UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
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July 21, 2015

Tom Imeson, Chairman
Oregon Board of Forestry
Oregon Department of Forestry
2600 State Street
Salem, Oregon 97310
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Dear Chairman Imeson and Oregon Board of Forestry Members:

The National Marine Fisheries Service's Northwest Fisheries Science Center's (NWFSC) mission is to conduct the science necessary to conserve marine and anadromous species and their habitats off the Washington, Oregon, and northern California coasts and in freshwater rivers of Washington, Oregon, and Idaho. Our research provides reliable, relevant, and credible information to help decision-makers and natural resource managers build sustainable fisheries, recover endangered and threatened species, maintain healthy ecosystems, and protect human health. I'd like to take this opportunity to build upon the testimony provided by my NWFSC colleague, Phil Roni, PhD on June 3, 2015 and provide additional perspective for your consideration on the action titled "Developing Riparian Rule Prescriptions", which is scheduled for the Board of Forestry (Board) review on July 23, 2015.

Salmonids depend on many ecosystem functions for long-term survival and recovery, including riparian functions such as wood supply to the stream for habitat structure, shade to regulate stream temperature, retention of flood flows and sediment, and supply of leaf litter and nutrients that fuel the food web (citations). Many salmon species—including Chinook salmon, coho salmon, and steelhead—have an affinity for wood cover (e.g., Beechie et al. 2005), as well as for low velocity habitats such as pools that are created by wood (e.g., Bisson et al. 1998). Wood forms pools in a wide range of channel sizes, but is particularly effective in smaller streams where relatively small pieces of wood can form pools (Bilby and Ward 1989, Montgomery et al 1995, Beechie and Sibley 1997). As channel size increases, the size of wood required to form pools increases (Bilby and Ward 1989, Beechie and Sibley 1997, Abbe and Montgomery 2003). In larger rivers single wood pieces may not be large enough to create pools, and instead accumulations of wood anchored by large key pieces are a dominant pool-forming agent (Abbe

and Montgomery 2003). In all channel sizes, low velocity habitats and wood cover are important habitat features for listed salmon species, including Chinook salmon, coho salmon, and steelhead (Bisson et al. 1988, Beechie et al. 2005).

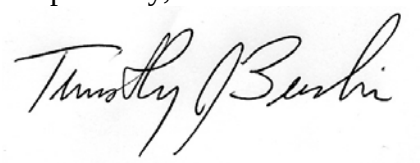
In the past, logging of riparian forests has contributed to significant declines in habitat function via loss of wood recruitment (Grette 1985; Andrus et al. 1988; Carlson et al. 1990; Bilby and Ward 1991; Ralph et al. 1994). This in turn has contributed to decreased availability of low velocity habitats (pools) (Bilby and Ward 1991; Ralph et al. 1994, Montgomery et al. 1995, Beechie and Sibley 1997), and also to declines in the capacity of rivers and streams to support salmon populations (e.g., Beechie et al 1994). Today, wood recruitment to streams is recognized as an important function of riparian forests, and the practice of leaving forested buffers along streams to protect this function is now common in the western US. It is well known that as distance to the stream increases the probability of a tree providing wood to the stream decreases (Van Sickle and Gregory 1990, McDade et al. 1990). Therefore, the portion of a forested buffer nearest the stream tends to provide more wood than the portion of the buffer farther away from the stream. **Models and field data for western Oregon forests indicate that 90% of wood recruited to streams from conifer forests originates from within 90-131 feet of the stream** (McDade et al. 1990) (modeled for 131 foot tall trees - 107 feet; modeled for 164 foot tall trees - 131 feet; field data for mature conifer - 90 feet; field data for old-growth conifer - 123 feet). **This suggests that most wood recruitment could be protected by leaving forested buffers 90 feet or greater in width**.

Chinook salmon, coho salmon, and steelhead are cold-water fish species that require cool water during all life stages, including adult migration to spawning areas and the summer rearing life stages (Groot and Margolis 1991, Richter and Kolmes 2005). In a literature review of temperature thresholds for salmonids, Richter and Kolmes (2005) found that coho salmon spawning migrations tend to occur at temperatures <16°C, and that reduced egg viability or thermal barriers for Chinook, coho and steelhead occurred at 20-21°C. For juvenile rearing, coho salmon tended to select habitats <14.8°C, and optimal growth for Chinook salmon and steelhead occurred between 14°C and 15.6°C. Lethal temperatures for Chinook, coho, and steelhead range from 23-25.8°C. These data suggest that temperatures <16°C are likely to protect salmon and steelhead during both the adult spawning migration period and the juvenile summer rearing period.

Stream temperatures are significantly influenced by shading from streamside forests (e.g., Brown 1970, Brown and Krygier 1970, Brazier and Brown 1973). Recent field evidence in British Columbia showed that stream temperature was 3°C higher with a forested buffer 33 feet wide than in the forested control site, and 1.6°C higher with a 98 foot forested buffer (Kiffney et al. 2003). **By contrast, a recent modeling effort showed that, on average, a 90 foot forested buffer in Oregon forests was likely to keep the temperature increase less than 0.3°C** (upper 95% confidence interval 0.6°C, based on modeled stream temperature using Ripstream, Groom et al. 2011). **This suggests that stream temperatures may still not be protected in many reaches even with a 90 foot buffer.**

In summary, a long history of research on the influences of forested riparian buffers on stream habitats and Pacific salmon species suggests that forested buffer widths necessary to protect wood recruitment and stream shading functions in the Pacific Northwest will likely exceed 90 feet.

Respectfully,



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Cc: Peter Daugherty, Oregon Department of Forestry, Ex-officio Chief, Private Forests
Cc: F/NWC3 George Pess
F/NWC3 Rich Zabel

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