Written Testimony

Oregon Board of Forestry Hearing:

Management Plan, Tillamook and Clatsop State Forests

June 3, 2009

Cover Photo: Source of December 2007 debris torrent in Bathtub Creek. This torrent ran continuously for two miles, dropping 2,000 in elevation, ultimately reaching the Salmonberry River. This view is on private industrial forest land. The Tillamook State Forest boundary is immediately downslope of this point. This illustrates several points discussed in the attached: 1) the need to consider the entire landscape in making decisions about State forests, 2) the role of logging roads in sediment delivery, and 3) the role of clearcuts in forest hydrology.

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Members of the Oregon Board of Forestry:

First, I want to thank you for your vote taking a stand against HB 3072. I congratulate you on having the courage to take such a stand in today's economic climate, when every job is critical, emotions are charged, and short-term solutions are appealing. Your stand is solidly in line with your mission "to promote environmentally, economically, and socially sustainable management of Oregon´s 28 million acres of public and private forests".

Please stay focused on that mission and vote to maintain the current plan (50% target for older forest) and make the current Salmon Anchor Habitat strategies permanent.

Those who portray increased timber harvest as a simple matter of providing jobs and economic benefits miss some very important points. There can be negative economic and environmental consequences from timber harvest, and the economy and the environment are connected and complex.

I am a member of the board of directors of the Association of Northwest Steelheaders, and a Native Fish Society "riverkeeper" for the Salmonberry River. The two organizations are pleased to work together on this important issue. Their common ground is a deep concern for the health of the river systems that support Oregon's anadromous fish.

I also have concerns as an Oregon taxpayer. I find it disconcerting that harvest may be increased when timber prices are at their lowest point in many years. Trees are much more valuable in the ground now. They will be worth far more in the future, when they are larger and the market has turned around. Increasing harvest now makes no sense from an economic standpoint. In addition, timber harvest has its own economic costs, many borne by taxpayers. There are clear and proven connections between timber harvest and mass soil movements (Amaranthus et al., 1985 and Swanson et al., 1987 are examples). In recent years, landslides originating in Oregon's managed forests have damaged roads, bridges, railroads, and homes. People whose livelihoods depend on fishing, transportation, recreation, and tourism are negatively affected. It is clear that while some may benefit from increased harvest, others will suffer.

Any proposal for increasing harvest on the Tillamook and Clatsop state forests must also consider the landscape as a whole, including the considerable acreage in private industrial forest in many of the same watersheds. It is wishful thinking to assert that the Oregon Forest Practices Act takes care of any environmental concerns. The Oregon Department of Forestry and Oregon Department of Environmental Quality (2002) stated that current FPA protections may not be sufficient for some small and medium streams. Areas of concern were: temperature increases, including increases transferred downstream to fish-bearing streams; large wood potential; lack of progress toward "desired future condition" of riparian areas along fish-bearing streams; sedimentation during wet-weather hauling; and sedimentation due to steep-slope ground skidding. The study also admitted that quantitative data are lacking regarding sedimentation propagated downstream of small non-fish-bearing streams; turbidity; and biocriteria. Finally, reservations were expressed regarding sediment delivery by existing roads; inadequate cross-drains; and road construction guidelines where there exists a high risk of landslides, surface erosion, or physical alteration to streams and riparian areas.

In an earlier study, the Oregon Department of Forestry (Dent and Walsh, 1997) questioned the effectiveness of riparian management areas and hardwood conversions in protecting streams from increases in temperature. Only three of the eleven streams studied never exceeded the DEQ water quality standard.

A sizeable body of scientific research has established the connection between timber harvest and water quality. For example, the Southern Interior Forest Extension and Research Partnership (British Columbia; http://www.forrex.org/program/water/wmbib.asp), focusing on coniferous cases studies in the Pacific Northwest, provides a literature review that cites more than **800** studies.

The U.S. Environmental Protection Agency (Poole et al. 2001) summarized the ways in which timber harvest has been shown to influence stream temperatures. Removal of upland vegetation decreases infiltration of groundwater on hillslopes, reduces baseflow in streams, results in flashy stream flow, and increases fine sediment load, which clogs gravels and reduces hyporheic exchange. Riparian management may remove large woody debris (and its sources) that contribute to steambed complexity, reduce shade to the channel, and reduce the amount of air trapped by the vegetation, increasing heat transfer from the atmosphere to the riparian zone and stream surface.

Increased temperatures can have varying effects on salmonid survival. Although directly lethal levels are rarely attained in Northwest coastal streams, temperatures can reach levels that affect juvenile growth and resistance to disease and parasites (McCullough et al., 2001) as well as predator avoidance (Sauter et al. 2001).

Roads constructed for the purpose of timber harvest may have an even greater effect on water quality than timber harvest itself. Amaranthus et al. (1985) found that erosion rates on roads and landings were 100 times greater than on undisturbed areas, and erosion rates on harvested areas were seven times greater than on undisturbed areas.

Fine sediments in gravel can reduce egg and fry survival by reducing intragravel flow rates and dissolved oxygen (Quinn, 2005). Scour, or the movement of streambed gravel, also affects survival of eggs and fry. There is immediate and direct mortality, as well as deferred mortality due to gravel of poor quality following a scouring event (Quinn, 2005). Scouring is a natural occurrence during winter flooding. Logging activities, especially road construction and soil compaction, can affect peak flows (Chang, 2006). Snow accumulates to greater depths in clearcuts, increasing the severity of flooding during a rain-on-snow event (Chang, 2006). The effects of forest practices on storm runoff are more pronounced in small basins and lower-magnitude floods (Ziemer and Lisle, 1998). ODF's "Modeled Management Scenarios" document http://www.oregon.gov/ODF/BOARD/docs/June_3_2009/2_Att_1.pdf states that harvesting can increase small peak flows (0.5 to 5 year return intervals). My conclusion from this evidence is that a greater degree of scouring can occur in normal winter floods because of harvest–related activities, and may affect smaller tributaries (favored by coho, steelhead and cutthroat trout) to a greater extent than larger streams.

Debris flows represent an extreme case of scour, removing riparian vegetation along with massive bedload movement. Of 36 debris flows in the Oregon Coast Range, 50% originated at roads, 45% in clearcuts, and 5% in forested areas (Swanson et al., 1987). Debris flows are one mechanism by which large wood is delivered to stream channels, and are an important component in providing quality fish habitat. However, very large and long-running debris flows can negatively affect miles of small stream habitat, delivering the large wood load far downstream in 4^{th} and 5th order floodplains, where it is relatively less important, and is forever lost to smaller streams.

I would like to move on to some specific details. I have been involved since 1994 in a STEP project that conducts spawning ground surveys and water temperature monitoring on the Salmonberry River. Huntington et al. (1996) identified the Salmonberry as the **only river on Oregon's North Coast** with a healthy native stock of winter steelhead. This is very important in light of ODF's distinction between "large scale (both forests)" and "watershed scale" impacts. Watershed scale impacts are precisely what would affect the Salmonberry and its winter steelhead, and those impacts are already occurring.

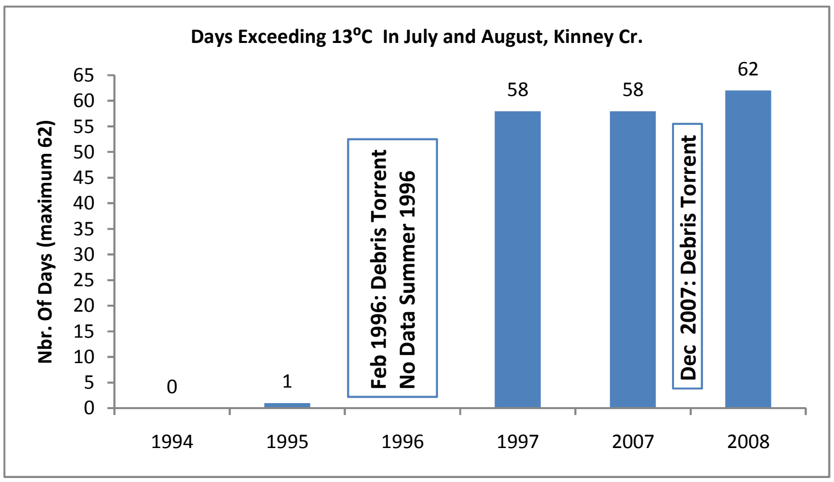
Two recent events have altered the Salmonberry. In February, 1996, a rain-on-snow event caused major flooding. Four tributaries of the Salmonberry experienced debris torrents that ran unimpeded for up to two miles, dropping as much as 2,000 feet in elevation. Fish habitat was affected, with decreased channel complexity, loss of pools, increased sedimentation, and increased temperatures. The Port of Tillamook Bay Railroad, which runs through the Salmonberry canyon, sustained more than $12 million in damage. Some part of the damage, although not quantifiable, must have been due to timber harvest, particularly failures of logging roads. Public funds have been used to purchase, maintain, and ultimately repair the railroad.

In December, 2007, a major rainstorm struck the region, and the Salmonberry flooded again. There was even more damage to fish habitat than there was in 1996.Three of the four tributaries that suffered debris torrents in 1996 did so again, and two of them were scoured from their headwaters to their mouths. These tributaries are 2^{nd} and 3^{rd} order streams. The repetition of debris flows in these streams in such a short period of time is an extremely unlikely occurrence: Benda and Dunne (1987) estimated the recurrence interval of debris flows in second-order channels to be 750 years. In the December, 2007 flood, the POTB railroad sustained over $54 million in damage, and the decision was made to not rebuild it. Again, some unquantifiable portion of the damage and the resulting job losses can be traced back to harvest activities.

Following both of those flood events, I traced the Bathtub Creek debris flows to their sources, and found that in both cases the debris flows originated in road failures two miles from the Salmonberry, and roughly 2,000 feet higher. Both reached the Salmonberry. In the case of the 2007 flood, there is evidence (sediment deposits) that the Salmonberry was dammed for a time at the mouth of Bathtub Creek. There was tremendous damage to the railroad immediately below that point. It is very likely that the breaking of the debris dam caused much of the damage. Residents at the mouth of the Salmonberry described a "wall of water" that destroyed the highway bridge at the mouth. A "wall of water" is not a typical occurrence during a winter flood, but it is typical of a debris dam break.

This raises some questions: how much of the economic damage to the railroad and highway bridge can be laid to timber harvest activity, specifically logging roads? Could the railroad have been rebuilt without the damage from road failures high in the watershed? How many railroad jobs were lost, and how can we say that timber jobs are more important than railroad jobs, or fishing jobs, or recreation-related jobs?

Finally, one of the tributaries that suffered debris flows in 1996 and 2007 is also one of the Salmonberry STEP project's temperature monitoring sites. The chart below shows the number of days in July and August where the 7-day moving average maximum temperature in Kinney Creek exceeded 13°C, a reasonable preferred temperature for juvenile steelhead, cutthroat trout, and coho salmon (Sauter et al, 2001; Dent and Walsh, 1997). 13°C is also associated with a relatively low risk of disease infection and mortality (McCullough et al. 2001).



It is clear from the chart that Kinney Creek had still not recovered from the 1996 debris flow when the 2007 debris flow occurred. Although we did not have temperature monitors in Bathtub Creek, it is certain that the temperature profile is very similar. In an undisturbed state, both of these streams could serve as nurseries and summertime thermal refuges for juvenile salmonids. In their current condition, that function is extremely limited, and is likely to remain limited for a long time. Johnson and Jones (2000), studying clear-cut timber units, determined an average of 15 years to return to preharvest stream temperatures in small first-order streams, coinciding with canopy closure in the riparian zone. Considering the extent of riparian vegetation removal (extending the total length of these 2nd and 3rd order streams), the recovery period is likely to be longer than 15 years.

There is a definite chain that can be traced backwards from this specific chart of water temperatures in a small stream: the increased temperatures resulted from debris flows that originated on logging roads transecting harvested uplands. Any further movement toward an industrial forestry model for State Forests will also mean increased clearcutting and road construction, and will increase the frequency of similar events. Again, specific to debris flows in the Oregon Coast Range, 50% originated at roads, 45% in clearcuts, and 5% in forested areas (Swanson et al., 1987).

<u>The specific science cited here supports the conclusion that a balanced management strategy would consist of maintaining the current plan (a 50% target for older, complex forests) and extending the current Salmon Anchor Habitat strategy. This approach would keep clearcutting at current levels and maintain existing riparian protections.</u>

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