CENTER *for* BIOLOGICAL DIVERSITY

THE JOHN MUIR PROJECT of EARTH ISLAND INSTITUTE

June 11, 2013

California Fish and Game Commission
Attn: Sonke Mastrup, Executive Director
1416 Ninth Street, Suite 1320
Sacramento, CA 95814
fgc@fgc.ca.gov

Re: Black-Backed Woodpecker Status Reviews

Dear Commission,

We have carefully read the May 6, 2013, Status Review by the California Department of Fish and Wildlife (DFW) for the Black-backed Woodpecker (*Picoides arcticus*), as well as the peer reviews of that document solicited by DFW. While we support and appreciate many of the management recommendations in the document that were adopted from the Black-backed Woodpecker Conservation Strategy (Bond et al. 2012 [see pp. 31-40 of DFW's Status Review]), we respectfully disagree with the Department's listing recommendation because it is not based on the best available science.

We hope, instead, that the Commission will base its decision on the independent Status Review that we submitted (Hanson 2012, submitted to the Commission on February 11, 2013). You can do this for the following reasons: 1) the independent Status Review was authored by a scientist who is an expert in regard to the species at issue, 2) the independent Status Review was peer-reviewed by other experts, as well as fire ecologists, and found to be based on the best available science, 3) the independent Status Review is not undercut in any way by the Department's Status Review, and provides a more in-depth analysis than did the Department, and 4) two recently published studies, as well as a Ph.D. dissertation, not only further support the independent Status Review's findings, they all demonstrate that we should be even more concerned about the Black-backed Woodpecker's status.

Overall, while there exist many complex scientific issues at stake in this listing decision, the situation largely boils down to the two following facts: 1.) Black-backed Woodpeckers eat, sleep, and reproduce overwhelmingly in dense, mature/old forest that has burned at moderate to high severity, and 2) this is the very kind of forest that is most targeted by salvage logging (e.g., because it contains the biggest trees and the greatest amount of basal area per acre). Moreover, this is not conjecture. We recently (May 2013) visited high-quality, burned-forest habitat on the

Lassen and Plumas National Forests – the only high-quality habitat in California that was produced last summer – and in areas currently designated to be salvage logged, we found Black-backed Woodpeckers. We therefore urge the Commissioners who have a distaste for any listing that might impact the timber industry, to set that aside, and to recognize that Black-backed Woodpeckers in California do in fact need help. Indeed, ask yourself, if your home was being knocked down, and someone had the power to stop it, would you not want them to? Again, this is not hyperbole or conjecture – it is exactly the situation you are confronted with.

The independent Status Review we submitted provides you with a clear framework for listing. As explained in detail in our review, listing of the Black-backed Woodpecker is warranted because the species is at least likely to become endangered in the foreseeable future (100 years) as a result of its isolation and low population size combined with a) very limited snag forest habitat that currently exists, b) lack of new snag forest habitat, c) the short-lived nature of snag forest habitat, d) loss of the snag forest habitat that is created due to salvage logging, e) climate change, and f) lack of meaningful legal protection for its habitat.

The best available science shows that Black-backed Woodpeckers rely primarily on "snag forest habitat," which is created by large patches of moderate/high-severity fire that has occurred in dense, mature/old, higher-elevation conifer forest. This habitat type is only sufficient for Black-backed Woodpeckers shortly after the fire occurs (i.e., for approximately seven or eight years, typically). Furthermore, not only is snag forest habitat ephemeral, it is very rare on the landscape to begin with due to three overarching reasons: 1) fire suppression (which, when fires do occur, prevents snag forest habitat from being created in greater amounts), 2) fire prevention (meaning the mechanical thinning and other efforts taken to prevent high-severity fire, and hence, snag forest habitat, from occurring at all), and 3) salvage logging (which eliminates snag forest habitat when it does occur). Consequently, only in those rare instances where the above three factors do not play out does new snag forest habitat occur.

The above three factors are playing out to a significant degree unfortunately. On public and private forests, fire suppression, fire prevention, and salvage logging are the dominant modus operandi, and there are no meaningful regulatory mechanisms, such as protection from salvage logging, that currently exist; consequently, both the Forest Service and private land holders can salvage log woodpecker habitat, and do—even in active nest sites in the middle of nesting season (the Forest Service has stated its intention to begin at least some of the planned post-fire logging of the 2012 fires during Black-backed Woodpecker nesting season this year). Moreover, this is not a matter of choosing woodpecker conservation over home/community protection. It is well established that the most effective way to protect homes is to create defensible space within 200 feet of individual structures (and to reduce combustibility of roofing)—not to conduct logging operations in mature forest wildlands that are far from homes (Cohen 2000, Cohen and Stratton 2008).

Furthermore, subsequent to the submittal of our Status Review in February, three new publications have been issued that demonstrate that our concern for Black-backeds should be even <u>more</u> heightened. First, a Ph.D. dissertation[1] was very recently approved that found that

[1] Rota, C.T. 2013. Not all forests are disturbed equally: population dynamics and resource selection of Black-backed Woodpeckers in the Black Hills, South Dakota. Ph.D. Dissertation, University of Missouri-Columbia, MO.

Black-backed Woodpeckers only maintain stable or increasing populations (i.e., viable populations) in recent higher-severity fire occurring within areas that, pre-fire, consisted of dense mature/older forest. Specifically, this equates to areas with more than 68% basal area mortality at the home range scale, creating over 21 square meters per hectare of snag basal area (Siegel et al. 2013, Table 4 and page 45; see, also, highly similar results in Rota 2013, Figure 2.1: Black-backed Woodpeckers selecting recent wildland fire areas with over 62% mortality, and over 27 square meters per hectare of snag basal area), and 93% basal area mortality in nesting habitat (Siegel et al. 2013, Table 13). Such areas are high-quality in part because they have very high densities of large wood-boring beetle larvae due to the very high densities of medium/large fire-killed trees (Rota 2013, Siegel et al. 2013). In addition, while Rota (2013) found that Black-backeds are occasionally found in unburned forest or prescribed burn areas, these unburned "beetle-killed" forests (unburned forest areas with high levels of tree mortality from small pine beetles), as well as lower-severity prescribed burned forests, have declining populations of Black-backed Woodpeckers. In other words, the study shows that unburned beetle-kill forests (and low-severity prescribed burn areas) do not support stable, viable populations. Instead, these very high snag-density beetle-kill areas are important only because they tend to slow the population decline of Black-backed Woodpeckers in between occurrences of wildland fire (if prescribed burns were conducted within the natural fire season, and achieved substantial higher-severity fire effects, which almost never occurs currently, Rota's results suggest that such prescribed fire would provide suitable habitat). This distinction is important to recognize because, while it demonstrates that a narrow subset of unburned forest can have value to Black-backed Woodpeckers by slowing their decline, these areas nevertheless are areas where the species declines. In fact, population decline rates were alarmingly fast in unburned beetle-mortality areas and low-severity prescribed burn areas (Rota 2013), indicating that such areas do not provide suitable primary habitat that can maintain viable populations of the species. Therefore, while unburned areas should be protected because they can help slow the woodpecker's decline, they cannot be considered sufficient habitat for the species.

Second, Odion and Hanson (2013)[2] found that high-severity fire, which creates the primary habitat for Black-backed Woodpeckers, has declined by fivefold since the early 20th century in the Sierra Nevada and eastern Oregon Cascades due to fire suppression. The study also shows that the combined effect of a moderate version of current forest management direction – prefire thinning of 20% of the mature/old forest (in order to enhance fire suppression), combined with post-fire logging of one-third of the primary Black-backed Woodpecker habitat over the next 27 years – would reduce primary Black-backed Woodpecker habitat from an already alarmingly low 0.66% of the forested landscape to a mere 0.20% (1/500th), thereby seriously threatening the viability of Black-backed Woodpecker populations. The results of this study are valid because all modeling parameters were calibrated with actual field data, from multiple sources, with regard to high quality Black-backed Woodpecker habitat (in terms of snag basal area and time-since-fire), forest basal area regrowth rates over time following stand initiation, and the current rate of high-severity fire. As discussed below, the Forest Service is currently planning to conduct post-fire salvage logging of 42-56% (i.e., well over 33%) of the highest quality Black-backed Woodpecker habitat that currently exists in California, and is proposing to increase

[2] Odion, D.C., and Hanson, C.T. 2013. Projecting impacts of fire management on a biodiversity indicator in the Sierra Nevada and Cascades, USA: the Black-backed Woodpecker. The Open Forest Science Journal 6: 14-23.

mechanical thinning to a rate of approximately 90-100%, or more, of the forest over the next 27 years (i.e., far more than the 20% over 27 years used to assess threats in Odion and Hanson 2013).

Third, Hanson and Odion (2013)[3] conducted the first comprehensive assessment of fire severity since 1984 in the Sierra Nevada using 100% of available fire severity data, and found no increasing trend in terms of high-severity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion (2013) also checked the results of Miller et al. (2009) and Miller and Safford (2012) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion (2013) found that there is a statistically significant bias in both studies ($p = 0.025$ and $p = 0.021$, respectively), the effect of which is to exclude relatively more conifer forest experiencing high-severity fire in the earlier years of the time series, thus creating the false appearance of an increasing trend in fire severity. Hanson and Odion (2013) also found that the regional fire severity data set used by Miller et al. (2009) and Miller and Safford (2012) disproportionately excluded fires in the earlier years of the time series, relative to the standard national fire severity data set (www.mtbs.gov) used in other fire severity trend studies, resulting in an additional bias which created, once again, the inaccurate appearance of relatively less high-severity fire in the earlier years, and relatively more in more recent years. Thus, the best available science now demonstrates that one of DFW's core assumptions – a "trending increase in fire frequency, size, and severity" – is simply not true.

Further, it is important to keep in mind that California Black-backed Woodpeckers are isolated from the boreal population and may even be isolated from Oregon woodpeckers – the Oregon/California population is a subspecies, and it may also be that the California birds are separated from the Oregon birds, thus potentially making them even more vulnerable. Although the science on this issue is still under analysis, addressing this issue from a conservation perspective means that we should act cautiously. This is partly why wildlife agencies are "not obligated to have data on all aspects of a species' biology prior to reaching a determination on listing"[4] – to ensure that we make conservation based decisions while awaiting new information. Here, a conservation approach would be to assume, in light of the available evidence, that California is isolated from Oregon. This assumption would best protect the species and would allow the situation to be reassessed should new information prove otherwise. There is no good reason to place the burden of this risk on the species, and we are at a loss to understand why the Department, or anyone, is willing to do so.

Regardless, the best available science shows that Black-backed Woodpecker numbers in California are likely very low – about 600 pairs. Our population estimate (which is extensively described in our Status Review) is the most supportable because it a) relies on the best available science regarding post-fire forest habitat in California, and b) relies on the best available science regarding likely use of unburned forest habitat. Other estimates, on the other hand (i.e., Fogg et al. 2012), rely on unsupportable assumptions regarding unburned forest habitat use. Moreover, as just discussed above, the only available science that has examined viability in unburned forest

[3] Hanson, C.T., and D.C. Odion. 2013. Is fire severity increasing in the Sierra Nevada mountains, California, USA? International Journal of Wildland Fire (in press).

[4] *Defenders of Wildlife v. Babbitt*, 958 F.Supp. 670, 679-81 (D.D.C. 1997).

– Rota (2013) – found non-viability in such forests. Our estimate was not addressed by the Department. Instead, the Department Status Review lists various estimates but fails to provide any context or analysis for which of those estimates is the best or supportable. Our independent Status Review, on the other hand, carefully explained the following: 1) why our estimate is the most supportable, 2) why other estimates are not supportable, and 3) why our estimate indicates that Black-backed Woodpeckers are at risk of endangerment due to small population size. This issue is a serious one, and goes to the heart of whether to list the species, and we therefore urge the Commission to pay careful attention to the analysis in the independent Status Review.

In light of the foregoing, and the detailed information provided in our Status review, we believe it is necessary to conclude that Black-backed Woodpeckers in California meet the criteria for "threatened" status because they will likely become endangered in the "foreseeable future" in the absence of "special protection and management efforts." (Fish & Game Code, § 2067, Cal. Code Regs., tit. 14, § 670.1). Per CESA's implementing regulations, "a species shall be listed as endangered or threatened . . . if . . . 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).) Given the threats we have described, and given that the best available population estimate shows that the species has far fewer numbers than the minimum viable population threshold identified in the scientific literature for bird species, this species meets the definition of threatened.

While we hope the Commission will rely on our independent Status Review, we recognize that the Commission may feel tempted to follow the Department's recommendation in light of the Commission's close association with the Department. However, as we explain in great detail below, the key rationales underlying DFW's recommendation do not comport with CESA's guiding principles, and are not supported by the best available science.

Instead, the Department's Status Review, time and again, when confronted with uncertainty regarding the woodpecker's biology, chooses to rely on the assumption that requires the woodpecker to bear the burden of risk. For example, the Department assumes the California woodpeckers are connected to the Oregon woodpeckers despite evidence suggesting the potential otherwise, and assumes that unburned forest can adequately support the species despite significant evidence to the contrary. Had either of these assumptions gone the other way, as they should, the Department's conclusions would likewise have gone the other way.

Under CESA, it is not proper for the Department to weigh uncertainty against the species. To do so means risking the decline or loss of a species simply because the Department believes it should wait for more conclusive evidence. CESA does not allow this. Instead, CESA seeks to protect species before it is too late. Like the Federal ESA, CESA "contains no requirement that the evidence be conclusive in order for a species to be listed." *Defenders of Wildlife v. Babbitt*, 958 F.Supp. 670, 679-81 (D.D.C. 1997). This is why wildlife agencies are "not obligated to have data on all aspects of a species' biology prior to reaching a determination on listing." *Id*. A species should be listed "even though many aspects of the species' status [are] 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]." *Id*. It is imperative,

therefore, that this Commission not simply defer to the Department's recommendation. Rather, our Status Review – which, again, is peer reviewed and complies with all applicable law (see 14 CCR 670.1) – is the only Status Review that a) relies on the best available science, and b) does so while placing uncertainty in its proper perspective. We are confident that had the Department followed the same framework, it too would recommend that listing is warranted.

Further, "the purpose of creating a separate designation for species which are '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." *Id.* This simple fact is crucial to keep in mind because it appears that the Department is only willing to recommend listing when a species is literally at extinction's door. Nowhere in their documents have we found a rational explanation as to why these woodpeckers are not likely to become endangered in the foreseeable future—indeed, the document does not even once discuss the issue of foreseeability.

We want to emphasize, however, that our discussion below of the Department's Status Review is in no way meant to nitpick their findings. Rather, just like the issue of foreseeability, every issue below goes to the very heart of this species' ecology and status. Again, we appreciate that the Department has made management recommendations that can benefit the species but, just like the Forest Service's Conservation Strategy, such management recommendations have no bearing at all unless they are adopted and enforced by agencies. This is why listing under CESA is so important – it is only then that aspirations become reality because CESA actually requires on the ground action. This is why we painstakingly address the Department's findings – because listing is so critical to ensuring that actions that benefit the species will in fact occur.

Finally, we want to emphasize that our goal for the upcoming June Commission meeting is to have a meaningful dialogue with all members of the Commission. The scientific issues at play in this listing decision are not easy to understand and in some instances are not what one would initially expect. Indeed, until recently, it was assumed that high-severity fire had no ecological value <u>at all</u>, and now scientists understand that just the opposite is true—it creates one of the rarest and most important habitat types of all. In fact, this fundamental scientific misunderstanding is one of the key reasons that listing of Black-backed Woodpeckers is necessary – for decades, and currently, our society has suppressed fire, and then, when it does occur, has all too often allowed the resultant burned forest to be clear-cut. In light of the complex scientific issues before the Commission, the only way to achieve as informed a decision as possible is if there is a dialogue about these issues, and we therefore encourage the Commission to ask questions of us at the upcoming meeting. We consider it our job to help educate the Commission, and we hope that the Commission will facilitate that by engaging us.

We now turn to the scientific issues that we believe were not accurately portrayed in the Department's Review:

<u>Degree of Genetic Isolation and Distinctiveness</u>

On page 2 of DFW's Status Review, DFW states the following: "[T]he degree to which the California population is genetically connected to the larger population of blackbacked

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." This is misleading. As discussed in detail in our Petition, Pierson et al. (2010) determined that the Oregon/California population of Black-backed Woodpeckers is genetically distinct and isolated from the Rockies/boreal population (which includes the eastern Oregon Cascades) at the level of subspecies, due to habitat gaps of less than 30 miles between the eastern Oregon Cascades and the closest portions of the Rockies/boreal populations (in northeastern Oregon and across the Columbia River gorge in Washington). These seemingly minor gaps in habitat were found to be sufficient to cause effective prevention of gene flow between Oregon/California and the Rockies/boreal population (Pierson et al. 2010). The gap between the California population and the closest portion of the Rockies/boreal population (northeastern Oregon and western Idaho) is over 200 miles (across high desert).

Moreover, while the habitat gaps (created by large expanses of meadows/wetlands and lava fields) between Oregon and California are on the order of 10-20 miles, rather than 30 or so miles, there are several such gaps. Recent genetic sampling of California's woodpeckers reveals that there is at least some genetic distinction between the Oregon population and the California population (Siegel et al. 2013, Appendix 2, Figure 2). While the extent of the genetic distinction is currently still being assessed, and is therefore unknown, that does not mean we should assume the California and Oregon populations are connected. Rather, as already expressed above, in light of what is known, and from a conservation perspective, it would be most prudent to assume that the populations are <u>not</u> connected so as best to protect them in case we learn later on that that is in fact true.

Moreover, an April 17, 2013, email message from one DFW staff member to another regarding the recent genetic sampling of California's woodpeckers, posits that there are three possibilities with regard to this new genetic information: 1) that what appears to be genetic isolation may be due to "small sample sizes and inaccuracy in estimating the true allele frequencies"; 2) that the apparent distinction between California and Oregon may be due to a "clinal gradient of allele frequencies from north to south," rather than a genuine genetic distinction; or 3) California and Oregon "are, in fact, genetically unique."[5] With regard to the first possibility, as the DFW staff member also notes, comparisons between populations should have a sample size of 20-30 for each population. Siegel et al. (2013, Appendix 2) had a sample size of 21—within the range that DFW recommends (the Oregon sample size was also over 20 [see Pierson et al. 2010]). With regard to the second possibility mentioned, Siegel et al. (2013) shows that all 21 of the California samples were taken from the very northernmost portion of the Sierra-Nevada/southern-Cascades forested region—i.e., the very northern tip of the population, just south of the habitat gaps between the California population (Sierra-Nevada/southern-Cascades) and the Oregon population (where the samples were taken from the Fremont National Forest just north of the California border). In other words, the California samples were taken from locations closest to the Oregon population—i.e., the place where genetic distinctions between California and Oregon

[5] The DFW staff member also suggests that Pierson et al. (2010) "had to" genetically type each sample three times, and that this indicates a lack of reliability of that data. This is incorrect. Pierson et al. (2010) chose to analyze each sample three times in order to not only double-check, but triple-check the findings (which is standard protocol in genetic typing analyses)—a level of diligence that raises the credibility of the results, not the opposite (see p. 3 of Pierson et al. 2010).

would be at their lowest level. In order for the clinal gradient hypothesis to be most relevant, the California samples would have to have been taken from an area hundreds of miles further south. That, of course, leaves as a reasonable interpretation, that California and Oregon "are, in fact, genetically unique." In short, while the available science is inconclusive as to the extent of genetic distinction between California and Oregon woodpeckers, the wisest, and most conservation-based approach, is to recognize that the available science suggests that the populations may be distinct and to therefore assume that until better information is available.

Furthermore, based on the foregoing information, it is not reasonable for DFW to report, as they did (DFW Status Review, p.17), the following: "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." Not only is the assertion about "no" indication of genetic isolation between CA and OR incorrect based upon the record to date, the statement about Black-backed's supposed ability to "move long distances" is also not scientifically sound. Pierson et al. (2010) found that the 30-mile or so habitat gaps separating the Rockies/boreal population from the eastern Oregon Cascades population genetically isolated these two populations from one another. Similarly, Hoyt and Hannon (2002) found that Black-backed Woodpeckers disperse to new habitat over distances as much as about 30 miles, but not further, largely consistent with the relatively limited dispersal distances documented by Rota (2013). Moreover, DFW's claim that Black-backeds "move long distances" (DFW Status Review, p. 17) is not supported by a citation to any source. To the extent that DFW is relying upon the three sources cited on pp. 7-8 of their Status Review—Van Tyne 1926, West and Speirs 1959, and Yunick 1985—this would be misleading. The first two of these are simply anecdotal accounts of amateur claims of Black-backed Woodpecker sightings, rather than empirical data, and the third, Yunick (1985) is, again, a summary of anecdotal accounts of amateurs, mostly relying upon Van Tyne (1926) and West and Speirs (1959). Perhaps more importantly, none of these sources document the distance that Black-backed Woodpeckers moved in any particular year (e.g., a group could have moved a mere 10-15 miles into an area of recent tree mortality that happened to be closer to human habitation and, thus, more available for observation by humans), and the areas discussed in these accounts were in Canada, the upper Midwestern U.S. forests, and forests of New England—well within, or not far outside of, the mapped range of the Rockies/boreal population (see Pierson et al. 2010, Figure 1). Thus, as things currently stand, the most pragmatic, and well founded, approach, is to assume that the California and Oregon populations are distinct.

Unburned Forest

On page 1 of DFW's Status Review, DFW states the following: "[The Black-backed Woodpecker] 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." On page 3 of DFW's cover letter to the Commission, DFW states: "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 . . . ."

DFW's assertions do not address the relevant issue—i.e., whether the woodpecker's habitat has contracted. With an ephemeral species such as this one, the exterior boundaries of the range can remain stable, but the effective range within those boundaries can diminish, and the population can be at severe risk due to habitat contraction within the species' overall range. Here, that is exactly what the CBD and JMP Status Review carefully explained with detailed attention to the available data. We demonstrated, and our peer reviewers agreed, that the woodpecker's primary habitat – moderate to high severity burned forest – has decreased over the past century to a remarkable degree. With regard to DFW's assumption that Black-backed Woodpecker's maintain "low, but stable" population levels in unburned forest, that is a matter of conjecture on the part of DFW, as no existing data support this claim. Further, recent research addressing this very question – i.e., the best available science – strongly contradicts DFW's assumption (e.g., Rota 2013, discussed above, and showing that Black-backed Woodpeckers only maintain stable or increasing populations (i.e., viable populations) in recent higher-severity fire areas occurring within areas that, pre-fire, consisted of dense mature/older forest). Black-backed Woodpeckers are highly specialized and adapted to prey upon the large wood-boring beetle larvae found predominantly in recent higher-severity wildland fire areas (as opposed to the much smaller bark beetle larvae generally inhabiting unburned forests and low-severity prescribed burns). Moreover, while Black-backed Woodpeckers are naturally camouflaged against the charred bark of fire-killed trees, they are more conspicuous in unburned forests, or low-severity burned forests, and are much more vulnerable to predation by raptors in such areas, leading to much lower adult and juvenile survival in such areas, relative to recent higher-severity wildland fire areas (Rota 2013). Thus, DFW's assumptions are not supportable, and further, put the burden of risk on the species in violation of CESA as well as DFW's own mandates (e.g., their public trust duty to conserve wildlife)

Population and Range Contraction Relative to Historic Conditions

On page 1 of DFW's Status Review, DFW states the following: "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…[T]here is no evidence that the population size is substantially different than it was in historical times." Similarly, on page 2 of DFW's cover letter to the Commission, DFW states that the Black-backed Woodpecker "was historically and continues to be uncommon". This assumption, however, is directly contradicted by multiple lines of evidence, and is therefore not supported by the available literature.

First, in DFW's Status Review (pp. 8-9, 14-15), the descriptions of historical occurrence are both incorrect and misleading. While DFW's Status Review (pp. 16-17) acknowledges that accounts in recent decades consistently describe the Black-backed Woodpecker as rare or very rare in the Sierra Nevada, when evaluating historical data, DFW assumes that 1949 represents the relevant year to represent the temporal dividing line between historic and current abundance (DFW Status Review, p. 8). However, the evidence shows that high-severity fire began its dramatic decline by the 1920s, not the 1950s (Odion and Hanson 2013, Figure 2). Thus, DFW's use (DFW Status Review, pp. 14-15) of documents from the 1920s through the 1940s, which noted that Black-backed Woodpeckers were rare/uncommon during that time period in the Sierra Nevada, is not evidence that there has not been a reduction in populations from historical levels. The reduction

simply began earlier. In fact, all of the reports/studies from the 1920s through the present describe the Black-backed Woodpecker as uncommon, rare, or very rare (DFW Status Review, pp. 14-15), while multiple reports within the Black-backed Woodpecker's range in earlier years (prior to the 1920s) describe this species as 1) "quite numerous" all the way from the Lake Tahoe area northward into Oregon (Cooper 1870), 2) "rather common" from the central Sierra Nevada north to Oregon (Henshaw 1880, in Belding 1890), and 3) "fairly common" by Grinnell (1915) (see discussion on pp. 14-15 of DFW Status Review). DFW's Status Review (p. 15) erroneously or misleadingly cites four sources, prior to the 1920s, describing Black-backed Woodpeckers as uncommon or rare: Merriam (1899); Townsend (1887); Keeler (1899); and Adams (1907). The first two of these, Merriam (1899) and Townsend (1887) only refer to Black-backed Woodpeckers being rare or uncommon outside of their natural range, i.e., outside of the Sierra Nevada management region (specifically, Mt. Shasta, and areas *west* of the Sierra Nevada—i.e., the coast range, respectively) (see DFW Status Review, p. 15). Neither report described them as rare within their range in the Sierra Nevada management region (see also Grinnell 1915, p. 79, summarizing findings of numerous previous reports, and concluding that Black-backed Woodpeckers were fairly common in what we now refer to as the Sierra Nevada management region—i.e., the Sierra Nevada bioregion, southern Cascades around Mt. Lassen and east of Mt. Lassen, and Modoc Plateau). Keeler (1899) was not an account of personal observations from bird surveys in the Sierra Nevada (see p. 290 of Keeler 1899). Rather, it was an offhand comment in the appendix of a book that described personal accounts from surveys in a number of areas of California, but not the Sierra Nevada. In fact, for this appendix, the author claimed to have drawn notes about distribution patterns for each species from Belding (1890) (see p. 237 of Keeler 1899) but, as noted above, Belding (1890) specifically described Black-backed Woodpeckers as being "rather common" in the Sierra Nevada at that time. Adams (1907) was an observation in the Sierra Nevada, but was a reference to one very small area in the "Boreal zone" of Placer County—i.e., the Donner Pass area, which had been heavily clearcut of its forests by the railroad companies by the late 1800s (Leiberg 1902 [maps showing logged areas]). Moreover, as mentioned above (and on p. 15 of DFW's Status Review), both Cooper (1870) and Henshaw (1877) observed that Black-backed Woodpeckers were relatively common in this same area 30-37 years earlier, before most of the area had been extensively clearcut. Thus, the weight of the historical (pre-1920s) accounts within the natural range of the Black-backed Woodpecker describe this species as being quite, or fairly, numerous or common, while all accounts over the past several decades describe this bird as being rare, very rare, or extremely rare in the Sierra Nevada management region.

Second, in the September 2010 Petition from JMP and CBD (pp. 50-52), and the February 11, 2013 Status Review from JMP and CBD (pp. 19-22), we describe in detail multiple published studies showing that there was several times more high-severity fire in the Sierra Nevada management region (Sierra Nevada, southern Cascades in California, and Modoc Plateau) historically, prior to fire suppression, than there is currently. Given that DFW acknowledges (DFW Status Review, p. 1) that Black-backed Woodpecker nest density is far lower in unburned forest than it is in higher-severity burned forest, it is a matter of simple arithmetic that, because the areas where Black-backed Woodpecker concentrations are by far the highest are far more scarce compared to the early 20th century and earlier, and now comprise a much smaller proportion of the forested landscape, there are necessarily far fewer Black-backed Woodpeckers now than there were several decades ago. The only way for this not to be true is to assume,

contrary to all evidence (e.g., Russell et al. 2009), that Black-backed Woodpecker nest densities are approximately equal over areas of equal size in burned and unburned forest; but, again, DFW has already acknowledged that this is not the case. Indeed, in agreement with Petitioners, DFW stated earlier that "the current and projected annual area of high severity wildfire [and all fire] remains reduced" relative to its previous extent just several decades ago, and "the contemporary extent of high severity burns is far less than the extent that occurred" in the 19th century. DFW 9/30/11 memo to the Commission, p. 2.

Third, even more recent research directly contradicts DFW's assumptions. Odion and Hanson (2013) found that high-severity fire, which creates primary habitat for Black-backed Woodpeckers, has declined by fivefold since the early 20th century in the Sierra Nevada and eastern Oregon Cascades due to fire suppression. Further, the current rate of high-severity fire in mature/old forest (which creates primary, or high suitability, habitat for this species) in the Sierra Nevada and eastern Oregon Cascades is so low, and recent high-severity fire in mature/old forest comprises such a tiny percentage of the overall forested landscape currently (0.66%, or about 1/150th of the landscape), that even if high-severity fire in mature/old forest was increased by several times, it would only amount to a very small proportional reduction in mature/old forest, while getting Black-backed Woodpecker habitat closer to its historical, natural levels. Conversely, the combined effect of a moderate version of current forest management—prefire thinning of 20% of the mature/old forest (in order to enhance fire suppression) over the next 27 years, combined with post-fire logging of one-third of the primary Black-backed Woodpecker habitat, would reduce primary Black-backed Woodpecker habitat to an alarmingly low 0.20% (1/500th) of the forested landscape, seriously threatening the viability of Black-backed Woodpecker populations (modeling parameters were calibrated with actual field data and empirical results, thus these results reflect real threats, not hypothetical conditions).

Based on the foregoing, DFW's assertion (DFW Status Review, p. 1)—that "[t]here has been no significant change…in the distribution of individuals within the range"—is strongly contradicted by the best available evidence.

Current Population Levels and Vulnerability of Very Small Populations to Extinction

On page 1 of DFW's Status Review, DFW states the following: "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)." DFW further asserts, on page 3 of their cover letter to the Commission, that "there is a lack of information concerning whether…the species' small population size affect[s] the woodpecker in any significant way." On page 15, DFW's Status Review refers to a Black-backed Woodpecker population estimate of 470-1341 pairs, citing Siegel et al. (2010); but, then on page 16, DFW cites to another report, Fogg et al. (2012), for the proposition that there may be 1,398-6,899 occupied Black-backed Woodpecker territories in CA, and to Rosenberg (2004) for the proposition that there may be 6,300 individuals in CA. DFW (p. 16) notes that Petitioners' estimate of 600 pairs or fewer in CA is within the range estimated by Siegel et al. (2010).

However, with regard to Fogg et al. (2012), DFW failed to explicitly acknowledge that this was not an actual population estimate but, rather, an analytical framework for future population

estimates that does not rely on supportable assumptions . For example, the use of one territory per 1 square kilometer (100 hectares) in unburned forest is a substantial overestimation, given that home ranges are much larger in unburned forest than assumed in Fogg et al. (2012). For instance, Siegel et al. (2013) (at p. 31, and Table 2) found that, while the 12 territories that were in the fire areas averaged 138 hectares, the two Black-backed Woodpecker home ranges that were mostly in unburned forest (222 and 777) averaged 763 hectares (using the 100% minimum convex polygon method)—about 5.5 times bigger than in burned forests. Thus, the required adjustment would reduce the mean figure of 3,980 occupied Black-backed Woodpecker territories from Fogg et al. (2012) down to only 724 occupied territories. And, this would not even take into account the other parameters relied upon in Fogg et al. (2012) that overestimated pair density, as discussed in great detail on pages 63-70 of the February 11, 2013 Status Review submitted by JMP and CBD (Petitioners). Our independent Status Review – which , again, was peer-reviewed – carefully explained why our population estimate is not only supportable, but the best available.

With regard to Rosenberg (2004), in the February 11, 2011 letter from DFW to the Commission, on page 19, DFW concluded the following with regard to Rosenburg (2004): "The Department agrees with the Petitioner's assessment (Appendix E) that the population estimate is not based on a robust data set…The Department did not rely on it for an assessment of abundance." In Appendix E of the Petition, Petitioners demonstrated that the Rosenburg (2004) estimate was simply not credible scientifically, given that it uses a very small number of observations claimed by amateurs, and then extrapolates these figures spatially across the entire state of California, including the Mohave Desert and many other places where Black-backed Woodpeckers simply do not live. We are therefore surprised to see DFW once again reference this unsupportable estimate without any context at all, especially given that DFW has already disavowed it.

Moreover, DFW's Status Review ignores a strong criticism on this issue in the January 22, 2013, peer review of DFW's Status Review by Rodney Siegel, Ph.D. On page 2 of that peer review, Dr. Siegel states the following: "[O]n page 17 the Status Report rather cursorily dismisses the possibility that California's Blackbacked 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…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."

DFW's final Status Review fails to address this important criticism. Indeed, in DFW's final Status Review (p. 25), DFW acknowledges that Traill et al. (2007, 2010) (which was based upon a massive scientific literature review of extinctions across many different species and taxa) found that populations below a certain size are inherently vulnerable to extinction over even relatively short time periods, but then inexplicably states the following: "However, a species with a small population size may not necessarily be in serious danger of extinction." No data source was cited to support this assertion. This conclusory assertion from DFW is particularly troubling in light of a) the fact that Trail et al. (2007, 2010) find precisely the opposite, and b) the fact that the two most scientifically sound population estimates for California both estimate population levels that are far below the extinction-risk threshold found by Traill et al. (2007, 2010).

DFW goes on to assert that 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." This is incorrect. In fact, it is possible to assess the threat posed by small population size to this species, and our independent Status Review did just that, and was peer reviewed and found to be credible.

Perhaps what DFW meant to say is that it is not possible to conclusively determine what the exact population size is for this species in California. Regardless, it is possible to make an educated prediction based on the best available science, and no one has explained why the CBD/JMP population estimate, as detailed in our independent Status Review, is not the most credible estimate. Rather, as Monica Bond, one of our peer reviewers, stated:

> Until additional, more robust data of nesting/population densities of Blackbacked Woodpeckers are available for different habitat categories in California (e.g., unlogged burned stands of various severities and ages; logged burned stands of various severities and ages; green forests of various types; etc.), the general methodology of extrapolation used by Dr. Hanson constitutes the best available current science, and gives a reasonable estimate of population size – a combined total of approximately 600 nesting pairs (or 1,200 nesting individuals) in California. More importantly, regardless of the exact number of Black-backed Woodpeckers occurring in the Sierra Nevada, these birds are undoubtedly rare in all habitats except in the very small amount of recent moderate and severely burned forest. No Black-backed Woodpecker biologist would dispute this fact. To compound the problem, many of these burned forests – on both private and public lands – are subjected to post-fire salvage logging, sometimes quite extensive, as was documented in [the JMP/CBD] Status Review. Thus, regulatory protections for the Black-backed Woodpecker's optimal habitat are sorely needed to ensure the conservation of this species.

Moreover, one of our peer reviewers – Dr. Richard Hutto – explained that the Fogg et al population estimate was not reliable:

> I can tell you from 25 years of experience in burned forest research that the density of Black-backed Woodpecker in green forests is nowhere near its density in burned forests. Every peer-reviewed publication that has comparative data on the issue says the same thing—the bird species is 10-20 times more abundant in burned than in green forests. I notice that Fogg et al. adjusted count data by conducting transformations to 'density' estimates, but every single assumption necessary to make such an adjustment is known to be violated (movement of birds in response to observers, accurate counting, accurate distance estimation, and adequate sample sizes of independent distance estimates being among the most severe violations in this case),

In sum, what we do know is that the Black-backed Woodpecker population in Oregon/California is likely exceedingly small, and it is therefore not credible for anyone, including the Department,

to sidestep this issue. Instead, this issue is central to the listing decision, and we urge the Commission to acknowledge that the JMP/CBD population estimate is the best available and demonstrates that this species is at great risk. At the very least, the situation mandates listing as "threatened."

Current Population Trend

On page 1 of DFW's Status Review, DFW states the following: "[T]he population trend in California is unknown, although preliminary data suggest relative stability during 2009-2011." No data source is cited to support this statement. On page 17, DFW attributes this statement to Siegel et al. (2012) (the Management Indicator Species monitoring report). However, this is misleading because Siegel et al. (2012) did not produce any demographic information on Black-backed Woodpeckers; rather, this study reported the proportion of fire areas that were occupied by at least one Black-backed Woodpecker, which does not allow a scientific inference about whether the population is stable, increasing, or decreasing. Indeed, the raw data from the Siegel et al. reports covering the 2009-2011 field seasons contradict DFW's statements. Siegel et al. (2010, p. 2) report 81,814 hectares occupied by Black-backed Woodpeckers in the Sierra Nevada in 2009, Siegel et al. (2011, p. 2) report 61,696 hectares occupied by Black-backed Woodpeckers in 2010, and Siegel et al. (2012, p. 2) report only 58,443 hectares occupied in 2011—a 29% reduction in just three years. Thus, had DFW appropriately reported the findings of Siegel et al. they would have had to state that there is a decline, not stability.

Extent of Threat from Post-fire Salvage Logging and Pre-fire Thinning

On pages 4-5 of DFW's cover letter to the Commission, DFW states that only 20% of high-severity fire areas on national forests have been subjected to post-fire salvage logging on national forests since 2003 (21,800 acres), concluding that 80% of the suitable Black-backed Woodpecker habitat on national forests has, effectively, been retained (87,200 acres) over that time period. DFW's cover letter also asserts (p. 3) that "in at least one instance, light salvage logging did not appear to impact black-backed woodpecker nesting activity or nest survival"—a representation that DFW used, in significant part, to conclude (cover letter, p. 5) that there is "uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging".

With regard to post-fire salvage logging, a peer-reviewer of the DFW Review, Dr. Rodney Siegel (p. 2 of Siegel review), explained that the effects of post-fire salvage logging should not be minimized. Dr. Siegel took issue with DFW's assertion that only about 20% of the area affected by high-severity fire on national forest lands is salvage logged, and with DFW's statement that, therefore, "[t]here is uncertainty regarding the magnitude of the threat posed to black-backed woodpeckers by post-fire salvage logging" (Siegel review, p. 2).
Dr. Siegel pointed out (Siegel review, p. 2) that the 20% figure is a serious underestimation of the proportion of high quality Black-backed Woodpecker habitat that is salvage logged, because the figure includes areas that do not comprise suitable Black-backed Woodpecker habitat, despite being affected by high-severity fire. Such areas include sparsely forested areas with few trees per acre prior to high-severity fire, young plantations, brushfields, and lower-montane westside forests and pinyon/juniper forests where Black-backed Woodpeckers simply do not live (Siegel

et al. 2008, 2010, 2011, 2012). DFW did not address Dr. Siegel's comments, and repeated the very same statement in their final Status Review (see, e.g., DFW Cover Letter, pp. 4-5; DFW Status Review, pp. 2, 19). While DFW elsewhere acknowledges that post-fire logging tends to target the higher-quality habitat, DFW nevertheless fails to revise its erroneous statement about 80% of Black-backed Woodpecker post-fire habitat being effectively retained, and then continues to rely upon this statement for its recommendation to not list the Black-backed Woodpecker under CESA (DFW Cover Letter, p. 5). Once again, this falls short of the best available science standard.

Furthermore, recent proposals from the Forest Service regarding salvage logging in 2012 fire areas further divulge the high percentage of impacted habitat. In the Chip-Munk analysis area (Chips fire of 2012, Plumas National Forest), the U.S. Forest Service intends to salvage log 42% of the best Black-backed Woodpecker habitat (areas with 75-100% mortality in CWHR 5M and 5D [old-growth forest with moderate to high pre-fire canopy cover]) (1444 out of 3398 acres to be logged) and 38% of the next best (areas with 75-100% mortality in CWHR 4M and 4D [late-successional forest with moderate to high pre-fire canopy cover]) (791 out of 2067 acres to be logged) – i.e., the areas most likely to be good nesting habitat (see Chip-Munk Environmental Assessment [EA], pp. 270-271) (see also Siegel et al. 2013). In the Poker Chip project area (the remainder of the Chips fire of 2012, Plumas and Lassen National Forests), the Forest Service intends to log 42% of the moderate severity dense/mature-old forest (331 out of 737 acres to be logged) and 51% of the high-severity dense/mature-old forest (166 out of 328 acres to be logged) (Poker Chip EA, pp. 64, 66). In the Reading fire project area (entirety of the portion of the Reading fire of 2012 on the Lassen National Forest), the EA states that the Forest Service intends to log 56% of the good Black-backed Woodpecker habitat on Forest Service lands (2,536 out of 4,543 acres to be logged on NF lands) (Reading EA, p. 77). In the Barry Point analysis area on the Fremont National Forest (entirety of the portion of the Barry Point fire of 2012 on the Fremont National Forest, eastern Oregon Cascades region, adjacent to the California border), the Forest Service intends to log 66% of the suitable Black-backed Woodpecker habitat (4395 out of 6660 acres to be logged) (Barry Point EA, pp. 76-77) (moreover, the Barry Point EA, pp. 76-78, misleadingly attempted to hide the magnitude of the adverse impacts by comparing the amount of actual logging of Black-backed habitat that is planned to the 474,972 acres of *potential* Black-backed habitat on the forest – i.e, areas that would be suitable habitat if they experienced higher-severity wildland fire [USFS map shows these acres as merely "potential" habitat, not actual]). These 2012 fire areas represent the best and largest contiguous patches of high-quality Black-backed Woodpecker habitat currently in existence in California and Oregon, since previous larger fire areas (e.g., Moonlight-Wheeler fire of 2007) are older, and are not as suitable, or will soon become unsuitable.

With regard to thinning in unburned forests, DFW's cover letter states (p. 3) that 32,000 acres of forest per year on national forest lands are subjected to mechanical thinning/logging operations, which DFW asserts amounts to less than 5% of the forest over a 20-year period. DFW further opines (DFW Status Review, p. 21) the following: "Although pre-fire fuels management is practiced by most forest land man[a]gers 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)." However, DFW misses the point. Petitioners did not raise the issue of thinning as a threat to Black-backed Woodpeckers based upon its potential to alter entire regional fire regimes

but, rather, based upon its strong tendency to disproportionately target the densest, old forests that, if affected by higher-severity fire, would provide the best Black-backed Woodpecker habitat (see Petition, pp. 53-54, 60-62; JMP/CBD Status Review, pp. 32-35). The disproportionate adverse effects of this are twofold: the thinning prevents higher-severity fire in the best locations for potential Black-backed Woodpecker habitat; and, even if higher-severity fire occurs in thinned areas, such areas function as very poor habitat because so many trees were removed by thinning that there are insufficient snags for Black-backed Woodpeckers (Hutto 2008).

Moreover, DFW's reference (DFW Status Review, p. 21; DFW Cover Letter, p. 3) to North (2012) for the proposition that the current level of thinning equates to 32,000 acres annually on Sierra Nevada national forests leaves out the fact that North (2012 [Chpt. 15]) recommends that this level of mechanical thinning be increased by nearly 14 times to 437,000 acres (176,923 hectares) annually, which represents a massive threat to Black-backed Woodpecker populations, particularly since the North (2012) report from the U.S. Forest Service is being used as a blueprint for the upcoming forest plan revisions.

This alarming rate of proposed mechanical thinning equates to approximately 90-100%, or more, of the forested area of the Sierra Nevada being thinned over the next 27 years, given that there are approximately 12,905,775 acres (5,225,010 hectares) of conifer forest—all types, ages, and densities included—in the Sierra Nevada (Franklin and Fites-Kaufman 1996). The actual rate could be even higher, since this massively increased thinning is proposed predominantly in relatively denser, mature/old conifer forest (North 2012), and there are only about 4.25 million acres (about 1.72 million hectares) of such forest in the Sierra Nevada management region (USDA 2001, Figure 4.4.2.1b).

Climate Change

On pages 3-4 of DFW's cover letter to the Commission, DFW concludes that the science is one-sided in predicting that fire extent and severity is increasing currently, and will increase in future decades, due to climate change; and DFW further assumes that any predicted range contraction (due to higher-elevation forest types used by Black-backed Woodpeckers moving upslope, with some disappearing) from climate change would be more than balanced by an increase in high-severity fire, resulting in a net increase in suitable habitat relative to current levels. On page 5 of the cover letter, DFW further references the "trending increase in fire frequency, size, and severity"—i.e., the notion that Black-backed Woodpecker habitat is increasing due to a current trend of increasing amounts of high-severity fire. On page 2 of its Status Review, DFW repeats these statements, indicating that it is clear that fire intensity/severity and extent is increasing and will continue to increase, and DFW repeats these statements on pages 19-25 of its Status Review. There are several major problems with these statements, and with DFW's treatment of this issue in general.

First, DFW only cites studies that predict increases in future fire, and high-severity fire, in the Sierra Nevada region, and avoids mention of the many scientific studies that predict decreased future fire activity as a result of climate change (due to warmer/wetter conditions less conducive to fire, as well as to reductions in pyrogenic vegetation) (DFW Status Review, pp. 19-25). This one-sided representation of data does not meet the best-available-science standard. Petitioners

submitted detailed and extensive citations to studies that predict reduced future fire activity from climate change in both the Petition (pp. 57-58) and the JMP/CBD Status Review (pp. 48-58), yet none of that is discussed or addressed in DFW's Status Review. While no one can know for sure whether those who predict increased future fire, or those who predict decreased future fire, will be correct, one thing is for certain: any assessment, such as the DFW Status Review, that does not discuss or acknowledge one half of an ongoing scientific debate is simply not accurate.

Second, DFW fails to mention that they previously not only acknowledged the existence of the substantial body of scientific evidence predicting reduced future fire activity due to anthropogenic climate change, but determined that the weight of scientific evidence—the best available science—indicates that climate change will lead to reduced levels of high-severity fire in future decades (DFW Report to the Commission, February 15, 2011, pp. 22-23). Specifically, DFW acknowledged, first, that there is far less high-severity fire acreage now than there was historically, prior to fire suppression, concluding the following: "The Petitioners indicate, and the Department agrees, that high quality BBWO habitat (i.e. conifer forests burned at high intensity) is being created at greatly reduced levels compared to historic levels due to modern fire suppression actions (p. 49)." (DFW Report to the Commission, February 15, 2011, p. 22). Then DFW acknowledged and concluded that, with regard to future high-severity fire occurrence, there will likely be additional declines, concluding the following: "The Department generally agrees with the Petitioner's view that changes in western North American climate can be expected to result in less annual fire extent and decreased fire intensity within mid and upper elevation conifer forests, thereby further limiting the creation of high quality BBWO habitat (p.57). McKenzie et al. (2004) have noted a trend towards increasing summer precipitation which is expected to reduce the frequency and extent of high intensity wildfire (Giardin et al. 2009, Parisien and Moritz 2009)." (DFW Report to the Commission, February 15, 2011, p. 23). The scientific data have not changed since then; therefore, DFW's changed position is not consistent with the best-available-science standard.

Third, with regard to current high-severity fire patterns, DFW cites to two studies in the Sierra Nevada—both of which are Forest Service studies, and both of which have claimed that fire severity is increasing in the Sierra Nevada: Miller et al. (2009) and Miller and Safford (2012). Hanson and Odion (in press, 2013) 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—one which has similar or greater statistical power than parametric analyses when using non-parametric data sets, such as fire data). They found no increasing trend in terms of high-intensity fire proportion, area, mean patch size, or maximum patch size. Hanson and Odion (in press, 2013) 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%). Hanson and Odion (in press, 2013) also checked the results of Miller et al. (2009) and Miller and Safford (2012) for bias, due to the use of vegetation layers that post-date the fires being analyzed in those studies. Hanson and Odion (in press, 2013) found that there is a statistically significant bias in both studies ($p = 0.025$ and $p = 0.021$, respectively), the effect of which is to exclude relatively more conifer forest experiencing high-intensity fire in the earlier years of the time series, thus creating the false appearance of an increasing trend in fire severity.

Interestingly, Miller et al. (2012a), acknowledged the potential bias that can result from using a vegetation classification data set that post-dates the time series. In that study, conducted in the Klamath region of California, Miller et al. used a vegetation layer that preceded the time series, and found no trend of increasing fire severity. Miller et al. (2009) and Miller and Safford (2012) did not, however, follow this same approach. Hanson and Odion (in press, 2013) also found that the regional fire severity data set used by Miller et al. (2009) and Miller and Safford (2012) disproportionately excluded fires in the earlier years of the time series, relative to the standard national fire severity data set (www.mtbs.gov) used in other fire severity trend studies, resulting in an additional bias which created, once again, the inaccurate appearance of relatively less high-severity fire in the earlier years, and relatively more in more recent years. The results of Hanson and Odion (in press, 2013) are consistent with all other recent studies of fire severity 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. (2012a) 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. Thus, the best available science demonstrates that one of DFW's core assumptions – a "trending increase in fire frequency, size, and severity" – is simply not valid.

Fourth, DFW's attempt to acknowledge the threat of climate change, and resulting Black-backed Woodpecker range contraction, while subsequently dismissing this concern by assuming that increased fire will more than balance out any range contraction, is simply not credible, and DFW presents no data or analysis to support this assumption. For example, DFW's Status Review (p. 21) admits that the higher-elevation montane conifer forests upon which Black-backed Woodpeckers depend (in their recently burned state) are projected to decline by 70% by the late 21st century in the Sierra Nevada due to anthropogenic climate change. This means that, in order to even maintain the current levels of suitable post-fire habitat for Black-backed Woodpeckers, high-severity fire would have to increase by 3.33 times—or a 233% increase—over and above current levels (and salvage logging levels would have to not intensify, which is an unrealistic assumption). The DFW Status Review (pp. 19-25) simply does not provide analysis or citations to conclude that most scientific studies project that increases anywhere near this high are likely to occur—in addition to the total failure, as noted above, to acknowledge that many studies predict decreased future fire, which would greatly exacerbate the adverse effects of range contraction. Efforts to minimize adverse side effects and cumulative impacts, such as we see here, do not meet the best available science standard. Indeed, DFW's own discussion of the studies that predict increased future fire in the Sierra Nevada acknowledges that most of these studies predict increases of 12-54%, while the most extreme prediction (Westerling et al. 2011) projects a 100% increase (DFW Status Review, p. 24). Even leaving aside for the moment the fact that many studies predict decreased future fire, the studies on the other side of that debate predict moderate increases that are about 2-5 times lower than the increases that would be necessary to merely maintain current levels of high-severity fire, in light of the projected 70% range contraction. And, as noted in the JMP/CBD Status Review (p. 55), some studies project substantially larger losses of higher-elevation montane conifer forests than 70%.

Moreover, DFW's citation to Gardali et al. (2012) (DFW Status Review, p. 25), to suggest that climate change may have only modest adverse impacts to Black-backed Woodpeckers, is

unpersuasive. This study was a qualitative assessment of large numbers of species, including the Black-backed Woodpecker, with rankings subjectively determined by the authors. DFW's Status Review (p. 25) states that, in the ranking system used by Gardali et al. (2012), for the "sensitivity category", the Black-backed Woodpecker was given a "3" for habitat specialization and a "2" for dispersal ability, and was assigned "1" for both physiological tolerances and migratory status; in the "exposure" category, the Black-backed Woodpecker was assigned a "3" for change in habitat suitability, and a "1" for both change in food availability, and for change in extreme weather (DFW Status Review, p. 25; Gardali et al. 2012). Rankings for each factor were 1 through 3 [3 being the most climate vulnerable] with the sum of the "sensitivity" and "exposure" scores multiplied to reach the final score (Gardali et al. 2012). This resulted in a score of 7 for the sensitivity category, and a score of 5 for the exposure category, for a total score of 7 x 5 = 35, which placed the Black-backed Woodpecker in the lower climate vulnerability class (Gardali et al. 2012, Table 2). Species with overall scores under 30, which comprised most bird species, were assigned to a no-vulnerability class, species with overall scores of 40-45 were assigned to the moderate vulnerability class, and species with overall scores over 45 were assigned to the high vulnerability class (Gardali et al. 2012, Table 2). By assigning the Black-backed Woodpecker a "1" for the physiological tolerance category, the authors yielded an overall score of 35, rather than a score of 40 (moderate vulnerability). The physiological tolerance category ranks species by their sensitivity to increases in temperature. The authors' ranking of the Black-backed as "1" in this category (defined as "minimal or no evidence of physiological sensitivity to climatic conditions") is incorrect given its absolute association with cold climates in higher-elevation and boreal forests—i.e., where annual precipitation is mostly as snow; and Black-backed Woodpeckers simply do not live in areas that are warmer than this, e.g., lower-elevation westside forests or eastside pinyon/juniper forests that comprise the transition to high deserts in the Great Basin (Siegel et al. 2008, 2010, 2011, 2012). Black-backed Woodpeckers show an almost perfect avoidance of these warmer climates (see, e.g., DFW Status Review, Figure 2; see also Siegel et al. 2008, 2010, 2011, 2012). Similarly, the authors' ranking of the Black-backed Woodpecker as a "1" for vulnerability to extreme weather, in the "exposure" category, is not right. This category is only for species for which there is literally "no evidence" that periods of extreme weather would adversely impact populations (Gardali et al. 2012). The periods of extreme weather in question include not only periods of hotter, drier conditions but also unusually wet weather, where fire would be heavily suppressed, based upon the data sources relied upon by Gardali et al. (2012). Based upon the data reviewed by DFW on the habitat needs of the Black-backed Woodpecker, and its extremely strong association with wildland fire, periods of wet weather that suppress fire, which are part of climate change predictions (even the ones that predict overall hotter/drier conditions in most periods), would substantially adversely impact Black-backed Woodpeckers. Thus, even a ranking of "2" for this criterion, and a "2" for the physiological tolerance category, would bring the overall score to 48, putting the Black-backed Woodpecker in the "high" climate vulnerability class. Consequently, using Gardali et al. (2012)'s parameters, the Black-backed Woodpecker can easily be characterized as being in the "high" climate vulnerability class.

Fifth, citations to numerous sources are misleading in the climate/fire sections. For example, on page 19 of the DFW Status Review, DFW cites Marlon et al. (2012) for the proposition that fire activity was above average in the 1800s before it declined steeply in the early 20th century—apparently to imply that the gap between historic and current post-fire habitat, though large, is

not necessarily quite as great as Petitioners suggest. However, Marlon et al. (2012) did not present data for the Sierra Nevada specifically, and the increase in fire in the 1800s was relatively moderate, and occurred 1850-1900, according to Marlon et al. (2012). Odion and Hanson (2013, Fig. 2) found that the higher-severity fire rotation interval specifically in the Sierra Nevada prior to the 1850-1900 time period (1750-1850) was 126 years—several times shorter than current higher-severity fire rotations.

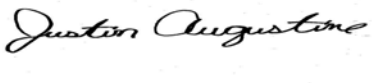
Sixth, DFW's Status Review (pp. 22-23) speculates that increasing temperatures could increase bark beetle presence but, as discussed above, this ignores the fact that Black-backed Woodpeckers depend upon the much larger wood-boring beetle larvae found mainly in higher-severity wildland fire areas, and areas (such as unburned forests and low-severity burned areas) dominated by bark beetles are associated with steeply declining, non-viable populations of Black-backed Woodpeckers (Rota 2013).

For the foregoing reasons, DFW's Status Review does not represent the best available science.

Conclusion

Thank you for taking the time to consider the status of the Black-backed Woodpecker. We urge you to carefully consider the independent Status Review we submitted and, as that Review recommends, to list the Black-backed Woodpecker as threatened or endangered under the California Endangered Species Act. Our Review is comprehensive, is based upon the best available science, is peer-reviewed, and fully addresses important questions (e.g., population size) that the Department Review does not. We look forward to discussing the Reviews at the June meeting, and we appreciate your attention to this important conservation issue.

Sincerely,



Chad Hanson, Ph.D., Ecologist
John Muir Project
(530) 273-9290
cthanson1@gmail.com

Justin Augustine, Attorney
Center for Biological Diversity
(415) 436-9682 ext. 302
jaugustine@biologicaldiversity.org

Cc: California Department of Fish and Wildlife

References (Not Already Included In Status Reviews from DFW or JMP&CBD)

Cohen, J.D. 2000. Preventing disaster: home ignitability in the Wildland-Urban Interface. Journal of Forestry 98: 15-21.

Cohen, J.D., and R.D. Stratton. 2008. Home destruction examination: Grass Valley Fire. U.S. Forest Service Technical Paper R5-TP-026b. U.S. Forest Service, Region 5, Vallejo, CA.

Hanson, C.T., and D.C. Odion. 2013. Is fire severity increasing in the Sierra Nevada mountains, California, USA? *In press* in International Journal of Wildland Fire.

Odion, D.C., and Hanson, C.T. 2013. Projecting impacts of fire management on a biodiversity indicator in the Sierra Nevada and Cascades, USA: the Black-backed Woodpecker. The Open Forest Science Journal 6: 14-23.

Rota, C.T. 2013. Not all forests are disturbed equally: population dynamics and resource selection of Black-backed Woodpeckers in the Black Hills, South Dakota. Ph.D. Dissertation, University of Missouri-Columbia, MO.

Siegel, R.B., M.W. Tingley, R.L. Wilkerson, M.L. Bond, and C.A. Howell. 2013. Assessing home range size and habitat needs of Black-backed Woodpeckers in California: Report for the 2011 and 2012 field seasons. Institute for Bird Populations.

USDA (Forest Service). 2012. Managing Sierra Nevada Forests. Gen. Tech. Rep. PSW-GTR-237. Albany, CA. Malcolm North, ed.