned site in a Canadian boreal forest at 50 km (31 miles)."* This is perhaps a minor point, but Hoyt and Hannon did not actually measure dispersal distance. Rather they inferred dispersal distance based on the minimum distance between habitat patches in which they detected the species. They therefore provide suggestive, but not conclusive, evidence of dispersal across 50+ km.

Page 7, "Range and distribution", 2nd full paragraph: The authors write: *"In California, black-backed woodpeckers are found from 1219 m to 3200 m (4,000 ft -10,500 ft) above sea level; the principal elevation is from 1981m to 2743 m (6,500 ft to 9,000 ft) (Grinnell and Miller 1944, Sumner and Dixon 1953, Gaines 1992."* I know of many occupied sites in California, including the intensively-studied areas described in Siegel et al. (2012c), which are well below 1981 m. Indeed, nearly half the detections from my research group's 2009-2010 surveys of burned areas for the Forest Service were below the 1981 m threshold, at elevations between 1461m and 1981 m (see figure 7 in Bond et al. (2012)), so using 1981 m as the lower boundary of the 'principal elevation' does not seem appropriate.

Indeed, the term "principal elevation", which is used again on page 33, seems overly vague to me. I would suggest a more clearly defined descriptor. One option is provided in Bond et al. (2012): *"During broadcast surveys for Black-backed Woodpeckers in burned forests throughout the Sierra Nevada, southern Cascades, and Warner mountains in 2009 and 2010, 95% of detections were between 1,461 and 2,596 m [4793-8517 ft] above sea level, with a mean detection elevation of 1,997 m (SD = 379 m; R. Siegel unpublished data)..."*. Besides being more clearly defined (e.g., the elevation zone that contains 95% of detections from our 2009-2010 surveys), note that this range extends considerably further downslope than 1981m (6,500 ft).

Page 9, "Current range and distribution in California": Figure 2 is referred to for the first time in this section. My concern about Figure 2 is the characterization of all data since 1950 – up to 62 years ago – as 'current'. Much of the data on this map come from the Forest Service Black-backed Woodpecker MIS surveys that I direct in partnership with the Forest Service, so I know they are recent. However, from the information on the map I cannot determine the source of the data points in the far northwest – western Siskiyou County, Trinity County, and western Shasta County. If these records are indeed credible and relatively recent, then I have no concerns about this map. However, if these records are decades old or are not from reliable sources, then I think it is problematic to include them in a map of 'current' distribution. The reason for this is that these few records rather substantially expand the current range of the species in California, at least as it is mapped in Figure 3, which is presumably based on these records, although the methodology for delineating the range is not specified. If there are no recent, reliable records from the large lobe of the mapped range in the northwest, then that lobe should be removed.

My other, more minor concern about Figure 3 is that the map encompasses several expansive, largely unforested areas – e.g., Shasta Valley in the north, and the high Sierra spine of Sequoia and Kings Canyon National Parks in the south, among others – that are unlikely to contain Black-backed Woodpecker habitat. These kinds of scale issues frequently arise in range mapping, and for most purposes are not of major concern. I just want to point out that their inclusion may somewhat exaggerate the actual area of the species' range in California.

Page 10, "Nesting Habitat", 1st full paragraph: Substantial nest tree data from 3 recent studies (one published, 2 unpublished) in California should be included. Data from these 3 studies are summarized in Table 1 of Bond et al. (2012). Currently, the only nest tree data presented in the Status Review are from Raphael and White (1984), and the average nest-tree diameter reported is quite a bit larger than the nests my research group has found. I do not have access to Raphael and White (1984) at the moment, but I suspect the sample size was quite small, so I urge the Status Report authors to include the substantial nest-tree data summarized in Bond et al. (2012) that indicate smaller nest trees.

In the next paragraph, when nest stand sizes are summarized, the authors define what constitutes a stand ("areas of uniform tree species, size, and distribution") but should also make explicit whether this is the size of the overall forest patch, or rather the size of a burned area within a larger forest matrix.

Page 10, "Nesting Habitat", 3rd full paragraph: The authors' summary of Black-backed Woodpecker results from Bock and Lynch (1970) gives the impression that the results provide a meaningful estimate of habitat-specific nest density for the species: *"In the Sierra Nevada, Bock and Lynch (1970) noted higher black-backed woodpecker breeding densities in burned forest (3.2 pairs/40 ha [99ac]) compared to unburned forest (0.5 pairs/40 ha [99 ac])."* However a close reading of the Bock and Lynch paper reveals that the data do not sufficiently justify the Status Review using these estimates. The density estimates were based on surveys of just two 20.9-acre plots, one of which was in a recent fire area and the other in nearby unburned forest. Each plot apparently was within the home range **of just a single pair of Black-backed Woodpeckers**; the reported nesting densities are derived from how much of that single pair's home range was subjectively judged to be contained within the nest plot. I suggest removing these estimates from the Status Review altogether, as they suggest that nest density in burned forest is only 6.4 times greater than nest density in unburned forest, but are not based on adequate data for making this assertion. I believe the true ratio of nest density in burned forest versus unburned forest in California is far greater than this.

In the same paragraph, the authors write: *"Not all recently burned forest attracts black-backed woodpeckers equally, however. At a newly burned site in the Rocky Mountains, Hutto (2008) detected black-backed woodpeckers at 6% of his point count stations while Hoyt and Hannon (2002) found black-backed woodpeckers at 30-50% of sampling stations in a recently burned forest in Canada. In California, the mean occupancy probability for black-backed woodpeckers on recently burned study plots was 0.097 or 10% (Saracco et al. 2011). By comparison, studies in unburned habitat in California yielded a detection rate of 1.7% (R. Burnett et al. unpublished data in Bond et al. 2012)."* This passage is misleading because care is not taken to distinguish between detection rates and occupancy rates (the latter estimating and adjusting for detection probability < 1). The two metrics are not directly comparable.

Page 12, "Prey species habitat": The authors write: "*While research shows both wood-boring beetle and black-backed woodpecker abundance declines three years post-fire (Murphy and Lenhausen 1998, Saab et al. 2004, Ferris and Zack 2005, Nappi and Drapeau 2009), other studies have found an additional peak in combined abundance six to ten years post-fire (Hoyt and Hannon 2002, Nappi et al. 2010, Saracco et al. 2011, Dudley et al. 2012). A smaller peak in* *beetle abundance may be attributed to delayed mortality of large-diameter trees on the edges of burns, due to variations in fire severity, allowing for long-term presence of deadwood associated with post-fire conditions (Nappi et al. 2010, Dudley et al. 2012).* I think the suggestion that there are two peaks in woodpecker abundance during the decade after fire is a mischaracterization of the data. Everyone who has looked at this has found that Black-backed Woodpecker abundance after fire reaches a peak within a few years and then declines; different analysis of data from different study sites have suggested the decline begins anywhere from about 3-6 years post-fire, but I know of no evidence for multiple peaks in abundance over time at the same site or set of sites.

Page 13, "Home Range": The ecological literature provides many different analytical methods for estimating animal home ranges based on animal movements, some with very different assumptions about what a home range is, and potentially yielding widely varying home range estimates from the same set of animal movement data. When presenting estimates from different studies side by side, as in this summary, it is critical to indicate which analytical methods (e.g., Minimum Convex Polygon, Fixed Kernal, etc.) were used to estimate home range size for each estimate, and whether the home range estimates describe 100% of the utilization distribution, or 95%, 50%, etc. Otherwise, it is not at all clear whether the estimates are comparable.

Page 15, "Current abundance in California": The authors summarize the rather broad range of population estimates for Black-backed Woodpeckers in California, which is appropriate. However I think it is important to stress here that all of these estimates are from the gray literature – not one has been through the rigorous peer review process associated with scientific publication.

Page 17, "Statewide": The authors write: *"Small population size increases the risk of extirpation by a variety of stochastic events, particularly if the population is isolated (Traill et al. 2007, Traill et al. 2010). However, a species with a small population size may not necessarily be in serious danger of extinction; population viability is also related to environmental context and life history factors (Flather et al. 2011). There is no information indicating the black-backed woodpecker population in California is isolated from populations in Oregon. Therefore, many of the risks of extinction inherent to small isolated populations identified by Trail et al. (2009) are not applicable to black-backed woodpeckers in California. Further, the black-backed woodpecker range trend in California is stable and there is no information suggesting the population trend in California is in decline."*

I think this section is overly breezy in its dismissal of a major reason for concern about Black-backed Woodpeckers in California: small population size. Earlier in the document the authors summarize recent population estimates for Black-backed Woodpeckers in California, but do not take a clear position on the relative merits of the various estimates. The population estimates range from relatively small (as many as perhaps 8,000 pairs, adding the upper bounds of the highest estimates for burned and unburned forests) to extremely small (fewer than 400 pairs, adding the lower bounds of the lowest estimates for burned and unburned forests). Much of the decision about whether to list Black-backed Woodpecker in California must hinge on a determination of whether the population is indeed small enough to be at risk of extinction due to stochastic events (e.g., several successive years without large fires in the species' range), as well as deleterious habitat management (e.g., widespread salvage logging or other post-fire management that removes large numbers of snags), or a combination of both kinds of factors. It is not clear to me how the authors, without having explicitly embraced or rejected any particular population estimate, have determined that the risks generally associated with small populations do not apply here. I believe this section would be greatly improved by a) a reasoned opinion about the size of the California population, and b) a much more explicit discussion of the risks that small populations face, and why the authors do not think those risks apply to Black-backed Woodpeckers in California.

Page 18, "Salvage": This section, and especially the section on **Existing Management Efforts** that begins on page 26, would be improved by a more careful use of terminology. The Society of American Forester's *Dictionary of Forestry* defines salvage as "the removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost." 'Salvage logging' thus has two key characteristics: 1) it involves the harvesting of injured or dead trees, and 2) the purpose of the logging is to recover economic value. While much post-fire snag removal in California is indeed salvage logging, there are other reasons for such activities as well. These other reasons are sometimes the primary reasons given to justify the management action, and they include:

- Removal of the hazard of dead trees falling on people, roads, or human structures.
- Reducing the likelihood of successive fires.
- Site preparation for activities aimed at accelerating the return of unburned forest – for reasons including timber production as well as habitat restoration for species dependent on forest conditions that are not met in burned areas.

When the authors discuss the effects and extent of 'salvage logging' it is unclear whether they are using the more narrow definition of the word or rather a more expansive definition that perhaps includes all post-fire snag removal for any reason.

Additionally, as the Status Report authors point out, 'salvage' does not necessarily mean extensive and complete removal of snags from an area – rather it can vary dramatically in intensity and in effect on the subsequent landscape. Some less intensive forms of post-fire snag removal are likely compatible or at least somewhat compatible with Black-backed Woodpecker occupancy and reproduction, while other more intensive forms are not. It should therefore be noted explicitly in the Status Report (but currently isn't) that when salvage logging is implemented on private lands, it typically involves the removal of virtually every last snag, rendering the habitat completely unsuitable for Black-backed Woodpeckers.

Page 24, "Fire and climate interactions": The authors write: *"There is broad agreement amongst these recent studies that the extent of wildfire-burned area is likely to increase in the forests of Northern California for at least the next several decades...Accordingly, it appears the influence of climate change on future wildfire activity is likely to increase the amount of burned-forest foraging and nesting habitat available to black-backed woodpeckers."*

I believe this statement is true, but it is not the whole truth. The authors should add an acknowledgement that increased fire activity will yield more Black-backed Woodpecker habitat only to the extent that the resulting burned areas are retained on the landscape without the snags being removed. Creation and maintenance of post-fire Black-backed Woodpecker habitat does not depend just on fire occurrence, but on the combination of fire and post-fire forest management practices that support Black-backed Woodpecker occupancy and reproduction.

Page 25, "Disease": Change "Procymea" to "Procyrnea".

Page 26, "U.S. Forest Service Management": One component of Forest Service management that is not addressed in the Status Report at all is the issuance of wood-cutting permits. Many burned areas, including areas where salvage logging or other post-fire snag removal have not been prescribed by Forest Service land managers (and which are presumably classified as 'un-salvaged' in the statistics presented to summarize how much salvage logging occurs), are subject to small-scale wood-cutting by permit-holders. In some locations, particularly where Forest Service road density is high, the cumulative activity of many wood-cutters may be substantial. In the last two years, in two of the three intensive study areas where my research group has conducted Black-backed Woodpecker research and been present in the fire area daily throughout the summer, the drone of wood-cutters' chainsaws was a constant presence. Stumps of snags cut post-fire were abundant (again, in areas where post-fire logging was not prescribed by the Forest Service) and in two instances, snags within 20 m of active Black-backed Woodpecker nests that we were monitoring were removed by wood-cutters. I believe the cumulative impact of small-scale wood-cutting, which extends far beyond the footprint of areas treated with salvage logging or other larger-scale management activities that remove snags, should be assessed or at least acknowledged.

Page 30, "Non-governmental Organization Designations", 1st partial paragraph: The text indicates that Bond et al. 2012 (*A Black-backed Woodpecker Conservation Strategy for California*) is currently undergoing peer review but the document was finalized as of October 2012, and is available at http://www.birdpop.org/DownloadDocuments/BBWO_Conservation_Strategy_for_CA_V1.0.pdf.

Page 30, "Management Recommendations": The Status Report reproduces selected management recommendations from Bond et al. (2012), but the authors obtained these from an early, draft version of the document. The recommendations were subsequently revised, incorporating input from various reviewers. I urge the authors to replace the recommendations presented in the Status Report with the revised recommendations that are now in the finalized document.

Page 32, "Life history": I suggest inserting the bold text into the following passage: "*Importance of bark beetles and bark beetle-killed forest* ***in California*** *to black-backed woodpeckers is unknown."*

Page 33, PRESENT OR THREATENED MODIFICATION OR DESTRUCTION OF HABITAT: I disagree with the statement,

- *"There is uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging."*

Rather, there is a strong scientific consensus from many studies in many places that post-fire salvage logging is detrimental to Black-backed Woodpeckers. A more accurate statement would be:

- The magnitude of the threat posted to Black-backed Woodpeckers by post-fire salvage logging is concomitant with the extent and intensity of the post-fire salvage logging.

Page 33, "HABITAT PREFERENCES": I suggest inserting the bold text into the following passage:

- *Breeding densities are* ***much*** *greater in burned forest compared to unburned forest.*
- *Black-backed woodpecker nest densities are highest in areas with the highest snag densities.*
- *Large patches of* ***burned forest*** *appear to be* ***optimal*** *for nesting.*
- *Studies* ***in California and*** *elsewhere suggest black-backed woodpecker home range is large but varies with vegetation type, habitat quality, food availability, number of years after a burn, elevation and geographic location.*

Page 34, "RANGE ISOLATION": The authors write, *"Black-backed woodpecker populations in California are not isolated from populations in adjacent states"*. To some degree, this is incontrovertibly true because we know birds currently occur in at least one recent fire area that straddles the California-Oregon border. Nevertheless, it is unknown how much gene flow occurs between the Oregon birds and the bulk of the California population. Conifer forest is somewhat fragmented and discontinuous in parts of northeastern California, giving rise to the possibility that there is relatively little gene flow between birds in Oregon and the Modoc area in the north, and birds on Lassen NF and the Sierra Nevada to the south. In the next section of the document ("Genetic Distinctiveness") the authors appropriately acknowledge that there is some uncertainty in how the California birds fit into the larger genetic population structure of the species, because genetic data from CA birds are not yet available. It seems that for the same reasons, some uncertainty should be indicated in the Range Isolation section.

Page 34, "OTHER NATURAL OCCURRENCES OR HUMAN-RELATED ACTIVITIES": I suggest inserting the bold text into this passage:

Black-backed woodpeckers may be vulnerable to predicted climate change in California. Future loss of coniferous forest habitat and increasing mean annual temperatures were considered important variables that could negatively impact the species. However, projected increases in fire frequency would likely benefit black-backed woodpeckers ***to the extent that post-fire snag removal is not increased concomitantly****.*

Review of ‘Report to the fish and game commission, draft for peer review, a status review of the black-backed woodpecker (Picoides arcticus) in California’ by Dr. Scott Stephens, ESPM Department, UC Berkeley.

Information provided in the report on the black-backed woodpecker indicates that it is not a species in decline. The current range of the back-backed woodpecker in California is similar to the historic range and includes the Sierra Nevada, Cascade Ranges, the Warner Mountains, and parts of the Siskiyou Mountains. Recent local records have extended the range of the black-back woodpecker southward to the southern Sierra Nevada.

The report concludes ‘The current range of the black-backed woodpecker in California is greater than the documented historical range but likely does not represent range expansion but rather, is the result of better observer coverage and the species known ability to respond to favorable habitat conditions.’ This is a logical conclusion that is supported by the information in this report.

Multiple references are provided in this report regarding the preference of back-backed woodpeckers to recently burned forests, especially with dead, standing trees. Studies conducted in California found that black-backed woodpeckers nest success was higher in burned forests compared to beetle-killed forests. The report also states that black-backed woodpeckers can live and nest in green forests but at lower densities than areas that have been recently burned.

Post-fire salvage logging reduced back-backed woodpecker foraging activity and nesting density in severely burned forests in the Sierra Nevada and Rocky Mountains. The report states ‘There is uncertainty regarding the magnitude of the threat posed to back-backed woodpeckers by post-fire salvage logging. The degree of salvage logging carried out varies by landowner. Large burned areas outside of special management zones on federal lands are typically salvaged, although recent management direction has been to retain some snags of all size classes and to incorporate blocks of unsalvaged forests within those projects.’ Current land management practices on federal lands have been modified to incorporate habitat requirements of the black-back woodpecker.

Current research on wildfire area and severity in the Sierra Nevada and Southern Cascades documents an increase in both of these fire regime characteristics. The report cites Miller et al. 2009 for this information, a newer paper is now available that updates their analysis

Miller, J.D., and H. Safford. 2013. Trends in Wildfire Severity: 1984 to 2010 in the Sierra Nevada, Modoc Plateau, and Southern Cascades, California, USA. Fire Ecology 8: 41-57.
DOI: 10.4996/fireecology.0803041

In this new paper the authors state:

Time-series regression modeling indicates that the percentage of total high severity per year for a combination of yellow pine (ponderosa pine [Pinus ponderosa Lawson & C. Lawson] or Jeffrey pine [P. jeffreyi Balf.]) and mixed-conifer forests increased significantly over the 27-year period. The annual area of high-severity fire also increased significantly in yellow pine-mixed-conifer forests. The percentage of high severity in fires ≥400 ha burning in yellow pine-mixed-conifer forests was significantly higher than in fires <400 ha. Additionally, the number of fires ≥400 ha significantly increased over the 1950 to 2010 period. There were no significant trends in red fir (Abies magnifica A. Murray bis) forests.

This paper provides further evidence that fire area and severity are increasing in many forest types in the Sierra Nevada and Southern Cascades.

Multiple papers have forecasted increasing forest fire areas as climate continue to warm in California and the rest of the western US. With increasing fire area and severity this will provide more habitat for the black-backed woodpecker. It is possible that further increases in fire frequency tied to climate change could transform some areas dominated by coniferous forests to shrublands and hardwood forests which could reduce the habitat quality for black-backed woodpecker. However, no information today has shown such an outcome. In summary, the increased trend in fire area and severity that we are already experiencing will be beneficial to the back-back woodpecker as long as forests are not converted to other vegetation types over large spatial scales.

The US Forest Service and US National Park Service are expanding the management of wildfires for resource benefit which will also increase habitat for back-backed woodpeckers since such fires will have a variety of severity levels.

The report concludes 'It appears the influence of climate change on future wildfire activity is likely to increase the amount of burned forest foraging and nesting habitat available to black-backed woodpeckers.' I strongly support this conclusion.

In summary, I agree with the report's conclusion that there is insufficient scientific information to list the black-back woodpecker.

Sincerely,

Dr. Scott Stephens
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University of California, Berkeley