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THE JOHN MUIR PROJECT *of* EARTH ISLAND INSTITUTE

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M. Earl Stewart, Supervisor
Coconino National Forest

Michael R. Williams, Supervisor
Kaibab National Forest

Dear Ms. Stewart and Williams,

On behalf of the John Muir Project of Earth Island Institute (JMP), I am submitting these comments on the Draft Environmental Impact Statement (DEIS) for the proposed "Four-Forest Restoration Initiative" on the Coconino and Kaibab National Forests Project (4FRI project). I have a Ph.D. in Ecology from the University of California at Davis, with a research focus in forest and fire ecology. I offer the following comments:

The DEIS Fails to Consider Well-known Recent Science on Historic Forest Density and High-severity Fire Extent

The Silviculture Report, relied upon by the DEIS, states, under the heading of "Desired Conditions" (in the project area), that the historic (pre-fire suppression) forests in the project area were very open and had only about 2 to 40 trees per acre, with a general average of about 23 trees per acre (Silviculture Report, pp. 54-55), relying upon spatially-limited studies using small areas and small plots. However, the DEIS fails to mention, let alone analyze, the only landscape-level studies ever conducted in northern Arizona—studies that use actual historical plot data across vast areas. Specifically, I refer to Williams and Baker (2012) and Williams and Baker (2013), both of which used extensive U.S. General Land Office field data from the 19th century to assess historic forest structure and fire patterns. Williams and Baker (2012) was conducted in the Kaibab and Coconino National Forests around Williams and Flagstaff (and southeast of Flagstaff)—in the largest portion of the 4FRI project area. They found that the historic forests were dominated by areas with 89-134, 134-178, and >178 trees per hectare over 10 centimeters in diameter at breast height (36-54, 54-72, and >72 trees per acre) (Williams and Baker 2012, Figure 2). Over 25% of the forest had more than 178 trees per hectare (more than 72 per acre). In Williams and Baker (2013), conducted around Tusayan—in the smaller, northernmost portion of the 4FRI project area—they found that historic forests were dominated by areas with 100-150, 150-200, and 200-391 trees per hectare over 10 centimeters in diameter at breast height (40-61, 61-81, and 81-158 trees per acre). The DEIS violates NEPA by failing to fully and completely consider these findings or incorporate the findings into the proposed action. Moreover, the DEIS fails to clearly divulge what the post-logging trees per acre would be in most of the areas proposed for logging in the project area.

Further, the DEIS (p. 158, Table 58) states that the Proposed Action and Preferred Alternative would result in only 1-2% active crown fire (high-severity fire), and only 3% passive crown fire (mixed-severity fire). Williams and Baker (2012) found that the historic forests had 15% high-severity fire effects and 23% mixed-severity fire effects (Williams and Baker 2012, Table 2), indicating that the action alternatives would not restore historic fire regimes but, rather, would take forests outside of the natural, historic range of variability, compromising ecological resilience. This information, though well known to the Forest Service, is simply not addressed in the DEIS, in violation of NEPA.

The DEIS Misrepresents, and Misleadingly Presents, the Data in Stand Density Index (SDI)

The DEIS (p. 14, 18) claims that, above 60% of maximum "Stand Density Index" (SDI), forest stands are at high risk of beetle mortality, and that the intensive logging proposed in the Proposed Action and the Preferred Alternative—which would directly kill and remove, through logging, most of the existing trees—is somehow necessary to prevent and reduce tree mortality. However, the DEIS fails to divulge the fact that the cited studies, and other relevant studies on SDI, show that the levels of tree mortality that result in stands above 60% of SDI are, on average, far lower than the guaranteed, direct levels of mortality that would be caused by logging.

Oliver (1995) found that, as relatively young ponderosa pine stands reached SDI levels from 300 to 365, beetle mortality reduced stand density by only about 13-20%. Mortality was **near zero** when SDI values were below 230 (Fig. 2 of Oliver 1995). Further, despite modest mortality as stands neared SDI of 365, the stands ultimately continued to grow more mature and more dense, reaching an SDI of 571 (100% of maximum SDI) finally (Fig. 1 A-C of Oliver 1995).

Oliver (2005) found that the very densest pine plots increased to a basal area of 175 square feet per acre, and an SDI of around 350, and then experienced beetle mortality of only 17% of the basal area (down to about 145 square feet per acre). In the ponderosa pine plots, the densest plots increased to a basal area of about 220 with almost no beetle mortality after the stands reached about 85 years of age (Oliver 2005, Fig. 1). Oliver (2005) noted that mortality levels have "declined over the years" in the dry ponderosa pine forests as these forests have grown older and denser.

Further, the Cochran and Barrett (1995) study investigated pine stands and found that, even at higher SDI levels, "there was no apparent correlation between stand density and mortality" (see p. 9 of Cochran and Barrett 1995). In that study, the highest annual growth rates were at SDI values **over 200** (Figs. 14, and 18-20 of Cochran and Barrett 1995). The maximum basal area mortality of any plot (i.e., not the average) was only 29% over 30 years (about 10% in a given decade—much less than decadal growth), and most plots had far, far less mortality than this. The "high" mortality rates in Cochran and Barrett (1995) were only about 5-10% of the basal area and less than 5% of the SDI for the very densest plots (Figs. 1 and 2 of Cochran and Barrett 1995).

Similarly, Cochran and Barrett (1999) found essentially the same thing as Oliver (2005), discussed above. The study found that, once ponderosa pine stands became older than 85 years of age, mortality from beetles dropped to nearly zero even at SDI values of 250-300 (see Fig. 3 and Table 3 of Cochran and Barrett 1999). Even when the stands in this study area were younger, as they were when studied by Larsson et al. (1983), the mortality levels from beetles were still relatively modest for stands with basal areas over 150 square feet per acre (i.e., a minority of the total stand basal area).

The DEIS Fails to Consider Well-known Recent Science on the Invalidity of the Fire Regime Condition Class Model

The DEIS (p. 25) bases its fire analysis fundamentally on Fire Regime Condition Class (FRCC), which is a model that attempts to assess, in essence, the number of natural fire return intervals that have been "missed" due to fire suppression. The FRCC model assumes that the areas that have missed the highest number of fire intervals (FRCC 3) will burn unnaturally severely (much more than FRCC2, e.g.), with predominantly high-severity fire effects. However, the DEIS fails to divulge the fact that every single scientific study that has empirically tested the FRCC model has found it to be invalid, and all studies have concluded that the areas with the highest FRCC ratings burn predominantly at low/moderate-severity, and do not burn more severely than areas with lower FRCC ratings (Odion et al. 2004, Odion and Hanson 2006, Odion and Hanson 2008, Odion et al. 2010, Miller et al. 2012, van Wagtendonk et al. 2012). The DEIS (p. 191) also uses this invalid FRCC model to justify intensive logging in Mexican Spotted Owl habitat and PACs, and fails to divulge and identify the risks and trade-offs of this approach, choosing instead to imply that the FRCC model is fully reliable.

The DEIS Fails to Consider Well-known Recent Science on Spotted Owls and Wildland Fire

The DEIS's section on Spotted Owls (pp. 178-191) attempts to justify the landscape-level intensive logging in Mexican Spotted Owl habitat and PACs by claiming/assuming that high-severity fire, and even mixed-severity fire, is inherently and categorically damaging to Spotted Owls. However, the DEIS fails to divulge or analyze the well-known scientific studies that have found that mixed-severity fire, including high-severity fire patches, do not reduce Spotted Owl occupancy (where such areas are not subjected to post-fire salvage logging), and in fact the owls preferentially select high-severity fire areas for foraging due to an enhanced small mammal prey base in complex early seral forest habitat created by high-severity fire, and reproduction is 60% higher in mixed-severity fire areas than it is in unburned forest (Bond et al. 2002, Roberts 2008, Bond et al. 2009, Lee et al. 2012) (annotated references for these citations are below). The DEIS simply fails to take the required hard look at impacts, in light of this.

Sincerely,

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