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March 20, 2014

VIA EMAIL: joelle.gore@noaa.gov

Ms. Joelle Gore
Acting Chief, Coastal Programs Division (N/ORM3)
Office of Ocean and Coastal Resource Management, NOS, NOAA
1305 East-West Highway
Silver Spring, Maryland, 20910

Re: Comments of the [redacted] on Federal Notice of Intent to Find That Oregon Has Failed to Submit an Approvable Coastal Nonpoint Program

Dear Ms. Gore,

The [redacted] is a trade association representing more than fifty large forestland owners and forest products manufacturing-related firms who own and manage roughly 5,000,000 acres of forestland throughout the State of Oregon. The [redacted] is a trade association representing approximately 3,000 members who own and manage roughly 2,500,000 acres of forestland throughout the State of Oregon. We write to you today in response to the Federal Register notice entitled "Coastal Nonpoint Pollution Control Program: Intent to Find that Oregon has Failed to Submit an Approvable Coastal Nonpoint Pollution Control Program" published December 20, 2013 at 78 Fed. Reg. 77104 (the "**Notice**"). Our comments respond directly to the Oregon Coastal Nonpoint Program NOAA/EPA Proposed Finding published with the Notice on December 20, 2013 (the "**Proposed Findings**"), and the assertion that additional management measures are necessary for forestry. In summary, we believe Oregon's Forest Practices Act, and its implementing regulations, comply with the requirements of the Coastal Zone Act Reauthorization Amendments of 1990, 16 USC §1455b (2000) ("**CZARA**"), and that the Environmental Protection Agency ("**EPA**") and the National Oceanic and Atmospheric Administration ("**NOAA**," and together with EPA, the "**Agencies**") should reconsider the Proposed Findings and unconditionally approve Oregon's Coastal Nonpoint Pollution Control Program (Oregon's "**CNPCP**").

I. Background

CZARA requires as a condition of certain grant funding that states develop CNPCPs that conform to certain statutory requirements. 16 USC § 1455b(a)(1). Among other things, CNPCPs must provide for the implementation of certain minimum management measures developed by the Agencies pursuant to CZARA Section 6217(g). *Id.* at § 1455b(g). Further, programs must also include "*additional* management measures * * * that are necessary to achieve and maintain applicable water quality standards under

section 1313 of Title 33 and protect designated uses." *Id.* at § 1455b(b)(3) (emphasis added). Though the relevant regulations make only passing reference to CZARA, *e.g.*, 15 CFR § 923.1(c)(9), NOAA and EPA have published considerable guidance on the subject. *See, e.g.*, Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance (1993), *available at* http://goo.gl/eDatW3 (the "**CZARA Guidance**"); Flexibility for State Coastal Nonpoint Programs (1995), *available at* http://goo.gl/OqC02R.

Oregon submitted its initial CNPCP in 1995, and on January 13, 1998, the Agencies released their Findings for the Oregon Coastal Nonpoint Program (the "**Original Findings**"), wherein they "conditionally approved" Oregon's CNPCP, but identified "areas where existing practices under the FPA and FPR should be strengthened to attain water quality standards and fully support beneficial uses." Though Oregon's program included the minimum management measures in conformity with CZARA Section 6217(g), the Agencies concluded that "additional management measures are necessary * * * ." Specifically, the Agencies called out

> "protection of medium, small, and non-fish bearing streams, including intermittent streams; protection of areas at high risk for landslides; the ability of forest practices to address cumulative impacts of forestry activities; road density and maintenance, particularly on so-called 'legacy' roads; and the adequacy of stream buffers for application of certain chemicals."

Unfortunately, the Agencies failed to reference a single water quality standard, and included less than a page of analysis connecting Oregon forest practices to impacts on water quality and the designated beneficial uses.

Prompted by litigation brought by Northwest Environmental Advocates challenging the authority of the Agencies to "conditionally approve" a state CNPCP, in 2013 the Agencies undertook a new review of Oregon's program. Upon concluding that review, on December 20, 2013, the Agencies released Proposed Findings that echoed nearly verbatim the Original Findings,

> "the State has not demonstrated it has management measures, backed by enforceable authorities, in place to: (1) protect riparian areas for medium and small fish bearing streams and non-fish bearing (type "N") streams (2) protect high-risk landslide areas; (3) address the impacts of forest roads, particularly on so-called "legacy" roads; and (4) ensure adequate stream buffers for the application of herbicides, particularly on type "N" streams."

Proposed Findings, at 7. In support of these sweeping assertions, the Proposed Findings offer a little over four pages of text, without citation to a single water quality standard, and again, with only passing connection between the listed activities and any beneficial use.

In the following sections, we will detail why we believe the Original Findings and the Proposed Findings are both legally and scientifically deficient.

II. Legal Standard

As highlighted above and in the Proposed Findings, CZARA requires a state to include in its CNPCP "additional management measures * * * necessary to achieve and maintain applicable water quality standards." 16 USC 1455b(b)(3). However, CZARA also requires a relatively sophisticated three-step analysis whereby a state must identify certain land uses, identify certain critical areas, and only then implement additional management measures applicable to those land uses and critical areas. This Section discusses each step in turn.

First, the state must determine which land uses

> "individually or cumulatively, may *cause or contribute significantly to a degradation* of * * * (A) those coastal waters where there is a failure to attain or maintain applicable water quality standards or protect designated uses, *as determined by the State* pursuant to its water quality planning processes; or (B) those coastal waters that are threatened by reasonably foreseeable increases in pollution loadings from new or expanding sources."

Id. at 1455b(b)(1) (emphasis added). That is, the CNPCP need only identify those land uses the state determines cause or contribute significantly to a degradation of threated or impaired coastal waters. *See also* CZARA Guidance, at 18-19. Notably, *the state* is to make the determination of which land uses should be subject to additional management measures, and CZARA includes no authority for the Agencies to second-guess that determination. Moreover, notwithstanding the Agencies' CZARA Guidance, nothing in CZARA requires that the land uses named by the State be styled as broad categories such as "forestry" or "agriculture." For example, land uses could be subcategorized by industrial activity (e.g., cat logging versus skyline logging), or by natural resource (hardwood forest harvests versus coniferous forest harvests). Likewise, the State could conclude that certain activities do not cause or contribute significantly to degradation of threatened or impaired coastal waters given modern environmental regulations.

Second, a state must identify "critical coastal areas adjacent to coastal waters * * * within which any *new land uses or substantial expansion of existing land* uses shall be subject to management measures in addition to those provided for in subsection (g) of this section." 16 USC 1455b(b)(2) (emphasis added). As above, the State has significant discretion to identify "critical coastal areas." For example, a state could determine that the forested area within twenty feet of a small fish-bearing stream is "critical," and that the forested area beyond twenty feet is not. Moreover, any such "critical coastal areas" must be those where *new or expanded* land uses will be subject to additional management measures. Ongoing *existing* uses, such as established agricultural or silvicultural rotations, are not an appropriate basis for naming critical coastal areas, and for that reason, would not be subject to additional management measures.

Finally, CZARA requires the state CNPCP include "additional management measures applicable to the land uses and areas identified pursuant to paragraphs (1) and (2) that *are necessary* to achieve and maintain applicable water quality standards * * * and protect designated uses." *Id.* at 1455b(b)(3) (emphasis added). Notably, CZARA does not require states implement management measures that "are arguably" necessary, or that "may be" necessary. Rather, the statute requires only those management

measures that "are" necessary. This requires affirmative evidence of a direct connection between water quality standards and designated uses on one hand, and the management measures on the other hand.

By way of summary, CZARA requires States to develop CNPCPs that:

1. Determine which land uses cause or contribute significantly to a degradation of threatened or impaired water bodies;

2. Identify critical coastal areas within which new or substantially expanded land uses shall be subject to additional management measures; and,

3. Implement additional management measures applicable to the foregoing land uses and critical areas necessary to achieve and maintain water quality standards and protect designated uses.

Of course, the corollary is that the Agencies may not require the state impose additional management measures as a condition of grant funding unless the Agencies can make a legally defensible showing that Oregon's analysis of the foregoing is deficient. For example, to overcome Oregon's determination that a particular land use does not contribute significantly to a degradation of water quality standards, the Agencies would need to produce evidence to the contrary. Likewise, to overcome Oregon's determination that additional management measures are not "necessary to achieve and maintain water quality standards," the burden would again be on the Agencies to produce evidence to the contrary.

A disapproval action that relies on bald assertions that "something more must be done" without substantial evidence connecting particular land uses to *significant degradation* of water quality, and without substantial evidence that a particular management measure is *necessary* to achieve and maintain water quality standards, would be legally indefensible. *See, e.g.*, *Alaska v. Fed. Subsistence Bd.*, 544 F3d 1089 1094 ("[W]e may not defer to an agency decision that 'is without substantial basis in fact.' Thus, our 'inquiry into the facts is to be searching and careful.'" (internal citations omitted)). Sections III and IV below explain why the Agencies fail to meet their burden in the Proposed Findings.

III. Oregon's Forestry Nonpoint Program

Oregon takes a relatively sophisticated and integrated approach to forestland protection and regulation by coupling voluntary and prescriptive management measures with widespread land use regulation. All of this is detailed at some length in the State of Oregon's July 1, 2013 submission to the Agencies available at http://goo.gl/7oqqlH. The point we would make here, however, is that Oregon's Forest Practices Act establishes a dynamic program that responds promptly and deliberately to environmental issues as they arise.

With respect to water quality, the Oregon Forest Practices Act (the "**OFPA**") mandates that the Board of Forestry adopt standards for forest practices that "provide for the overall maintenance" of "water resources, including but not limited to sources of domestic drinking water." ORS 527.710(2)(b). The OFPA also charges the Board of Forestry with establishing

> "best management practices and other rules applying to forest practices as necessary to insure that to the maximum extent practicable nonpoint source discharges of pollutants resulting from forest operations on forestlands *do not impair the achievement and maintenance of water*

quality standards established by the Environmental Quality Commission."

ORS 527.765(1) (emphasis added). Note that this language hews closely to the CZARA requirement that the CNPCP include additional management measures necessary to "attain or maintain applicable water quality standards." 16 USC 1455b(b)(3). Moreover, Oregon law allows the public, or any public agency, to petition the Board for review of best management practices to ensure forest operations are not a significant contributor to violations of water quality standards. ORS 527.765(3). If the petitioner is the Environmental Quality Commission (the "**EQC**"), the Board of Forestry may not terminate review without concurrence of the EQC unless the Board commences a rulemaking to establish or amend BMPs. ORS 527.765(3)(c).

The OFPA also includes a rigorous monitoring component, with adaptive feedback. For instance, state statute requires the Oregon Department of Forestry ("**ODF**") enter into agreements with appropriate state agencies for joint monitoring of the effectiveness of forest practice rules in protecting forest resources and water quality. ORS 527.710(7)(b). Likewise, because the OFPA requires as a condition of new rules "monitoring or research evidence that documents * * * degradation of resources," ORS 527.714(5)(a), the Board of Forestry has established certain monitoring programs within ODF. For example, OFPA rules specifically require water quality monitoring, including annual reports to the Board of Forestry. OAR 629-635-0110.[1] Similarly, the Board has charged ODF with pesticide use monitoring, OAR 629-620-0700(1),[2] and landslides and public safety monitoring. OAR 629-623-0000(4).[3] In each circumstance, the Board will consider the monitoring results and take appropriate action, including when necessary, development of new forest practice rules.[4]

As a result of ongoing monitoring, forest practice rules have been promulgated and revised on numerous occasions to address water quality issues. For example, in 2000, ODF and landowners embarked on a "wet-weather haul" study to determine the extent to which haul traffic (not just the presence of roads, but the influence of traffic during rain events) produced measurable turbidity in fish-bearing waters. The winter of 2000/2001 was unusually dry, so the study was held over until the following winter when sufficient rain events produced representative conditions. ODF scientists

[1] "In cooperation with state and federal agencies, landowners and other interested parties, the department shall conduct monitoring on a continuing basis to evaluate the effectiveness of the water protection rules. The monitoring shall determine the effectiveness of the rules to meet the goals of the Forest Practices Act and the purposes stated in the rules, as well as their workability and operability." OAR 629-625-0110(2).

[2] "In cooperation with state agencies, landowners, and other interested parties, the department shall conduct monitoring to evaluate the effectiveness of the chemical and other petroleum product rules." OAR 629-620-0700(1).

[3] "The department will continue to monitor factors associated with shallow, rapidly moving landslides and also review new research on this issue. The department will recommend rule changes if this new information suggests different forest practices may be appropriate." OAR 629-623-0000(4).

[4] OAR 629-635-0110(4) ("The department shall report to the Board of Forestry annually about current monitoring efforts and, in a timely manner, present findings and recommendations for changes to practices. The Board of Forestry shall consider the findings and recommendations and take appropriate action."); OAR 629-620-0700 ("The department shall report to the Board of Forestry annually about current monitoring efforts and, in a timely manner, present findings and recommendations for changes to practices. The Board of Forestry shall consider the findings and recommendations and take appropriate action."); OAR 629-623-0000(4) ("The department will recommend rule changes if this new information suggests different forest practices may be appropriate.).

measured turbidity above and below active haul routes. This study isolated traffic as a cause by removing the effects of upstream sediment sources, cut-bank failures, and other confounding variables. The study found predictably large variation in road response, but several variables emerged as significant when turbidity increased. Those included ditch line length that flowed to live streams, total rainfall in a three day window, durability of the surfacing used, and traffic. ODF initiated rule-making in 2002 that now allows stewardship foresters to instruct landowners to install additional cross drains (ditch line length), shut down haul if certain conditions are met (total rainfall and traffic levels), and require durable surfacing or other means to be used if rutting of the road was occurring. All of these collectively have significantly reduced traffic-related sediment delivery to fish bearing streams.

Of course, forest practice rules adopted by the Board of Forestry are fully enforceable. The OFPA includes both civil and criminal penalties for violations, ORS 527.990-.992, and the Board of Forestry has promulgated extensive Oregon Forest Practices Act Enforcement and Civil Penalty Rules. OAR 629-670-0000 through -0350. Pursuant to these authorities, ODF regularly brings enforcement actions against violators, and assesses civil penalties (e.g., 31 civil enforcement actions in 2010, 23 in 2011, 37 in 2012, and 41 in 2013). *See* ODF Private Forest Civil Penalties Data, *available at* http://goo.gl/wJTgSE.

Again, notwithstanding the environmental community's storyline, the OFPA is not a static program. To the contrary, forest practice rules are under constant scrutiny and revision. Enclosed with these comments as Exhibit A is a document prepared by ODF entitled "*The Evolution of Oregon's Forest Practice Rules*." This document details the major rule revisions between 1971 and 2005, and highlights the dynamic and changing regulatory environment for forest landowners.

There are some who would argue that 303(d) listed waterbodies within the coastal zone is sufficient evidence that additional management measures are required (i.e., because the waterbody is listed for water quality standard exceedances, the management measures in place must be insufficient to maintain or attain water quality standards). While it is true that Oregon has many listed waterbodies within the coastal zone, this is true of all states, even those with fully approved programs. For instance, California has a fully approved CNPCP, yet many streams in forested areas of Northern California are listed for sediment.[5] Likewise, Ohio has a fully approved CNPCP, yet many streams flowing into Lake Erie are impaired by sediment and siltation.[6] Moreover, a listing decision requires no analysis of source and linkage. That is, a water body in a forested area may be listed for bacteria, but it is unlikely that forest practices significantly contribute to the exceedance. The bacteria listing alone is not enough to make a determination that forestry management measures are somehow insufficient. We would also highlight DEQ's practice of listing long stream segments on the basis of a single measurement showing an exceedance as evidence that a stream listing provides no information regarding source or linkage.

The relevant question is not whether a State continues to have listed waterbodies within the coastal zone. Rather, the question is whether the State has a CNPCP that describes a regulatory

[5] *See* California Impaired Waters, Cause of Impairment: Sedimentation/Siltation, Reporting Year 2010, *available at* http://goo.gl/ftjOmh.
[6] *See* Ohio Impaired Waters, Cause of Impairment: Siltation, Reporting Year 2008, *available at* http://goo.gl/rh3vV6.

program sufficient to address water quality issues. This Section III explains why Oregon's nonpoint forestry program is legally sufficient to address water quality issues arising from forest operations.

The next question is whether the nonpoint forestry program is working as it should. The State of Oregon believes it is, and we agree. To allege the program is failing vis-à-vis CZARA, one would have to produce scientific data to support a connection between a particular land use and "significant degradation" of water quality standards or designated uses. The following Section highlights the Agencies' failure to produce such data in the context of forestry, and offers numerous sources supporting the opposite conclusion.

IV. Proposed Findings

As highlighted above, the Proposed Findings state that Oregon's CNPCP fails to "1) protect riparian areas for medium and small fish bearing streams and non-fish bearing (type "N") streams (2) protect high-risk landslide areas; (3) address the impacts of forest roads, particularly on so-called "legacy" roads; and (4) ensure adequate stream buffers for the application of herbicides, particularly on type "N" streams." Proposed Findings, at 7. Each of these is discussed in turn below.

a. Protection of Riparian Areas

The Agencies propose to find that Oregon's existing measures for protection of medium and small fish bearing streams (type-F) and non-fish bearing streams (type-N) are not adequate to protect water quality and designated uses. The Agencies use three sources to justify this conclusion: the Oregon Department of Forestry's Riparian and Stream Temperature Effectiveness Monitoring Project ("**RipStream**"); the Statewide Evaluation of Forest Practice Act Effectiveness Protecting Water Quality ("**Sufficiency Analysis**"); and the Governor's Independent Multidisciplinary Team ("**IMST**") Report on the adequacy of the Oregon forest practices in recovering salmon and trout. This proposed finding by the Agencies is based on an uncritical review of these study results. Further, it fails to consider the most current and relevant research on the effectiveness of the OFPA rules for fish and non-fish streams. At best, it is an incomplete and inaccurate assessment of the most recent science findings. At worst, it represents a fundamental misunderstanding of the science.

Both the IMST (1999) report on *Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds* (hereinafter the "**IMST Forest Report**") and the Sufficiency Analysis (ODF and ODEQ 2002) are now more than a dozen years old and do not include more recent findings about the effectiveness of contemporary forest practices to protect water quality and fish. Forest management under contemporary practices and rules often creates small but measurable, short-term impacts to water quality, but conditions recover over time (See RipStream and Watersheds Research Cooperative discussions below). The Oregon Board of Forestry has responsibility to provide "practicable" measures and an effective nonpoint source control program for private forests in Oregon. One of the most important factors in an effective program is that the landowners and operators believe in and support the program (Sugden et al. 2012). Oregon was the first state to adopt Forest Practices Act rules designed to protect water quality. These rules have evolved over time (see discussion above). Private landowners, foresters, and loggers support the OFPA, and application of the rules is high (Robben and Dent 2002). Confusing rules that appear to be capricious and arbitrary could damage the historic partnership between forest operators and the state. The IMST Forestry Report also concludes that "[t]here is not a scientifically sound basis for managing riparian buffers based on the presence or

absence of game fish." While this may or may not be true (See discussion below of Janisch 2012), it is a logical policy decision by the Oregon Board of Forestry to focus on fish-bearing stream that provide a greater return on environmental protection investments for salmon and water quality. Key goals of the Oregon Plan for Salmon and Watersheds and the Oregon Forest Practices Act are to protect water quality and fish habitat. Current buffers and other OFPA rules appear, based on the most recent research (see Watersheds Research Cooperative findings below) to achieve these goals.

The RipStream Study, available at http://goo.gl/2rbDTo, represents new science since the Agencies set conditions for the forestry nonpoint source control program in 1998. This study is cited as supporting a "not satisfied" finding for the conditions of forest riparian areas under the OFPA. We believe that the Agencies have not carefully evaluated the findings from RipStream, focusing on small short-term increases in stream temperature. A closer examination of the results from RipStream would conclude that:

- Maximum water temperatures in streams adjacent to private lands harvested under today's OFPA rules experienced a wide range of responses including small increases and decreases. These changes were an order of magnitude smaller than the changes observed with pre-OFPA rule harvests (Groom et al. 2011a; Groom et al. 2011b).
- The small increases observed on average for maximum stream temperatures following harvesting on private forestland harvests did not result in streams failing biologically-set water-quality standards (Groom et al. in preparation).
- Three of the private forest sites in the RipStream Study experienced the greatest increases in water temperatures and these conditions could be address through minor modifications to the rules or guidelines rather than sweeping changes.
- Preliminary data results from RipStream shows that maximum water temperatures recover downstream (Presentation to the RipStream External Advisory Committee).
- Preliminary analysis finds that shade and maximum water temperatures recover rapidly over time, with a 5 year recovery period, and the most rapid recovery for sites experiencing the largest changes.
- Annual variation in weather and disturbances such as beaver, windthrow, fire, landslides, and floods can cause substantially greater changes in maximum water temperature than the responses seen following forest harvests (Ice and Schoenholtz 2003). In many cases these disturbances and variations can stimulate the productivity of trout and salmon populations.
- The Board of Forestry is seriously assessing what changes if any are needed in the OFPA rules. While we believe any changes to the OFPA rules should be minor, the Oregon BOF will go through a thoughtful and public assessment of these rules based on the best available science for Oregon.

In summary, the RipStream Study found variable, small, short-duration, spatially isolated changes in maximum water temperature. These changes did not cause streams to fail water quality standards designed to protect salmonids, and are smaller than changes periodically experienced due to weather, natural disturbances or historic practices.

The lack of any discussion about findings from the Watersheds Research Cooperative (the "**WRC**") represents a huge omission in the Agencies' analysis of the Oregon CNPCP. In the Sufficiency

Analysis (ODF and ODEQ 2002) there is a discussion about the adequacy of small type-N and small and medium type-F streams:

> Standards for some medium and small Type F streams in western Oregon may result in short-term temperature increases at the site level. However, the significance and scope of this increase is uncertain, and it may be offset at the landscape scale by other factors.
>
> Standards for some small Type N streams may result in short-term temperature increases at the site level that may be transferred downstream (this may impact water temperature and cold-water refugia) to fish-bearing streams. The significance and scale of this change is uncertain, and it may be offset at the landscape scale.

The WRC is investigating the effectiveness of contemporary forest practices to protect water quality and fish. The WRC research program, explained in detail at http://watershedsresearch.org, involves three paired watershed studies: Hinkle Creek, Alsea Watershed Study Revisited, and Trask. These three studies represent the first paired forest watershed studies to assess the impacts of contemporary forest practices since the original 1959-73 Alsea Watershed Study (Stednick 2008). In total, these studies represent a multi-million dollar public-private investment by the forest community in Oregon to assess the adequacy of the OFPA rules. Their design specifically allows for assessment of impacts to both small and medium type-F and small type-N streams, and to evaluate potential transfer of water quality impacts downstream. These studies go further to assess how the fish communities in these streams are responding to forest harvests. These studies directly address questions about the adequacy of riparian management areas under the current OFPA rules. Information about these studies and findings is easily accessed at the cooperative website (http://watershedsresearch.org) and scientists have published results as theses and journal articles, and presented at special meetings. Omission of any mention of a decade of WRC work reflects directly on the insufficiency and poor quality of the Proposed Findings.

Partly from design and partly from serendipity, the three WRC studies address hydrology, water quality, and aquatic responses with different but complementary replication approaches. The first, Hinkle Creek, was designed to assess the effectiveness of Oregon's current OFPA rules. It provides replication of managed and control watersheds for two reach types of concern: fish-bearing and non-fish-bearing streams. The study design also allows assessment of impacts at different watershed scales, from onsite impacts to downstream effects. The Alsea Watershed Study Revisited does not have the same replication of subbasins but instead replicates in time, directly comparing impacts of contemporary management with impacts that resulted from practices of the 1960s in the same watershed. The Trask Watershed looks at alternative riparian practices with replication of individual treatments along non-fish-bearing reaches, and also assesses how these impacts translate downstream. The conditions represented by these three watersheds reflect an important cross-section of managed forests in Oregon (all western Oregon and two of three in the Oregon Coast Range). The following summary of the observed sediment and temperature responses from WRC projects is from a summary paper by Ice (2013).

> Compared to water quality impacts measured in benchmark studies at the Alsea Watersheds in coastal Oregon and H.J. Andrews Experimental Forest in the Oregon Cascades, impacts following the WRC harvests are

small (Beschta and Jackson 2008; http://watershedsresearch.org/assets/reports/WRC_Skaugset_Hinkle%20Sediment_2013_S3.pdf). In the first benchmark studies suspended sediment loads increased 100 to 400% over expected values based on the paired watershed response. In the original Alsea Watershed Study the two treatment watersheds appear to have experienced increases in suspended sediment losses for different reasons: one as a result of severe channel disturbance and the other due to uncompacted sidecast road failures (landslides). Both issues were addressed in the Oregon FPA rules. Compared to these large impacts, sediment responses in WRC study basins harvested using contemporary practices are generally small. There appears to be no shift in suspended sediment concentrations for the treated watershed in the Alsea Watershed Study Revisited. Hinkle Creek increases in suspended sediment loads were in the range of 20 to 40%. Most of the increase is believed to have resulted from increased stream power due to elevated discharge, as no overt sediment delivery was observed. This is consistent with findings from other forest watershed studies across the US (NCASI 2012). In the Alto Watershed Project in Texas, sediment losses for contemporary forest practices with BMPs were 80 to 90% less than historic levels and were within the range of natural disturbance events (McBroom et al. 2008).

This story is repeated for stream temperature changes. Increases in temperature for harvests near fish-bearing streams were small compared to impacts we would have expected without FPA rules. In the Alsea Watershed Study Revisited we can look at water quality responses in the same watershed to compare effects with and without the Oregon FPA rules (Ice et al. 2011; http://watershedsresearch.org/assets/reports/WRC_Light_Alsea%20stream%20temps_2013_S2.pdf). The maximum temperature increase was about 1°F (7 day moving average of maximum daily water temperature) compared to as much as 18 to 25°F increases observed in the original study. There was also little temperature response in the harvests near fish-bearing reaches of Hinkle Creek.

There were also some surprises. The consensus among forest hydrologists was that harvests along non-fish-bearing reaches in Hinkle Creek would produce large stream temperature increases, perhaps approaching those observed in the original Alsea Watershed Study. FPA rules do not require shade retention along these types of streams. Instead, water temperature responses were small and variable (Kibler 2007). In some cases maximum streamwater temperatures actually decreased following logging. The small responses were a result of shade produced by low-hanging shrubs and slash in the riparian area.

> The decrease in water temperature was probably a result of increased streamflow from reduced evapotranspiration following harvesting. The headwater reach in the treatment watershed in the Alsea Watershed Study Revisited also showed little change in temperature, as waters remained very cold.

Perhaps the muted and variable temperature responses that have been observed in the headwater type N streams should not be a surprise. Jackson et al. 2001 conducted a study comparing the effect of timber harvesting on headwater streams in Washington where buffered and no-buffer riparian areas were compared. They found that "[o]f the seven clearcut streams, three exhibited no statistically significant difference in stream temperature, one became cooler (-1.1°C), one became slightly warmer (+0.8°C), and the remaining two streams became both cooler and warmer depending on location in the stream." Jackson et al. concluded that slash from the harvest provided cover over these channels to create this muted temperature response. By comparison, two of the buffered streams became warmer and one became slightly cooler. The buffer trees may have served as barriers to keep slash out of the stream but also creating potentially more stream exposure to solar radiation.

More recently, a study of headwater streams in Washington (Janisch et al. 2012) found a similar mixed and muted stream temperature response to alternative headwater treatments.

> Temperature responses were highly variable within treatments and, contrary to our expectations, stream temperature increases were small and did not follow expected trends among the treatment types. We conducted further analyses in an attempt to identify variables controlling the magnitude of post-harvest treatment responses. These analyses showed that the amount of canopy cover retained in the riparian buffer was not a strong explanatory variable. Instead, spatially intermittent streams with short surface-flowing extent above the monitoring station and usually characterized by coarse-textured streambed sediment tended to be thermally unresponsive. In contrast, streams with longer surface-flowing extent above the monitoring station and streams with substantial stream-adjacent wetlands, both of which were usually characterized by fine-textured streambed sediment, were thermally responsive. Overall, the area of surface water exposed to the ambient environment seemed to best explain our aggregate results. <u>Results from our study suggest that very small headwater streams may be fundamentally different than many larger streams because factors other than shade from the overstory tree canopy can have sufficient influence on stream energy budgets to strongly moderate stream temperatures even following complete removal of the overstory canopy</u>.

The underlined text represents a key new finding that conflicts with the conclusion in Sufficiency Analysis mentioned above.

Another important opportunity is to put these observed water quality responses into context with the scale of annual and between-stream variability observed in these watersheds. Ice (2013) notes that:

> The scale of changes in water quality that can be detected needs to be compared to natural variations between basins and years, to assess whether changes that are statistically significant are also ecologically significant. For example, we looked at how suspended sediment loads varied for the three Alsea Watersheds during the 1959-1965 pre-treatment period. During this time all three watersheds were described as having old-growth forest stands. For this seven year period (before management activities) the annual suspended sediment loads varied around the median load by -52 to +830% for the control watershed, and minus 43-65% to + 267-560% for the two treated watersheds. The average suspended sediment loads (adjusted for watershed size) between the three watersheds during this period varied by ±45%. By using the paired watershed approach scientists were able to detect the 100 to 400% increases in the original study and we should be able to detect the smaller changes in our contemporary studies, but is it affecting aquatic communities that have developed in this type of variability? Maximum temperatures experienced annually during this same period varied by 1.7 to 2.8°C for the three watersheds and the difference in maximum annual water temperature observed between watersheds was 0.6°C.

Research by the WRC also addresses transport of water quality impacts downstream and recovery over time (Ice 2013).

> Changes in water quality resulting from forest management can diminish rapidly downstream and over time. All water parameters are non-conservative, meaning that they do not transport downstream without reductions. Suspended sediment particles can be trapped in long-term storage or dissolve. Watershed scientists use the term "delivery ratio" to reflect the change in sediment amount delivered downslope or downstream from an erosion site. Delivery ratios are always less than one, often reflecting a large reduction in sediment delivered. Forest streams often have features, such as deep gravel deposits, that allow for mixing and muting of temperature increases. Water temperature is constantly interacting with its environment to gain or lose heat. The Hinkle Creek study showed that temperature increases were not propagating far downstream. Nutrients may be taken up by aquatic or riparian plants. Forests also recover over time and provide the cover and forest floor conditions that provide high quality water resources. Even for severe disturbances such as the original Alsea Watershed Study, temperatures recovered to within the range of values observed in the 1959-1965 pre-treatment period (Hale 2007).

First observations from the Trask Watershed Study suggest that temperature increases following harvesting along some of these type N streams are going to be larger than those observed

at Hinkle Creek and the Alsea Watershed Study Revisited (Maryanne Reiter, personal communication, February 18, 2014), but temperature impacts are not transporting downstream. At Mica Creek, Idaho, an increase in streamwater temperature of 3.6°C was observed for an upper reach of a clearcut (non-fish reach without a buffer) but there was no significant change in the maxima observed at the downstream fish-bearing reach (Gravelle and Link 2007).

Most water-quality protection measures under the Clean Water Act or Coastal Zone Management Act are designed to keep pollutants out of waterbodies. Wood recruitment is a unique issue for forests compared to other land-uses, requiring landowners to supply material that will eventually reach streams and contribute to fish habitat. While we agree that wood recruitment is important and that forest management should account for wood needs in streams, our understanding of wood in streams is evolving. The IMST Forestry Report argues the need to leave buffers on non-fish bearing streams because these streams may deliver wood downstream, but many small streams cannot transport pieces of key wood[7] unless they are landslide-prone. In some cases in Oregon, these landslide-prone reaches already have rules requiring leave trees. The WRC study at Hinkle Creek appears to highlight the role of smaller debris to provide shade for type-N streams and the critical role of woody debris and rocks for cover in small fish-bearing reaches. The OFPA rules for small and medium fish-bearing streams do provide minimum requirements for development of large mature trees that can contribute key wood pieces to streams. These contributions can be augmented by discretionary placement of wildlife trees along riparian areas; policies that promote active management of riparian areas to accelerate the development of large mature trees near the stream; and voluntary measures by landowners including retention of additional leave trees in the near-stream area, and placement of large wood or wood-structures in streams as part of active management or other conservation efforts (See discussion on Oregon Plan for Salmon and Watersheds). The long-term wood recruitment needs for Oregon streams can most efficiently be achieved through a combination of these OFPA rules that provide for minimum leave trees along fish-bearing reaches and the many options for voluntary enhancements to targeted reaches needing additional wood volumes.

Perhaps most importantly, the WRC studies are measuring the fish and macroinvertebrate response to contemporary forest practices, and the results are available at http://watershedsresearch.org. The findings so far indicate that timber harvesting on headwater type-N and along small and medium type F streams is not degrading fish populations. For example, see the initial findings of Bateman et al. at http://goo.gl/XaUnI4. Instead, there seems to be a positive response in biomass at the first two studies (Hinkle Creek and Alsea Watershed Study Revisited) for apparently different reasons. An example of this positive response is the fish response observed for the harvested stream (Needle Branch) in the Alsea Watershed Study Revisited. Not only has Needle Branch experienced an increase in trout biomass following the 2009 timber harvest relative to the expected values based on the control watershed, but the increase appears to be in the reaches immediately below the harvested type-N section and through the portion of the type F stream reach that was harvested.

[7] Key wood pieces are of sufficient size to be relatively stable in a channel to create a wood feature. The size needed to be functional changes with the size and character of the stream. See: http://bofdata.fire.ca.gov/board_committees/monitoring_study_group/msg_supported_reports/2012_supported_reports/benda_bigelow_cawood1__final_.pdf (Accessed February 28, 2014)

In summary, these more recent findings from RipStream, the WRC, and other regional research do not support the Agencies draft conclusion that the Oregon FPA rules are not protecting water quality and beneficial uses.

b. Protection of High-Risk Landslide Areas

The Proposed Findings also assert that Oregon "does not have additional management measures for forestry in place to protect high-risk landslide areas to ensure water quality standards and designated uses are achieved." Proposed Findings, at 10. Unfortunately, the Proposed Findings fail to specify which water quality standards and which designated uses, but we presume that the Agencies are primarily concerned with sediment deposition negatively impacting aquatic life. We believe this concern is misplaced for reasons discussed below.

The geology of Oregon is highly variable and complex. The OFPA covers lands across the State and across a diverse range of geologic and geomorphic conditions. Accordingly, any forest practice rules that address landslide hazard and risk mitigation must include an appropriate range of non-prescriptive, risk-based measures designed to cover a variety of hazard and risk scenarios associated with forest practices. This has been recognized in the existing rules addressing landslides in the OFPA, including the Harvest rules that dictate how steep slopes may be harvested, OAR Chapter 629, Division 630,[8] and the Forest Road Construction and Maintenance rules that dictate where and how roads may be constructed on steep or otherwise unstable slopes. OAR Chapter 629, Division 625.[9] The more recently-developed Landslides and Public Safety Rules, OAR Chapter 629, Division 623,[10] and rules specifically addressing debris flow-prone streams in the Water Protection: Vegetation Retention Along Streams rules, OAR Chapter 629, Division 640,[11] more explicitly acknowledge the range of geologic conditions and associated landslide hazard and risk across the state. They take a risk-based approach towards managing the wide range of conditions in Oregon and avoid a one-size-fits-all prescriptive approach.

The Oregon rules discussed above have largely incorporated the general findings of numerous studies that have compared forested areas with recently harvested areas and found higher landslide

[8] *See* OAR 629-630-0000(2) ("Harvesting operations result in a temporary disturbance to the forest environment. (3) The purpose of the harvesting rules is to establish standards for forest practices that will maintain the productivity of forestland, minimize soil and debris entering waters of the state, and protect wildlife and fish habitat.").

[9] *See* OAR 629-625-0000(3) ("The purpose of the road construction and maintenance rules is to establish standards for locating, designing, constructing and maintaining efficient and beneficial forest roads; locating and operating rock pits and quarries; and vacating roads, rock pits, and quarries that are no longer needed in manners that provide the maximum practical protection to maintain forest productivity, water quality, and fish and wildlife habitat.").

[10] *See* OAR 629-623-0000(1) ("The purpose of the shallow, rapidly moving landslides and public safety rules is to reduce the risk of serious bodily injury or death caused by shallow, rapidly moving landslides directly related to forest practices. These rules consider the exposure of the public to these safety risks and include appropriate practices designed to reduce the occurrence, timing, or effects of shallow, rapidly moving landslides.").

[11] *See, e.g.*, OAR 629-640-0000(1) ("The purpose of this rule is to describe how the vegetation retention measures for streams were determined, their purpose and how the measures are implemented. The vegetation retention requirements for streams described in OAR 629-640-0100 through 629-640-0400 are designed to produce desired future conditions for the wide range of stand types, channel conditions, and disturbance regimes that exist throughout forestlands in Oregon."); OAR 629-640-0210 ("The purpose of this rule is to provide a source of large wood that can be moved by rapidly moving landslides into Type F streams.").

densities in more recently harvested areas. However, the findings have been variable and the relationships remain unclear. Montgomery (2000) found that clearcutting increases regional landslide frequency and sediment yield. More specifically, Montgomery determined that at sites with high apparent soil cohesion (from soil properties and/or tree roots), landslides occur most frequently in landforms with excess pore pressure and thick soils (e.g., colluvium-filled bedrock hollows developed in Tyee sandstone). This scientific understanding is consistent with Oregon's definition of high landslide hazard locations ("**HLHL**"). HLHL are defined in rule as any slope in western Oregon steeper than 80%, except in the Tyee Core Area, where it is any slope steeper than 75%, or any headwall or draw in western Oregon steeper than 70%, except in the Tyee Core Area, where it is any headwall or draw steeper than 65%. OAR 629-600-0100(35). In summary, Oregon forest practice rules identify headwall/hollow landforms as landforms with a high natural hazard that may be affected by forest operations.

In December, 2007, a high magnitude–low frequency storm stuck the Pacific Northwest, and as a result, numerous landslides were triggered on industrial forestlands located in southwest Washington. Weyerhaeuser conducted a study, Turner et al., (2010), with the goal of estimating landslide density associations with precipitation, topography, and forest stand age. The study utilized ground-based and air photo-based landslide inventory data to develop reliable estimates of landslide density across stands of various ages.

Of interest were the following conclusions from Turner: (1) While landslide densities on steep slopes (>70% gradient) were higher than on gentler ground, the total number of landslides was greater on acres with slope <70%. (2) density of landslides was greater in younger stands; the total number of landslides was greater in stands over 10 yrs old, (3) The influence of harvest diminished after stands reached 10 years of age, and (4) regardless of stand age, the intensity of rainfall, and slope steepness had a direct influence on landslide densities.

In evaluating the results from Turner et. al. (2010), it is misleading to focus only on landslide density relationships. Rather, it is important to also consider the total number of landslides triggered during major storms. While landslide densities have been shown to be higher in steep terrain with young forest stands, the proportion of this area across mountainous terrain is potentially very low, so that potential increases in sediment delivery to public resources from landslides triggered in these areas is also proportionately small.

Shallow landslides (e.g., debris slides, debris flows, and debris avalanches) are the primary landslide of concern in managed forest lands in the Pacific Northwest. They typically occur over only one to two percent of Pacific Northwest landscapes impacted by large storm events (Ketcheson and Froelich 1978; Ice 1985) that are typically initiated during the fall and winter months (Swanson et al 1987, Wiley 2000). The susceptibility of specific sites to landsliding from rain or rain-on-snow events is highly variable. Turner et al., (2010) found that rainfall intensity of 100-yr return or greater was necessary to trigger significant landsliding in the Willapa Hills during the 2007 event.

Debris avalanches and debris slides can become channelized and travel considerable distances. It is also understood that channelized debris flows usually transport more debris, including substantial amounts of wood, than the initiating event, due to scouring action on the slope or in the channel. They can have long-lasting effects on stream channels. This is important because, even though landslides may only impact a small proportion of a watershed, and debris flows typically stop before entering fish-

bearing water, landslide-derived sediment can be transported long distances from the source (Swanson et al. 1987). Channel alterations from debris flows are a natural habitat-forming process and not necessarily negative. For example Benda et al. (2003) found that channel morphology and habitat complexity (e.g., pool density, substrate texture, and channel widths) increased in proximity to low-order tributary confluences where debris flows typically deposit wood and sediment, which are important to the maintenance of productive stream habitat.

Oregon's forest practice rules recognize this science and policy conundrum. Landslides will largely occur during large storms and channel impacts may temporarily be deleterious to aquatic life. However as noted by Benda (2003) and Weyerhaeuser (Mt. St. Helens recovery research and 2007 Chehalis river flood response) channel morphology and habitat complexity increased, and aquatic populations quickly recover and may actually benefit from such events. In recognition of this Oregon Division 640 sets minimum protections standards for debris flow–prone streams. The purpose of those rules also is to retain large standing trees in locations where they might promote debris flow deposition and provide for delivery of large wood to fish streams to increase channel complexity and provide good habitat.

EPA argues that Oregon must have additional management measures for forestry to protect HLHLs, to maintain good water quality, and to ensure that designated uses are protected. However, EPA does not offer any objective evidence that these additional measures are necessary. It simply refers to a single study in the Oregon coast range (Montgomery et.al. 2000) in which landslide rates increased following timber harvest. While studies do reveal a small management signal on a small fraction of the landscape, none have demonstrated significant or lasting impacts to fish populations from these changes. In fact, where habitat changes and fish responses have been carefully monitored, impacts have been subdued and short-lived (Jones et al. 1998, Danehy et al. 2011, Doug Bateman, OSU, personal communication).

Oregon's coast range is a dynamic landscape prone to mass wasting. The fish that inhabit this landscape have evolved to accommodate this process and even rely on it to maintain quality habitats (Reeves et al. 1995). Reeves et al. (1995) recommend establishing a system of reserve watersheds in concert with managing for watershed-scale disturbance regimes. The reserve system has been accomplished under the aquatic conservation strategy of the Northwest Forest Plan. Very little timber harvest or other forest management activities beyond restoration have occurred in federal forests of the Pacific Northwest since 1994. These lands constitute the majority of forested areas in Oregon. On private lands, Oregon has rules in place to reduce the fraction of landslides associated with roads, and it manages the quality of landslides on steep hillslopes through voluntary leave tree areas. It is irrational to think that all landslides are preventable, or that this would be desirable.

In Washington, the objective of unstable slope rules is to prevent forest practices from increasing landslides above natural background rates. However, natural rates are highly variable and determining rates for a given time-frame and region is essentially an intractable problem. It is also very difficult to determine which landslides at specific sites are naturally occurring or caused by forest practices. Yet the Agencies insist that Oregon address a forest management signal that is difficult to quantify and adopt new harvest and road construction restrictions for all HLHLs with the potential to impact water quality and designated uses. Simply put, EPA has not offered any objective evidence to

demonstrate that Oregon's water quality standards and designated uses are not being achieved by its current regulatory system for high risk landslide-prone areas.

While it is likely that landslides naturally contribute deposits in streams that may temporarily impact water quality and aquatic life, a body of science suggests that populations quickly recover and often benefit from such events. Aquatic communities have evolved in a dynamic landscape and naturally respond to disturbance events such as landslides. Some species flourish in recently disturbed habitats, others prefer conditions more typical of streams that have not been impacted by recent disturbance. Community composition and productivity naturally ebb and flow over time in these natural aquatic systems.

We respectfully suggest that EPA consider a landscape-scale view over long timeframes as the proper context for evaluating whether water quality standards and designated uses are impaired or attained. Disturbance and recovery processes are an essential part of these landscape-driven forest ecosystems. It is impossible to measure the management influence on the natural landslide rate for a given basin. Transitory impacts to water quality and designated uses from mass wasting processes are not necessarily something we should be trying to prevent.

From a strictly legal perspective, the Agencies have produced no evidence (much less, substantial evidence), that landslides resulting from forest management activities are causing water quality standard exceedances, or negatively impacting aquatic life more than landslides do under background conditions. Without more, a decision to disapprove Oregon's CNPCP would not withstand judicial review.

c. Forest Roads

The Agencies also "remain concerned" about forest roads delivering sediment into streams. Proposed Findings, at 9. This, notwithstanding extensive forest practice rules applicable to road construction and maintenance, including significant new rule revisions in 2002 and 2003, and broad success under the Oregon Plan for Salmon and Watersheds, all detailed thoroughly in the State's July 1 submission to the Agencies. In fact, the Agencies "remain concerned," without citing a single source indicating a problem exists, without citing any water quality standard or beneficial use the rules fail to protect, indeed without citing a single reason for concern.

Instead, the Agencies allege that the state has not provided "a commitment to exercise its back-up authority to require implementation of additional management measures for forestry roads, as needed." *Id.* This is ludicrous. The rule revisions in 2002 and 2003 indicate that the OFPA is working precisely as it should, and evidence a continuing commitment by the Board of Forestry to implement additional management measures as needed. One would be hard-pressed to imagine better evidence of the Board's commitment. If there were additional data indicating that forest roads continue to "cause or contribute significantly to a degradation of * * * coastal waters"—an issue ODF is actively monitoring under OAR 629-635-0110—then the Board would initiate a new rulemaking, as it has done repeatedly in the past. However, to the contrary, the Sufficiency Analysis concluded that "[w]ith the exception of wet-weather road use [addressed in the 2002 rulemaking], complying with the road construction and maintenance rules currently in place is likely to result in meeting water quality standards." Sufficiency Analysis, at 46. The Agencies offer no reason to question the conclusions in the Sufficiency Analysis.

The Agencies also assert that the State has not provided sufficient data to the Agencies to document effectiveness of voluntary efforts under the Oregon Plan. Proposed Findings, at 9. The Agencies suggest that an extensive (and expensive) inventory and reporting program for forest roads is necessary "to determine the extent of forestry road miles not meeting current road standards within the nonpoint management area." *Id.* Here, the Agencies presume a problem exists (again, without citation to a single source) until the State can prove otherwise. However, nothing in CZARA requires that a state prove a negative. Rather, CZARA allows a state to make determinations of what land uses are contributing significantly to water quality impairments, 16 USC 1455b(b)(1), and what additional management measures are "necessary to achieve and maintain applicable water quality standards." 16 USC 1455b(b)(3). After extensive monitoring and review, the State of Oregon concluded that the rules in place are "likely to result in meeting water quality standards." Substantiating that conclusion, monitoring by the Oregon Department of Fish and Wildlife since 1997 has shown stable to improving habitat conditions along coastal Oregon (Anlauf et al. 2011), and increasing returns of adult coho spawners.

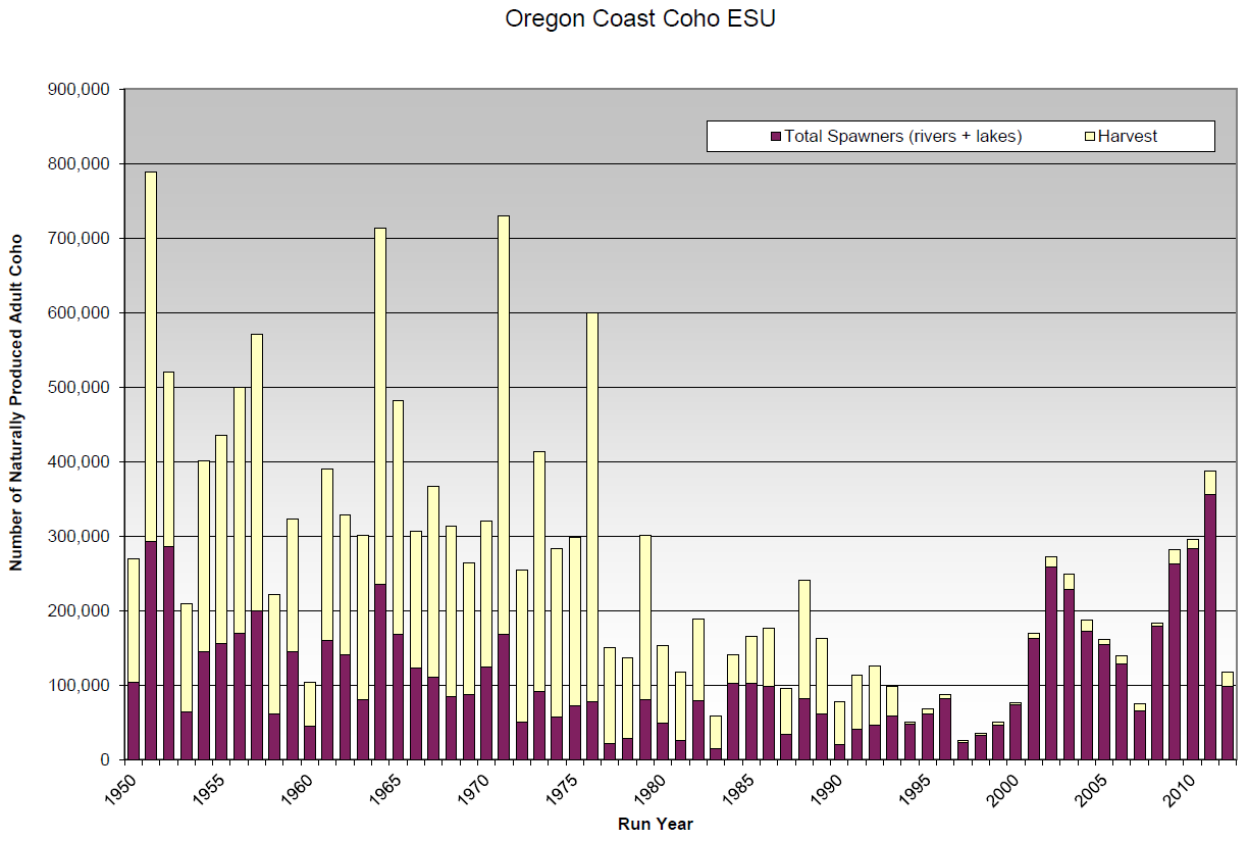

Figure 1. Estimated numbers of naturally produced adult coho in the Oregon Coast Coho ESU (run years 1950 to 2012). Number of adult coho spawning in the wild, and harvest impacts (both landed and non-landed).

Oregon Department of Fish and Wildlife, Oregon Adult Salmonid Inventory and Sampling Project

On the other hand, we are not aware of any scientific evidence indicating that habitat and water quality conditions have materially improved in Washington State due to implementation of their road maintenance and abandonment program.

To overturn the States' determination, the Agencies must produce substantial evidence connecting Oregon forest roads *under modern forest practice rules* to water quality standard impairments. No such evidence exists. Alleging that Oregon's rules are insufficient without reason, and without any support, is the definition of arbitrary, and a disapproval action on this basis would not survive even cursory judicial scrutiny.

d. Herbicide Application Buffers

The final issue raised by the Agencies is the need for buffers during aerial spraying of herbicides along type-N streams. Again, the draft assessment by the Agencies does not represent changes since 1998 in how forest managers and chemical applicators protect Oregon streams. Nor does the assessment include the most recent extensive and intensive monitoring for herbicides associated with forest chemical applications. Water quality monitoring of a type-N (non-fish bearing) forest stream during and after herbicide spray operations (applied under OFPA rules and guidelines and FIFRA/labeling regulations) shows no evidence of detrimental impacts. Nevertheless, Oregon continues to support monitoring that would identify potential problems should they arise.

Two important developments have occurred related to application of forest chemicals since 1998: the Spray Drift Task Force, and court cases and developments under FIFRA and the Clean Water Act affecting aerial herbicide applications on forest lands. The Spray Drift Task Force worked to identify ways of quantifying and modeling chemical drift to better protect off-target locations (http://www.agdrift.com/) (Teske et al. 2003). The forest community supported this effort through cooperative research (Teske and Ice 2002, Thistle et al. 2009). This led to the common adoption of larger drop size distributions for forest herbicide applications. Most forest herbicide aerial applications use technology that create drops which are classified as coarse or larger. It wasn't until after 1998 that the ultra coarse class of drop distributions was adopted by the American Society of Agricultural and Biological Engineers (ASABE Standard S-572.1). Another practice documented as effective and commonly used in forest applications is turning off the half of the spray boom nearest a waterbody. This reduces turbulent mixing and drift toward the stream.

Since 1998 there have been significant changes in how chemicals are applied to forests under the Federal Insecticide, Rodenticide, and Fungicide Act (FIFRA). Findings from the Spray Drift Task Force and other research led to revisions in chemical labeling. Pesticide applicators are licensed under FIFRA and recent court rulings have further increased regulation of applicators and land owners. Oregon's Forest Practices Act rule guidelines state that applications must comply with the most stringent of requirements of either the label, or forest practice rules and guidelines. ODF has developed extensive guidelines for implementing the Oregon Forest Practices Act rules for herbicide applications to forest lands. *See* Oregon Department of Forestry, Forest Practice Rule Guidance: Chemicals and Other Petroleum Products (2009), *available at http://goo.gl/uv8oIH.*

A number of water quality monitoring projects have been conducted which have assessed herbicide concentrations in Oregon and Northwest streams. These began with research by the USDA Forest Service (*see, e.g.*, Norris and Charlton 1995). Of particular significance for this assessment is a study by Rashin and Graber (1993). They monitored seven small streams in Washington: six forested and one Christmas tree plantation. These streams would be considered small type-N streams in Oregon.

Herbicides were found in all streams monitored, but the maximum instantaneous concentration observed was 7.55µg/L. All herbicide concentrations were far below levels of concern, and chemicals were detected in the water samples for just a short period of time. The only case where concentrations were above water quality guidelines was for the Christmas-tree insecticide/fungicide application. This was in 1993 before many of the advancements in controlling placement of chemicals.

Oregon has had numerous studies and monitoring efforts since 1998 which have looked at herbicides and other pesticides in streams. A USGS study of the Clackamas River Watershed (Carpenter et al. 2008) found 63 pesticide compounds in water samples across the watershed but most samples were at low concentrations. Only 7 percent of the chemicals detected were licensed for use on forests and none of these were at concentrations of concern. Monitoring on the McKenzie River from 2002-2010 found the highest frequency of detections and highest concentrations associated with urban runoff (Kelly and Anderson 2012). "In contrast, forestry compounds were rarely detectable in the McKenzie River, even though forest land predominates in the basin and forestry pesticide use was detected in small tributaries draining forested lands following application." Kelly and Anderson further concluded that "[b]ecause forestry applications are relatively limited in both time and space, forestry pesticide use is less of a concern than urban or agricultural use."

The Oregon Department of Forestry conducted a study of 26 streams following aerial pesticide (both herbicides and fungicides) applications to assess the effectiveness of the OFPA rules (Dent and Robben 2000). Most of these were fish-bearing (type-F) or domestic water supply (type-D) streams but two were small type-N streams. Both these type-N streams were located in the Oregon Coast region. Any significant contamination of type-N streams draining into F or D streams might also be expected to create a response at the downstream monitoring sites. For all 26 sites no sample was found with a pesticide concentration at or greater than 1 µg/L. A subset of sites (5) had the detection limits lowered during the analysis to provide some quantification of aerially-applied chemicals in streamflow. The two highest chemical concentrations observed in sampling were 0.9 and 0.56 µg/L, both for the same unit. One hundred and twenty-two (122) of 129 samples analyzed for these 26 streams were below the detection limit.

The most direct and intensive assessment of the potential impacts of aerial herbicide applications along a small type N streams comes from the Alsea Watershed Study Revisited ("**AWSR**"). A presentation on the results of this study can be found at http://goo.gl/SFV82j, and a NCASI Special Report covering results and analytical methods is available (NCASI 2013). As part of AWSR, the harvest unit on Needle Branch was sprayed in August 2011 with a mixture of four herbicides: glyphosate, imazapyr, sulfometuron methyl, and metsulfuron methyl. This was one of the most intensive streamwater herbicide monitoring projects ever conducted. It included monitoring at multiple stations along Needle Branch, including a station at the stream's fish/no fish interface. Samples were collected at the time of the spray, during baseflow, and during storm runoff events. The study analyzed for glyphosate, metabolites of glyphosate, sediment attached glyphosate, and the three other herbicides. Methods were "pushed" to lower detection limits than normal to better understand the pattern of runoff for glyphosate during the application and subsequent storm events.

No chemical other than glyphosate was detected in the streamwater samples. The maximum glyphosate concentration observed was 0.115µg/L (during the first storm after the spray application, at the station immediately below the full harvest unit) and pollutographs were steep and short-lived.

Concentrations were higher at the bottom of the no-fish reach than for other monitoring stations during and immediately following the spray operation and for most of the subsequent storms but concentrations were extremely low. The analytical method used had a high bias so these results are conservative (i.e., over-estimates). Based on published toxicological guidelines the exposures observed (product of the concentration and duration of exposure) were four orders of magnitude or more below no observable effect levels for aquatic life. These findings for a spray operation adjacent to a small type-N stream in Oregon using contemporary aerial application methods and under the OFPA rules and guidelines, supports the effectiveness of the current Oregon approach. These results do not support the findings of the draft assessment by the Agencies.

But Oregon has not stopped with these results. The state of Oregon is continuing to monitor waters across the state pro-actively to detect any significant impacts from current practices under the Oregon State Plan and Pesticide Stewardship Program ("PSP") (http://tinyurl.com/ktbhz49). This ongoing monitoring will allow the state to respond should herbicides be identified at unacceptable levels and it is currently monitoring for more than 100 pesticides. Between 2009 and 2011, PSP monitoring found few cases where herbicides in samples exceeded benchmark concentrations of concern and most of these herbicides could be used in other land-use activities besides forestry.

In summary, Oregon has a strong Forest Practices Act program for chemicals which is tightly connected with FIFRA regulations and labeling. Many changes have occurred since the 1998 assessment by the Agencies about how herbicides are applied. Recent monitoring has not found a problem with contemporary forest aerial herbicide spray operations; in fact just the opposite. Extensive monitoring of large and small streams has not detected high or long-lasting concentrations in water samples. A temporally and spatially intensive study of a forest herbicide application in the Oregon Coast Range found extremely low concentrations of one herbicide (out of a tank mix of four chemicals) and detectable values occurred for only short periods. Values were orders of magnitude below published no-effect levels.

V. Conclusion

As highlighted in Section III, Oregon's forestry nonpoint program is robust and dynamic. The OFPA includes a specific mandate to the Board of Forestry to achieve and maintain water quality standards, and provides the Oregon Department of Forestry with enforcement authority. The Board, in turn, has promulgated extensive forest practice rules, and is currently considering more, and the Department of Forestry is rigorously enforcing those rules. Likewise, Section IV evidences that Oregon's forest practices rules are protecting both water quality and beneficial uses. The Agencies have produced little to no evidence that Oregon's forest practices rules are failing to meet these objectives. To the contrary, there is a large body of science indicating that modern forest practices are either neutral to positive in terms of impacts to aquatic life.

On a final policy note, forest practice rules should be modified with great care to avoid unintended consequences. For example, one consequence of unnecessary restrictions is to limit management options for restoration or habitat improvements, and to pull resources away from legitimate restoration needs. Professionals from the forest and aquatic resource communities are beginning to recognize that active riparian management will be necessary to achieve some of our conservation goals (Ice 2010, 2011). The state of California is exploring active riparian management (Liquori 2012) and initial results from the first two Watersheds Research Cooperative studies (Hinkle

Creek and ASWR) point to positive fish response following timber harvesting under the OFPA rules. There may be opportunities to enhance and sustain gains in fish populations through active riparian treatments, including harvesting to increase discharge, thinning of riparian forests to levels that promote primary production in the stream or adjacent understory, and large wood placement in streams. Resources diverted toward unnecessary restrictions could limit the ability of private landowners to invest in watershed restoration efforts, including riparian areas and forest roads. During the July 2007 EPA road tour (to address the issue of road classification under the Clean Water Act) the USDA Forest Service highlighted its resource limitations to upgrade its road system. Where active management is providing financial gains, there are greater opportunities to address water resource enhancement needs.

Theories about desirable characteristics for salmon habitat continue to evolve. It wasn't that long ago that stream cleaning of wood was promoted to enhance fish passage and avoid creating oxygen deficits. Then large wood recruitment was promoted. Large conifers were especially desired because they would last for long periods in streams and could create pool habitat. There are even OFPA rules that promote conversion of riparian areas to conifers. Then the benefits of riparian hardwoods began to be touted and now there are conifer to hardwood conversions (Jones et al 2013). Any criticism of the existing OFPA rules needs to be tempered against this background of changing values and expectations. The BOF must continue to be give the latitude necessary to develop practical, understandable, and effective rules that provide certainty to landowners and a favorable return on the conservation investment being made.

We respectfully request that the Agencies reconsider the Proposed Findings and unconditionally approve Oregon's CNPCP.

Very truly yours,

[redacted]

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EXHIBIT A

The Evolution of Oregon's Forest Practice Rules

1971 - 2005

Prepared by Oregon Department of Forestry Public Affairs and Private Forests Staff.

Following is a chronology of the rule and statute changes that have occurred throughout the history of the Oregon Forest Practices Act. This list captures the major efforts resulting from legislative changes or responses to noted problems in forest practices. Most of these revisions increased protection in riparian areas, improved in water quality and other benefits for fish and wildlife.

1971 With industry support, Oregon legislature approved the nation's first Forest Practices Act. New law set minimum standards for reforestation, road construction and maintenance, timber harvesting, chemical application and slash disposal. Legislation governed private and state lands; federal officials subsequently agreed to meet or exceed terms of the Oregon Act. Emphasis is on prevention of problems and abuses. Law became a model for other states adopting similar legislation. Law became effective July 1, 1972.

July 1972 Initial adoption of Forest Practices Rules. Rules set specific standards for reforestation, road construction and maintenance, and streamside buffer strips. Though many rules were advisory in nature, the majority were specific and enforceable. More than 6.800 people from industry, Oregon Department of Forestry, and cooperating state and federal agencies completed Forest Practices Act training program.

July 1974 State Board of Forestry adopted amendments to tractor skidding and mechanical clearing rules. Objective is to avoid soil compaction, deep soil disturbance and accelerated erosion. New rules defining "the Waters of the State" required drainage systems be installed on harvest sites to prevent mudy water runoff. New rules related to spillage of petroleum products and provided additional protection of water sources, wetlands.

July 1975 Increased detail required in notification of operations. New rules requiring water quality protection related to surface mining practices were adopted.

Jan. 1978 State adopted 15-day prior notice requirement for all forest operations, giving state forest practices foresters time to review operations requiring special attention. New rules and definitions related to "filling and removal" and stream channel changes were added.

June 1978 Comprehensive revision in response to 1977 federal Clean Water Act, Section 208. Made rules more clear and specific regarding water quality protection and added "prior approvals" as requirement for several practices which potentially could directly affect water quality.

Sept. 1978 New rules for application of the herbicides 2,4,5,-T and Silvex (rendered moot by registration cancellation in February, 1979).

Jan. 1980 Transferred responsibility for reforestation compliance from operators to landowners.

Sept. 1983 Comprehensive revision of road construction and harvesting rules in response to severe landslide problems following heavy storms in 1981 and 1982. Introduced concepts of "high-risk sites" and "written plans."

June 1985 State Board of Forestry adopted additional requirements related to "in-unit slides" in harvesting units aimed at minimizing soil erosion. Clarified requirement to comply with written plans.

April 1987 Comprehensive revision to harvesting and road construction rules dealing with riparian protection in response to state agency coordination requirements of land use planning and an agreement between the Board of Forestry and the Fish and Wildlife Commission. Required specific numbers and sizes of conifer trees to be retained in riparian management areas of western Oregon.

July 1987 ***Major amendments to Forest Practices Act through HB 3396***. Reduced Board of Forestry membership from twelve to seven with no more than three members holding financial interests in forestry. Bill also required site-specific protection for state and federally listed threatened and endangered species; sensitive bird nesting, roosting and watering sites; wetlands, and ecologically and scientifically significant biological sites.

May 1988 New procedures developed to provide copies of notifications and written plans to interested parties. New rules adopted governing operations of Regional Forest Practices Committees.

Aug. 1988 New rules specified forest practices enforcement and procedures and administration of civil penalties. Contested case procedures developed for civil penalties.

Sept. 1988 New requirements for approved mandatory written operations plans within 100 feet of Class I streams, or within 300 feet of sites of threatened or endangered species, sensitive bird nesting, roosting or watering, significant wetlands, or biological sites. Interim protection requirements established for operations in above listed sites.

Sept. 1989 New procedures for operator appeals of orders of the State Forester. New procedures for appeals of written plan approvals from public who are adversely affected.

July 1990 Process rule adopted for listing sensitive bird nesting, roosting or watering sites. Oregon Forest Industries Council proposed major reforms designed to strengthen the Act. Proposals addressed stream protection and water quality, reforestation, clearcut sizes, forest practices along designated scenic highways, and snag and green-tree retention.

Jan. 1991 Protection rules adopted for osprey nesting and roosting sites. Process rule adopted for granting exceptions to protection of resource sites.

May 1991 Process rules adopted for listing sites of threatened or endangered species. Protection rules adopted for great blue heron nesting sites.

June 1991 Protection rules adopted for northern spotted owl nesting sites.

July 1991 ***Major amendments to Forest Practices Act through SB 1125.*** Legislature instructed Board of Forestry and Oregon Department of Forestry to revise stream protection rules. The objective was to provide equal protection for fish present in all Oregon Streams. State forestry officials conferred with forest landowners, environmental groups and other state and federal agencies responsible for managing and protecting forest resources in developing stream protection rules.

Oct. 1991 Process and protection rules adopted for significant wetlands.

May 1992 New rule adopted requiring compliance with statutory provisions of SB 1125, to allow enforcement with civil and criminal penalties. Enforceable statutory provisions include size and spacing of clearcuts, retention of wildlife trees and snags in clearcut units, interim stream protection measures and protection of scenic highway corridors.

Jan. 1993 "Single ownerships" for the purpose of determining size and spacing of clearcuts was defined. Process rules adopted for listing biological sites that are scientifically and ecologically significant.

Sept. 1994 New rules adopted for classification and protection of waters of the state with the objective of reaching a desired future condition of mature streamside stands. Rules provide protection measures for streams (based on size and beneficial use), lakes, wetlands, and other water bodies. Rules provide incentives for stream enhancement and conversion of hardwood-dominated sites to conifer where appropriate.

Jan. 1995 New reforestation rules established standards to ensure timely replacement and maintenance of tree cover following forest operations based on potential productivity of the site. Provide greater flexibility for site-specific reforestation decisions and recognition of forestry research, silvicultural methods, and trees species used by forest landowners.

July 1995 New civil penalty rules implemented. Rules generalize the categories for base penalties, provide enforcement flexibility by weighing operator's compliance history as a factor in computing penalties. Also aligned base penalties with forest economy.

Mar. 1996 Oregon Board of Forestry approved public hearings to address changes in chemical application rules.

Sept. 1996 Board of Forestry adopted administrative rules governing chemical rule applications.

July 2002 Board of Forestry adopted changes to administrative rules governing forest roads and harvesting that implemented many of the road recommendations from the Forest Practices Advisory Committee convened by the Board under the direction of Executive Order 99-01.

Oct. 2002 Board of Forestry adopted new rules: Division 623 – Shallow, Rapidly Moving

Landslides and Public Safety. These rules developed from Senate Bill 1211 (1997) and Senate Bill 12 (1999) that was the result of public concern about shallow rapidly moving landslides similar to those triggered by storm events in 1996 that caused five human fatalities.

Aug. 2003 ***Amendments to Forest Practices Act through HB 3264*****.** Legislature removed authority for the Board of Forestry to adopt or enforce a rule under ORS 527.610 to 527.770 that requires the board or the State Forester to approve written plans as a required precedent to conducting a forest practice or operation.

Dec. 2005 Board of Forestry adopted rules to implement HB 3264 (2003).

For more information about the Oregon Forest Practices Act, contact the Oregon Department of Forestry Private and Community Forests Program, 2600 State St., Salem, OR 97310. (503) 945-7470.