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22 UNITED STATES DISTRICT COURT
23 FOR THE DISTRICT OF OREGON
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25 LEAGUE OF WILDERNESS DEFENDERS-)
26 BLUE MOUNTAINS BIODIVERSITY PROJECT,)
27 an Oregon non-profit corporation, CASCADIA)
28 WILDLANDS PROJECT, an Oregon non-profit)
29 corporation, SIERRA CLUB, a California non-)
30 profit corporation,)

Civ. Case No. 07-06283-HO

DECLARATION OF
DR. CHAD HANSON

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Petitioners,

and

LESLIE A.C. WELDON, in her capacity as Forest
Supervisor of the Deschutes National Forest,
UNITED STATES FOREST SERVICE, an
administrative agency of the United States
Department of Agriculture,

Respondents.

1 1. My name is Chad T. Hanson. I have a Ph.D. in Ecology (2007) from the University of
2 California at Davis, with a research focus on forest and fire ecology. I have authored or co-
3 authored several scientific studies on this subject, which have contributed to the published
4 literature. The subjects of my research have included: mechanical thinning and fire severity;
5 wildlife response to wildland fire; fire history; and post-fire conifer survival. My curriculum
6 vitae is included below. I have been asked by Plaintiffs to provide expert commentary on the
7 Five Buttes logging project.

8 2. The Five Buttes logging project would allow intensive mechanical thinning across 7,798
9 acres of conifer forest, including 2,023 acres of Northern spotted owl habitat. The reduction in
10 forest canopy cover would be so severe that, according to the project documents, the suitable
11 spotted owl habitat proposed for logging would not become suitable again for 30-50 years. The
12 stated purpose of the project is to, through intensive logging which includes substantial removal
13 of mature and old growth trees, reduce the risk of severe wildland fire effects, which the project
14 documents suggest is necessary to benefit and protect spotted owls. These claims lack a
15 scientific basis, and are starkly contradicted by existing scientific studies, as I outline below.

16 3. Where a project goal is to effectively reduce the potential for high severity fire in conifer
17 forests, it is not necessary to remove mature trees in order to accomplish this goal. Recent
18 studies have found that precommercial thinning of sapling and pole-sized trees (subcanopy trees
19 10 inches in diameter and smaller) can effectively reduce fire severity (see, e.g., Omi and
20 Martinson 2002, Perry et al. 2004). Such prescriptions would likely tend to remove relatively
21 little of the total standing biomass, but they would remove most of the subcanopy foliar fuel.

22 4. Further, mechanical thinning (i.e., wherein a substantial portion of the standing biomass
23 is removed, including some mature trees, and canopy cover is significantly reduced) will often

1 tend to increase, not decrease, fire severity, due to accelerated brush growth due to increased sun
2 exposure, increased midflame windspeeds, slash debris, and drying of surface fuels (Hanson and
3 Odion 2006, Platt et al. 2006, Raymond and Peterson 2005). Raymond and Peterson (2005) was
4 conducted in southwestern Oregon within the Biscuit fire area. The mechanically thinned areas
5 that burned in the Biscuit fire had significantly higher fire severity than the unthinned areas.
6 This study is sometimes mis-cited by the Forest Service for the proposition that areas
7 mechanically thinned, and then followed by prescribed fire, will have lower fire severity. In fact,
8 the areas that were thinned and prescribed burned in the Raymond and Peterson (2005) study did
9 not burn in the Biscuit fire. The post-thinning burning occurred under controlled conditions and
10 is not representative of wildland fire effects. In Hanson and Odion (2006), the mechanically
11 thinned sites burned at significantly higher severity than the adjacent unthinned areas, using a
12 paired t-test. Only one mechanically-thinned site in Hanson and Odion (2006) had similar fire
13 severity to the adjacent unthinned area. In this case, the thinning was followed by mastication of
14 small-diameter fuels just months prior to the occurrence of the Power Fire in 2004. This site had
15 approximately the same fire mortality as the adjacent unthinned site, however, the combined
16 mortality of the thinned area (fire mortality plus mortality from trees felled and removed by
17 thinning) was higher than the fire-related mortality in the adjacent untreated area. As Platt et al.
18 (2006) found:

19 Compared with the original conditions, a closed canopy would result in a 10
20 percent reduction in the area of high or extreme fireline intensity. In contrast, an
21 open canopy [from fuel treatments] has the opposite effect, increasing the area
22 exposed to high or extreme fireline intensity by 36 percent. Though it may
23 appear counterintuitive, when all else is equal open canopies lead to reduced fuel
24 moisture and increased midflame windspeed, which increase potential fireline
25 intensity.
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1 The Forest Service commonly assumes that the greater and more intensive the removal of trees
2 and biomass, the greater the reduction in potential fire severity will be. This is based upon faulty
3 modeling assumptions, not empirical scientific data. In reality, when it comes to thinning for the
4 purpose of reducing fire severity, less is more. In addition, thinning effects decline rapidly.
5 There may be a reduction in potential fire severity in the first couple of years after thinning,
6 assuming all slash has been removed, but over time, the effectiveness goes down quickly. By
7 opening up the forest canopy and removing competition at the ground level, thinning stimulates
8 the growth of small trees, shrubs, and other plants that constitute combustible fine fuels and
9 which carry and drive fires. Thus one must thin and/or burn frequently to keep fuel loads low
10 after thinning, creating substantial additional expenses and potential impacts. So, between
11 opening up the forest to greater drying and creating conditions for more fine fuels growth,
12 mechanical thinning tends to be counter-productive to the goal of reducing potential fire severity.

13 5. In addition, some of the Forest Service’s assumptions regarding “historic range of
14 variability” are faulty with regard to this project. In the Five Buttes area much of the forest at
15 mid-high elevation is lodgepole pine and spruce-fir. Lower elevations have more ponderosa
16 pine. The kind of forest type greatly influences its characteristic fire regime, thus the degree of
17 potential deviation from historic conditions. Lodgepole pine is a forest type that burns
18 infrequently with long intervals between fires and typically has high severity stand replacement
19 blazes, in which most or all of the trees are killed. This is the natural fire regime for lodgepole
20 pine forests in the Pacific states (see, e.g., SNEP 1996). The Forest Service appears to assume,
21 incorrectly, that stand replacement blazes are somehow unnatural or undesirable, when in fact, it
22 is the dominant ecological process in lodgepole pine forests. Other forest types dominated by fir
23 and spruce are considered to be mixed to high severity fire regimes. Ponderosa pine forests have

1 relatively less high severity fire naturally, but even these forests had some occurrence of high
2 severity fire historically, driven by periodic high fire weather conditions (Hanson 2007).

3 6. The assumption of the Five Buttes project Final EIS that wildland fire is a threat to
4 spotted owls is also without scientific merit. Mixed-severity fire, which include a mosaic pattern
5 of low severity (most trees survive fire), moderate severity, and high severity (most trees killed
6 by fire) effects, is natural in the conifer forests of the Cascades (Beatty and Taylor 2001, Olson
7 et al. 2004), such as those in the Five Buttes project area. Northern spotted owls evolved with
8 mixed severity fire, including patches of open, brushy habitat created by high severity fire (Olson
9 et al. 2004). Two studies have tested the assumption that substantial patches of open, brushy
10 habitat created by higher severity wildland fire is detrimental to Northern spotted owls. Both
11 studies found precisely the opposite. They concluded that, based upon demographic data of
12 banded spotted owls and habitat characteristics within their territories, Northern spotted owl
13 territories were optimal for spotted owl survival and reproduction when roughly 40-60% of the
14 territory was in habitat types created by higher severity wildland fire, which include open
15 conditions brush patches, and large downed logs (Franklin et al. 2000, Olson et al. 2004).

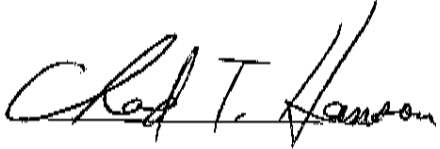
16 These fire-created habitat attributes are not, ecologically, mimicked by logging (Franklin et al.
17 2000, SNEP 1996). Territories that were homogenously closed-canopy mature and old growth
18 forest—i.e., suitable spotted owl habitat—were associated with declining owl populations, as
19 were territories wherein little or no closed-canopy mature and old growth forest existed (Franklin
20 et al. 2000, Olson et al. 2004). The reason for this is that the habitat conditions created by higher
21 severity fire are optimal for the reproduction of preferred spotted owl prey species. A mixture of
22 suitable spotted owl habitat, and habitat suitable for spotted owl prey, provides the habitat
23 conditions that are, overall, most beneficial to spotted owl survival and reproduction (Franklin et

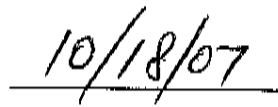
1 al. 2000, Olson et al. 2004). Thus, not only is it incorrect to simply state or assume that
2 wildland fire effects are a threat to spotted owls, it must be recognized that the lack of habitat
3 conditions created by patches of higher severity fire are a threat to spotted owls.

4 7. Wildland fire is still heavily suppressed in western U.S. forests, including the forests of
5 the Cascades, relative to the historic (pre-settlement) annual average extent of burning. The
6 average area of forest that burned historically was several times higher than current annual
7 burning levels, resulting in a huge “fire deficit” according to U.S. Forest Service research
8 (Medler 2006). The habitat created by patches of high severity fire is among the most
9 ecologically-important, biodiverse, and rare of any forest habitat types in western U.S. forests
10 (Noss et al. 2006), and many native wildlife species depend upon these areas for survival (Hutto
11 1995, Noss et al. 2006). These species depend, variously, upon: the native beetle larvae which
12 are laid under the bark of the fire-killed trees (woodpeckers); standing fire-killed trees for nest
13 cavities (excavators and secondary cavity-nesters); the abundance of flying insects in heavily
14 burned patches (e.g., aerial insectivores), which are attracted to the many flowering plants which
15 proliferate following wildland fire; large downed logs (small mammals, reptiles, amphibians, and
16 invertebrates); seed beds following fire (granivores); shrub patches facilitated by fire (many taxa
17 of native wildlife) (see, e.g, Hanson 2007, Hutto 1995, Smucker et al. 2005, Smith 2000).

18 Wildland fire is not an ecological threat to forest ecosystems of the Cascades, contrary to the
19 assumptions made by the Forest Service here. Indeed, the lack of wildland fire is among the
20 greatest ecological threats currently, as the species associated with the habitat conditions created
21 by wildland fire tend to be in decline in this era of continued fire suppression and fire deficit.

1 Under penalty of perjury, I declare the foregoing to the true and correct to the best of my
2 knowledge.

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5 Chad T. Hanson, Ph.D.

Date

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1 Curriculum Vitae of Chad T. Hanson, Ph.D.

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4 **EDUCATION**

5
6 **University of California at Davis, Ph.D., Ecology, June 2007**

7
8 Completed a Ph.D. in Ecology, with 3.97 GPA, focusing research on forest and fire ecology
9 in the Sierra Nevada.

10
11 **University of Oregon School of Law, Juris Doctorate, May 1995**

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13 Specialized in natural resources law

14 Meritorious Brief Award in Best Brief Competition

15 Hired by the Law School's Legal Research and Writing Program at end of first year of law
16 school

17 Created and wrote course texts for the Legal Research and Writing Program for two years
18

19 **University of California at Los Angeles, Bachelor of Science, 1990**

20
21 Individual major in Nutritional Biopsychology through the Honors Department

22 Designed and implemented original research on blood sugar levels and reading

23 comprehension

