TESTIMONY OF PETER LEINENBACH, AQUATIC AND LANDSCAPE ECOLOGIST

ENVIRONMENTAL PROTECTION AGENCY, REGION 10

BEFORE THE OREGON BOARD OF FORESTRY, July 23, 2015

Good morning, Chairman Imeson, and Board Members. My name is Peter Leinenbach. I am employed as an ecologist with the EPA Region 10 Forest Team. Based on concepts brought up during previous Board of Forestry meetings, it is our conclusion that many features in Package 1 of the staff report, particularly the 90 foot no-cut buffer provision, will promote the protection of water quality and fish in Oregon. However, ODF research used to inform the development of Package 1 has shown that the proposed 1,000 foot upstream extent distance will need to be increased to fully protect water quality. I will present three points which support this conclusion.

The **first point** is that the ODF staff have presented strong evidence through the Ripstream analysis that **a minimum of a 90 foot intact "no-harvest" riparian buffer** is needed to ensure that streams exposed to FPA rules do not violate the PCW rule. It is important to point out that this finding is supported by other research on this subject that has been done in the Pacific Northwest over the past several decades (**Figures 1a. and 1b.**).

The **second point** is that the ODF staff have presented strong evidence that the stream reach extent above SSBT streams needs to be greater than 1,000 feet in the revised FPA rule. Specifically, the ODF analysis clearly shows that **a minimum of a 1,600 foot upstream extent** is needed to ensure that the water temperatures entering into SSBT streams do not, on average, violate the PCW rule

(**Table 1**). However, it is important to point out that even greater stream reach extent distances are needed for streams with multiple harvest units, which is often occurring along streams in Oregon.

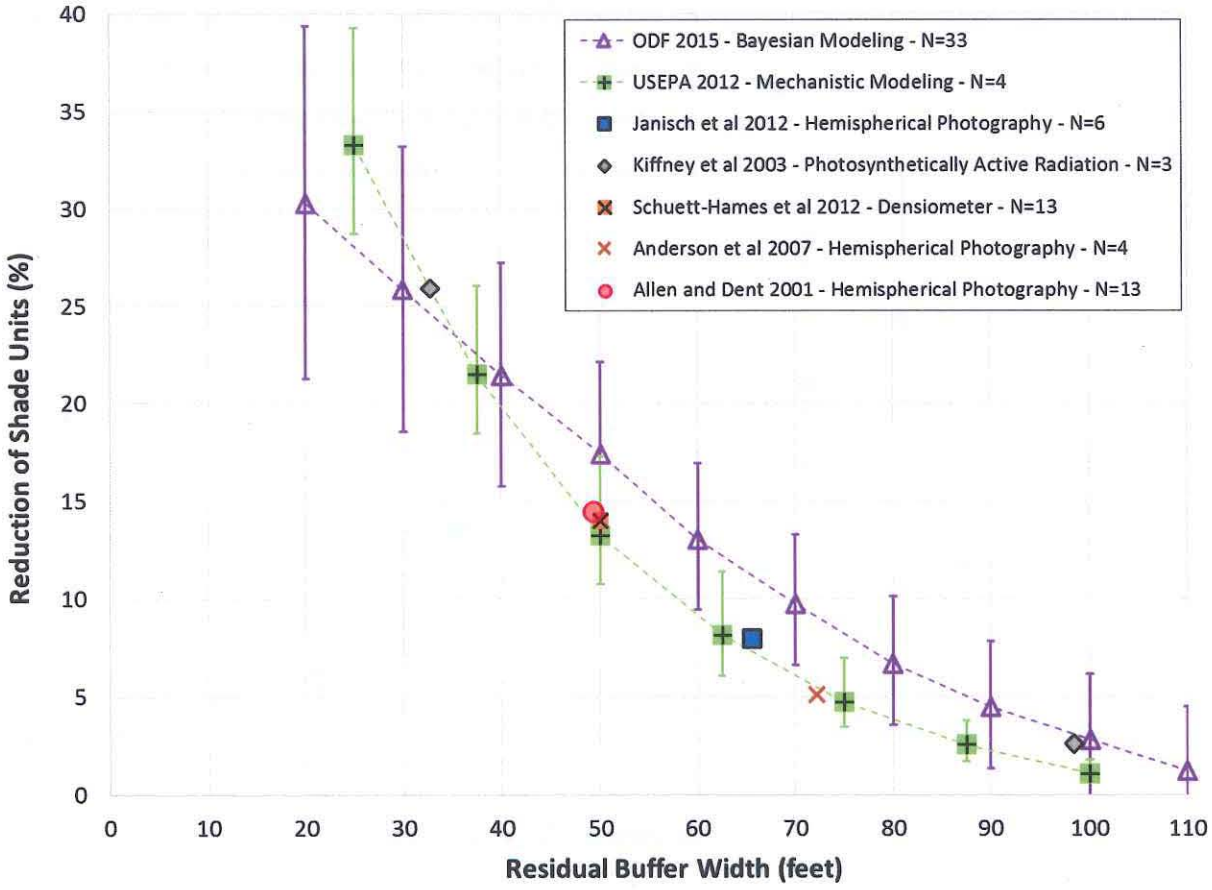
The **third point** is to briefly highlight that the revised rules should apply to all forests in the "western region". The Ripstream sites were collected over a large spatial range in both the Coast Range and South Coast. Similar responses should be expected in nearby geographic regions. There are numerous 303(d) temperature listings all throughout western Oregon which indicate more protection is needed throughout the region.

We would like to make an additional comment regarding the so called "South-sided" prescriptions. ODF staff have presented evidence that "south-sided riparian prescriptions" **do not** ensure the protection of the PCW rule. Specifically, the ODF "Systematic Review" reported that only a few, less rigorous, south-sided prescription studies were available for review and that the study results were inconclusive. Finally, this ODF review stated that south-sided riparian prescriptions "appear to not achieve the PCW criterion". We therefore do not support further consideration of the "south-sided riparian prescriptions" as a viable component for a revised rule.

We want to thank you for the opportunity to provide this testimony. We are also providing the Board of Forestry a hard copy of this testimony. We would be happy to answer questions you may have at this time.

Figure 1a. Observed mean stream shade response associated with "no-cut" riparian buffers with adjacent clearcut harvest.

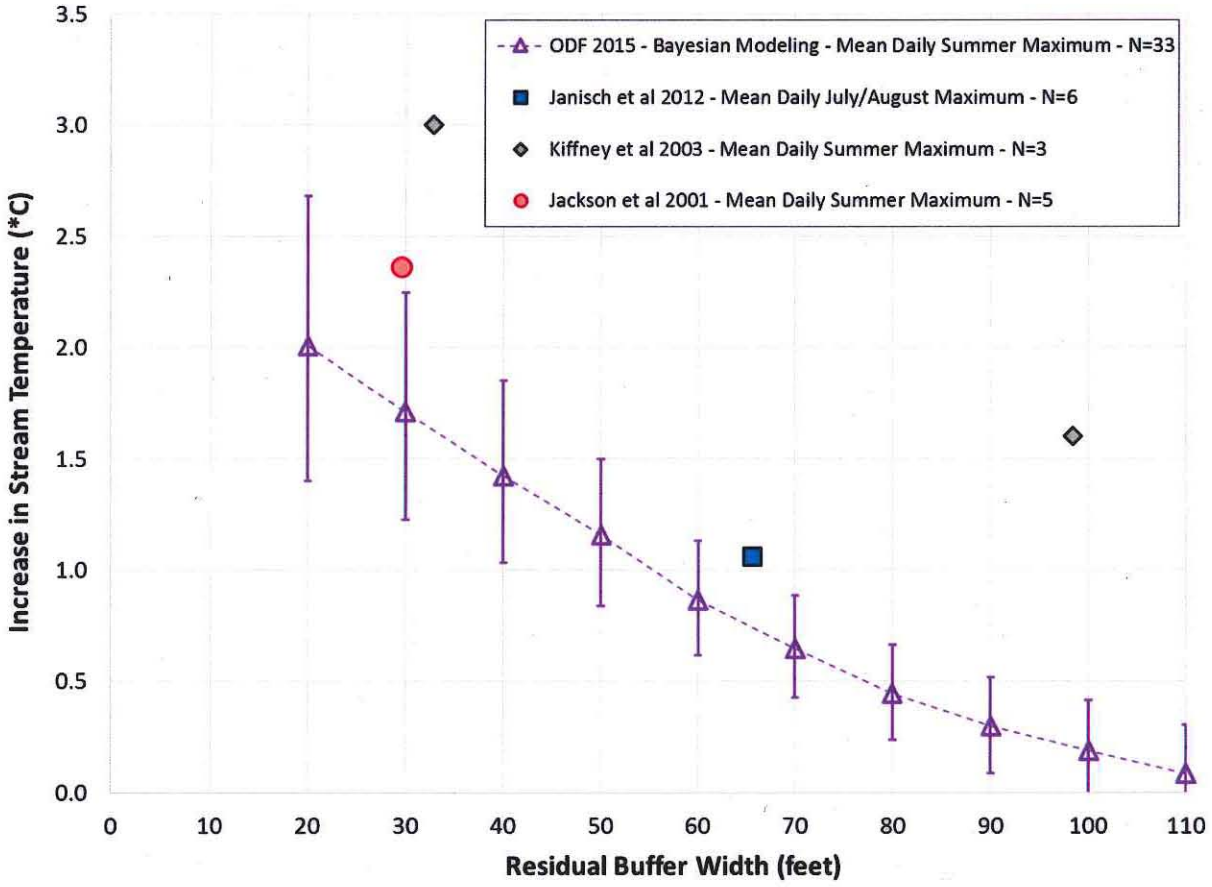
[Only studies that employed a BACI (Before After Control Impact) design within forests of the Pacific Northwest were included in these figures. ODF Bayesian modeling was derived from data collected as part of Ripstream (Groom et al 2011)[1]. The bars associated with ODF Bayesian temperature model results represent the Bayesian 98.5% and 2.5% credibility intervals of the mean, which are analogous to confidence intervals in frequentist statistics. The bars associated with the USEPA mechanistic modeling results represent the range of estimated values.]



[1] Bayesian modeling results are predictions based on data collected at the 33 Ripstream field sites. The modeled values are estimated mean response based on these sites, however the individual site response may range outside of the credibility intervals based on unique site characteristics present at the individual site.

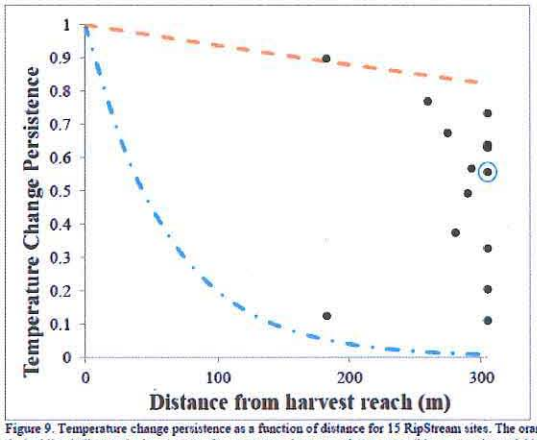
Figure 1b. Observed mean stream temperature response associated with "no-cut" riparian buffers with adjacent clearcut harvest.

[Only studies that employed a BACI (Before After Control Impact) design within forests of the Pacific Northwest were included in these figures. ODF Bayesian modeling was derived from data collected as part of Ripstream (Groom et al 2011)[2]. The bars associated with ODF Bayesian temperature model results represent the Bayesian 98.5% and 2.5% credibility intervals of the mean, which are analogous to confidence intervals in frequentist statistics.]



[2] Bayesian modeling results are predictions based on data collected at the 33 Ripstream field sites. The modeled values are estimated mean response based on these sites, however the individual site response may range outside of the credibility intervals based on unique site characteristics present at the individual site.

Table 1. Methods used to estimate the upstream extent

Previously Presented Information
ODF calculated that the temperature response associated with the application of the FPA private land buffers was a 1.45*C temperature increase. (see the June 3, 2015 Matrix presented by ODF to the BOF)
ODF staff also showed that average temperature change resulting from harvest activities at the Ripstream sites was 50% persistence at 1000 feet downstream of the end of harvest activities. (see April 22, 2015 presentation by ODF to the BOF)
Calculations
The temperature increase associated with FPA harvesting (i.e., 1.45*C) will still result (**on average**) in a 0.72*C temperature increase 1000 feet downstream of the harvest activities. (i.e., 1.45*C * 0.5 = 0.72*C)
If one assumes that the temperature dissipation loss continues linearly at the same rate downstream of 1000 feet of the harvest activities associated with , it would take 1,597 feet (1,600 feet) to reach a 0.3*C temperature increase: $\left(\frac{1000\ ft}{0.72\ ^{\circ}C}\right) = \left(\frac{X\ feet}{1.15^{\circ}C}\right)$ (Note: 1.15°C was calculated as 1.45 °C – 0.3 °C = 1.15°C)
It is important to point out that there is a tremendous amount of variation around this reported response observed in the Ripstream data and in literature: The observed variability is in response to localized conditions at each site. In other words, this estimated 1,600 foot recovery distance is an average recovery distance – many sites will require a much longer recovery distance, while others will require less.    Figure 9. Temperature change persistence as a function of distance for 15 RipStream sites. The orange dashed line indicates the lowest rate of temperature change persistence possible among site variables while the blue line represents the fastest. Black dots are individual site data. The blue circle highlights an example site discussed in the text.