SFLO Template Position Paper

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Introduction

As described in the cover memo, a group of CMER members has been working for over a year in response to TFW Policy's motion to review the Washington Farm Forestry Association (WFFA)-sponsored SFLO Template Scientific Justification (SJ) and supporting documents (See attached CMER cover memo). CMER was given three documents by Policy, including the SJ, a review of this document by Mark Teply of Cramer Sciences (hereafter, Teply review), and an ISPR assessment of the Teply review (hereafter, ISPR review). The group made a good faith effort to come to a mutually acceptable agreement on the scientific merits, assessment and interpretation of information provided by the SJ, the Teply review of the SJ, and the ISPR review of the Teply review. Despite these efforts, we could not agree on many of the substantive issues.

CMER members were not able to come to consensus on how to use the information in the Teply review to answer questions 4a and 4b in the CMER Answers to 6 Questions document. Group members found that the Teply review contained contradictory information, and it was not clear to some group members the extent to which ISPR comments addressed the science in the SJ or in Teply's review of that science. There was no opportunity for group members to discuss these issues with Teply or with the ISPR reviewers, and ultimately the full group was not able to come to agreement on how to interpret the various findings. As a result, CMER members found it difficult to engage in substantive discussions on the technical merits of the SFLO prescriptions based on Teply's review of those prescriptions. Additional attempts to come to a mutual agreement about an overall understanding of the context and utility of the information provided were also unsuccessful. Ultimately, these factors prevented resolution of disagreements regarding what the SJ and supporting documents told us and did not tell us about the proposed SFLO riparian buffer prescriptions.

The following is a summary of the large-scale issues that were seen by the CMER participants listed above as obstacles to consensus regarding a technical summary of the information. These include issues with the (1) type of documents provided, (2) the uncertainty of assessments within the SJ, (3) the scope of inference needed to reach a defensible conclusion, and (4) the role that newer data might have played if it had been used to update the document during the seven years since the SFLO Template Proposal was originally submitted to Policy for review.

Documents

The SJ was written based on a limited literature review and contained an un-validated, modeled analysis of shade. Neither un-validated models nor limited literature reviews meet the scientific merits for considering non-CMER science in the AMP (Use of Non-CMER Science in the Forest Practices Adaptive Management Program, 2013).

The SFLO template proposal did not follow CMER's project development, literature review, scoping, best available science, alternatives analysis or QA/QC process outlined in the CMER Protocols and Standards Manual and referenced in DNR's adaptive management board manual (Section 22). Additionally, the author never revised his report in response to the Teply review.

The ISPR review of the Teply review did not address the assumptions made by the SJ but instead looked at the thoroughness with which the Teply review assessed the SJ. The executive summary of the ISPR review made note of this discrepancy, saying that because the task was to review the Teply review, it should not be considered an assessment of the SJ itself. Additionally, the ISPR review of Teply's review did not follow CMER's ISPR review process.

Uncertainty of Assessment

Several CMER members found important technical deficiencies in the SJ. These include:

1. Shade
    a. Several CMER members noted the modeled shade results are simply not plausible. For example, the SJ's modeled shade values for a 15 ft width buffer are greater than most measurements of 50 ft width buffers from the CMER Type N Effectiveness Hard Rock and Soft Rock Studies (McIntyre et al. 2018, 2021).
    b. Teply remarked that based on his experience with the same model used in the SJ's analysis the model is "*prone to bias, both across ecoregions and within ecoregions.*" He added that based on his review of field studies conducted in the PNW shade loss from the proposed buffer widths would likely be greater than what would be predicted using the shade model. Teply concluded that "*WFFA's predictions using the DOE shade model do not comport with field studies testing the effects of riparian management compared to that in unmanaged forests,*"
    c. The analysis in the SJ also did not incorporate estimates of windthrow in the model runs, likely resulting in an overestimate of shade that might be maintained from the prescriptions post-harvest.
    d. It's difficult to understand how the proposed buffers could provide equal protection/function as the existing rules. Results from the Type N Hard Rock and Soft Rock Studies indicate that 50 ft. buffers have a very high likelihood of not meeting Forest Practices performance targets for temperature outlined in the FP HCP (Schedule L-1).

2. LWD

    a. Much of the scientific literature on large wood (LW) recruitment cited in the author's (Dr. Martin) riparian function assessment is misleading or irrelevant. Tree heights within a riparian area have a significant influence on LW recruitment distances (Johnston et al. 2011, Benda and Bigelow 2013). Hence, comparisons of recruitment distances across studies should normalize distances using the mean tree heights reported by each study.
    b. For the riparian function assessment, Dr. Martin used "*empirical data from the Northwest and Southeast AK.*" Most of the studies used in the SJ were from riparian stands in SE Alaska with trees typically shorter than the same species and age of trees found in mature western Washington Douglas fir hemlock forests. Because of this, Teply concluded the SJ likely underrepresents the distance from which LW recruitment would occur in western Washington and the amount of LW that would ultimately be lost based on narrower WFFA buffers.
    c. Additionally, inadequate consideration was given to LW recruitment mechanisms. Recruitment in many of the SJ's cited studies was due to stream-bank erosion artificially reducing the estimated distances within which wood is recruited into streams from riparian areas by other mechanisms, such as windthrow. Multiple studies from Western Washington,

including CMER Type N studies, have found windthrow is an important if not primary mechanism for wood delivery into streams (McIntyre et al. 2018; Schuett-Hames et al. 2012). Source distances for wood delivered via windthrow are considerably longer than wood delivered from stream bank erosion processes. This suggests that LW delivery should be separately analyzed by recruitment process.

d. In the analysis of thinning prescriptions, the SJ relied on an un-validated model to determine the effects of thinning stands on LW availability.

3. Leaf and litterfall, sediment/turbidity

    a. The SJ used rainbow trout stomach contents to estimate the relationship between turbidity and feeding success in natural systems of Northern California. Teply found the analysis deficient as it did not incorporate relevant science, though didn't disagree with the finding that most litterfall originates from within 10 meters of the streambank.
    b. Teply did however disagree with the finding that 25' buffers provide 'high' leaf and litterfall function because the SJ cannot "*claim that any science explicitly influenced their determination.*"
    c. Teply concluded that the SJ's evaluation of potential sediment delivery was less protective than what the science supports. Sediment filtering was ranked as H (high), M (moderate), or L (low) based on the following conditions: a minimum 25-ft RMZ with 25% stand density within a 30-ft. ELZ = H; a clearcut with 30-ft ELZ = M; and a clearcut with no ELZ = L. Not only does this analysis have no empirical basis, but this system of relative ranking for sediment delivery does not account for important factors known to influence soil erosion and sediment transport including precipitation amount and intensity, runoff volumes and rates, soil texture, topography and soil slope, infiltration rates, degree of soil disturbance and compaction, amount of soil cover, and vegetation stem density. It therefore does not provide a credible evaluation of the effectiveness of the proposed riparian prescriptions.

The utility of the SJ estimates of riparian function effectiveness is further compromised by the treatment of the proposed "no-cut" RMZs. The SFLO proposal states, "*within 50 or 75 ft- wide no-cut buffers along F- streams, individual trees may be marked for harvest . . .*" and "*within the 25 ft- wide no-cut buffers along F- streams, individual trees may be marked for harvest . . .*" and "*within the core zone, some individual or groups of trees designated by landowners may be removed . . .*" Harvest in "no-cut" buffers must be approved by DNR, but the amount of harvest in "no-cut" RMZs and its effects on riparian functions are impossible to estimate with the information provided in WFFA's SFLO template proposal.

Overall, the deficiencies noted above call into question many of the conclusions of the SJ and the SFLO template proposal that is based on these conclusions. The SJ should have been revised based on the Teply and ISPR reviews and could have made better use of the best available science including data collected by the CMER Type N Hard Rock Study, Soft Rock Study, and Westside Type N BCIF study.

Scope of Inference

Much of the SJ and the Teply review focus on comparing changes in functions while harvesting under current rules versus harvesting with a series of proposed alternative SFLO prescriptions. These analyses are summarized in Table 3 in the SJ and Table 8 in the Teply review. In particular, these analyses compare the proposed prescriptions with current rule prescriptions that have yet to be confirmed as

effective. Findings from completed CMER studies indicate the current Type Np rules are not effective in providing full resource protection. The Type F rules have yet to be tested at all.

At the time the SJ was initially proposed the DNR forest practices rules for westside Type N and Type F rules had not yet been validated for effectiveness by CMER and therefore, any comparison of riparian functions between the current rules and the proposed prescription does not address the ability of the proposed prescriptions to protect the habitats of species covered under the FP HCP or to meet state Water Quality standards. This same concern was made in the Teply review, which is stated in the discussion section regarding the function table for Type F Waters:

> *According to Table 8, all prescriptions for fish-bearing streams—WFFA and FPR (Forest Practices Rule) analogs—would provide less than maximum riparian function. Function provided by WFFA (i.e., SFLO template) prescriptions would most often be lower than that provided by their FPR analog, but to varying degree distinguished by whether the WFFA prescription uses a 25-ft fixed-width no-harvest buffer…*

and for Type Np Waters:

> *Both analyses, however, show similar directional trends, and both show the near lack of riparian function provided by FPR prescriptions when streams are harvested to the streambank.*

Additionally, since this was a proposed set of alternatives to the standard rules based on economic qualifications and not ecological conditions, landscape risks are not considered within the function comparison table. The ISPR review discussed the importance of determining the areas where small forest landowners are most concentrated in order to better understand any regional resource concerns due to cumulative effects that may have been overlooked when considering the application of these prescriptions across the western part of the state.

Role of Newer Data

The template proposal and SJ were completed in 2014 and do not meet CMER's Best Available Science standard (Use of Non-CMER Science in the Forest Practices Adaptive Management Program, 2013). Since that time (2014) CMER has completed research and monitoring projects on the effectiveness of the forest practices rules on Type Np (Western WA) and Type F waters (Eastern WA) in meeting functional objectives and performance targets (e.g., State Water Quality Standards) outlined in Schedule 1 of the FP HCP (2005, Appendix N).

CMER recently approved an ISPR reviewed study testing the effects of forest practices for three treatments: full length 50 ft. buffers, partial length 50 ft. buffers, and full length clear cut harvest on Type Np perennial flowing streams (i.e., the Type N Effectiveness Hard Rock Study; McIntyre et al. 2018, 2021). All three treatments resulted in shade reduction levels that directly contributed to statistically significant increases in stream temperatures. Key statements of relevance to the SJ from the Hard Rock Study include:

> *The average post-harvest increase in the 7DADM temperature, measured at the lowermost monitoring location on each stream that represented the buffer treatment (i.e., Buffer Treatment location) was 1.2ºC in the 100% and FP treatments and 3.2ºC in the 0% treatment. The post-harvest increase in 7DADM in the three FP treatment streams ranged from 0.4 to 2.3°C.*

Further downstream at the F/N break, the magnitude of the 7DADM increase was 0.7°C, 1.2°C, and 2.9°C in the 100%, FP, and 0% treatments, respectively.

Post-harvest increases in 7DADM were significant (P <0.05) in all buffer treatments at the Buffer Treatment location and at the F/N break. There was no significant difference between the 100% and FP treatments, while the increase in both the 100% and FP treatments was significantly less than in the 0% treatment.

Note that the 100% treatment in the Hard Rock Study is a full length two-sided 50 ft. buffer, similar to the SFLO Type S/F prescription (5-15 ft. BFW). Moreover, several of the Hard Rock Study 100% treatment sites incorporated unstable slopes buffers that resulted in buffer sections that were substantially wider than 50 ft. As stated in the Hard Rock Study report *"These wider sections of RMZ buffers potentially masked the full impacts of harvest on shade reduction and stream temperature increases of 50 ft. buffers."*

CMER recently completed the Hard Rock Study Phase II (through nine years post-harvest), and the Soft Rock Study. Both studies showed increased stream temperatures in response to shade reduction (Ehinger et al. 2021; McIntyre et al. 2021).

CMER has completed research testing the impacts of leaving non-thinned contiguous 75 ft. buffers on small (< 15 ft. wide) streams in Eastern Washington under the Bull Trout Overlay (BTO) and found no substantial increase in stream temperature in response to shade reduction from 75 ft contiguous RMZs (Cupp and Lofgren 2014). Limited thinning in the outer potion of RMZs was also tested using the Eastern Washington Standard rules, which differ from the BTO rule by allowing more harvest if basal area requirements are met, however thinning generally did not extend to within 75-80 ft. of the bankfull channel (Cupp and Lofgren 2014).

CMER is currently finishing a study design for the Riparian Characteristics and Shade project (RCS), recently scaled back by TFW Policy, that will test some thinning configurations of RMZs within 75 ft. of streams. CMER also has a study in progress testing the effects of variable width RMZs on Eastern Washington Type Np streams (ENREP) that will assess and analyze the effects of thinning some RMZs within 75 ft. These studies will further inform the analysis of the SFLO template proposal, but both studies will not be completed, and reviewed via the AMP process, for at least 5 -7 years.

Conclusion

The SJ and Teply review were both done outside of the CMER process, and as such important consensus building steps in that process never occurred. As a result, the group could not agree whether these products met CMER's standard for best available science, and therefore could not agree to what the products could and could not reliably tell us. Without that agreement, the CMER members were not able to develop consensus answers to the 6 Questions.

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