WASHINGTON FOREST PROTECTION ASSOCIATION
724 Columbia St NW, Suite 250
Olympia, WA 98501
360-352-1500 Fax: 360-352-4621

January 29, 2020

Forest Practices Board
1111 Washington St SE
PO Box 47012
Olympia, WA 98504-7012
forest.practicesboard@dnr.wa.gov

Re: Headwater Stream Smart Buffer Pilot Project

Dear Forest Practices Board Members:

WFPA respectfully submits the attached Adaptive Management Program proposal initiation and pilot rule petition for consideration, and we look forward to discussing with you at the February 12, 2020 meeting. In the meantime, you may contact me at dcramer@wfpa.org or (360) 280-5425 should you have any questions.

Sincerely,

Darin D. Cramer
Sr. Director of Forest & Environmental Policy

Adaptive Management Proposal Initiation to Forest Practices Board for Headwater Stream Smart Buffer Pilot Project

Introduction

In May 2019 TFW Policy provided a consensus action recommendation to the Forest Practices Board (FPB) in response to the Type N Hardrock Study, Phase I. That recommendation included formation of a workgroup of scientific and operational experts tasked with reviewing the science relevant to Type Np streams, with the goal of producing alternative Type Np riparian management zone (RMZ) recommendations to TFW Policy for western Washington designed to meet a suite of objectives, including but not limited to, stream temperature standards and minimal economic impact. The workgroup began meeting in November 2019 and has additional meetings scheduled through at least June 2020.

There are more than two dozen projects identified in the Type N Riparian Prescription Rule Group section of the current CMER Workplan, less than half of which have been completed. The TFW Policy Type N workgroup charter specifically calls out six of the western Washington Type N projects in the CMER Workplan, either already completed or anticipated to be complete within the next ~12 months, to be considered. The workgroup may also identify knowledge gaps and utilize outside science/expertise to fill those gaps.

One of the knowledge gaps identified by WFPA is testing of different Type Np stream RMZ configurations (e.g. location, length, width, density) at meeting both resource protection and operational objectives - the Type N Hardrock Study varied RMZ length only. According to the Type N Hardrock Study, Np streams make up more than 60% of the stream length on forestland subject to the Forest Practices Rules in Western Washington, therefore alteration of Type Np RMZs can have a very high cost impact to forest landowners. Accordingly, WFPA members are interested in learning more about alternative RMZ configurations which minimize cost impact while meeting resource protection objectives. To that end, in June 2019 WFPA initiated the Headwater Stream Smart Buffer Pilot Project.

The purpose of the Headwater Stream Smart Buffer Pilot Project is to evaluate alternative RMZ schemes on Type Np streams at maintaining shade and minimizing water temperature changes that may be the result of forest management. At the same time, we are interested in determining if smart buffering is cost effective from both a planning and operational perspective. The working hypothesis is that RMZ locations, lengths, widths, and stand densities can be configured to improve effective shading of Np streams over that provided by existing fixed-width RMZs, and it can be achieved by a cost-effective planning process and strategic allocation of the RMZ area.

WFPA is submitting this project as a proposal initiation to the FPB in order for the project information to be considered as part of the Adaptive Management Program (AMP) process, and we are committed to working openly and cooperatively with all caucuses on implementation. Below are responses to the proposal initiation questions outlined in Board Manual 22, Guidelines for Adaptive Management Program.

Proposal Questions - Board Manual 22

1. The affected forest practices rule, guidance, or DNR product.

WAC 222-30-021 (2) (a),(b),(c) Western Washington protection for Type Np and Ns Waters

2. The urgency based on scientific uncertainty and resource risk.

The TFW Policy Type N Workgroup referenced above anticipates delivering a final report to TFW Policy at the end of 2020 or early 2021. The timeline in the Department of Ecology's December 2, 2019 letter extending Clean Water Act (CWA) Assurances to December 31, 2021, indicates the Forest Practices Board should initiate rulemaking by the summer of 2021. These timelines do not comport with the AMP having complete information regarding Type Np stream RMZ effectiveness, particularly that of alternative RMZ configurations. Therefore, acquiring as much relevant information as possible for AMP consideration by the summer of 2021 increases the chance for a successful, collaborative outcome, and minimizes the risk of divergence from the AMP program requirements in RCW 76.09.370(6),(7)

3. Any outstanding TFW, FFR, or Policy Committee agreements supporting the proposal.

Schedule L-1 of the Forests & Fish Report (adopted by the FPB in February 2001 and incorporated into the 2005 FP HCP) and the current CMER Workplan contain key questions which include a commitment to *"…test whether less costly alternative prescriptions would be effective in producing conditions and processes that meet resource objectives…"* This pilot project will be the first attempt to embark on such an endeavor. WFPA hosted a field trip for several TFW caucuses to one of the proposed smart buffer pilot project sites on November 21, 2019 and invited any caucus to participate and collaborate on the project.

4. How the results of the proposal could address AMP key questions and resource objectives or other rule, guidance, or DNR product.

In addition to fulfilling the Schedule L-1 and CMER Workplan commitment regarding alternative prescriptions referenced above, this pilot project may provide information helpful for determining if resources objectives in WAC 222-12-045(2)(a)(C) (meet or exceed water quality standards) and Schedule L-1 (provide cool water by maintaining shade within 50' for at least 50% of stream length) can be more efficiently/effectively met.

In addition, this project may help meet Goals 3 and 4 of Forests & Fish Report (meet CWA requirements for water quality on non-federal forest lands, and keep timber industry economically viable), and the desired outcomes of the AMP in WAC 222-12-045(1) (certainty of change as needed to protect targeted resources; predictability and stability of the process, etc.).

5. Available literature, data and other information supporting the proposal.

The primary function of riparian vegetation in controlling water temperature is to block incoming solar radiation (direct and diffuse). Direct-beam solar radiation on the water's surface is the dominant source of heat energy that may be absorbed by the water column and streambed. Absorption of solar energy is greatest when the solar angle is greater than 30° (i.e., 90 to 95 % of energy is absorbed as heat; Moore et al. 2005) and solar heating of a stream from direct beam radiation is most significant during mid-day (Beschta et al. 1987) as the sun travels from southeast to southwest (azimuths 135° to 225°). Therefore, riparian vegetation that blocks direct solar radiation along the sun's pathway across the sky is the most effective for reducing radiant energy available for stream heating (Moore et al. 2005). Research shows that the attenuation of direct beam radiation by riparian vegetation is a function of canopy height, vegetation density, and buffer width (Beschta et al., 1987, Sridhar et al. 2004, DeWalle 2010). Light

attenuation increases with increasing canopy height and increasing buffer density as a result of the increased solar path and extinction of energy. Buffer width has a variable influence on light attenuation depending on stream azimuth (e.g., effective buffer widths for E-W streams may be narrower than for N-S streams due to shifts in solar beam pathway from the sides to the tops of the buffers; Dewalle 2010).

Effective shade is a term used to distinguish between vegetation that provides shade to the stream versus vegetation that does not provide shade to a stream (Allen and Dent 2001). Effective shade is based on measures of radiant energy and is computed as the fraction of total direct-beam solar radiation that is blocked by riparian vegetation (Teti and Pike 2005). Effective shade is a function of the spatial relationships among sun position, location and orientation of stream reach, hiIlslope topography, and riparian vegetation buffers (Chen et al. 1998). Effective shade differs from canopy closure or canopy cover which are commonly used terms to express the percentage of open sky that is obscured by overhead vegetation.

1. Proposal's testing hypotheses and assumptions.

The working hypothesis for the Headwater Stream Smart Buffer Pilot Project is that RMZ locations, length, widths, and stand densities can be configured to improve effective shading of Np streams over that provided by fixed-width RMZs, and it can be achieved by a cost-effective planning process and strategic allocation of the RMZ area. The project goals are to determine where smart buffers are implementable, to measure their effectiveness, and to provide proof of concept. To achieve these goals, we propose to:

- Implement alternative RMZ configurations (e. g., variable width, length and stand density) that are designed to optimize for the reduction in solar insolation and allocation of retained riparian stands (i.e., RMZ area) along Np streams.
- Examine smart buffering in a range of different harvest unit sizes and locations (e.g., entire Np basin, imbedded within Np basin) that are commonly implemented on Np streams.
- Measure the effectiveness of smart buffering to reduce solar insolation within the Np harvest unit and minimize changes in water temperature within and downstream of harvest unit.
- Evaluate how watershed characteristics (i.e., aspect, topography) and harvest unit configuration influences effective shade, solar insolation, and air temperature within the harvest area.
- Evaluate how watershed and hydrology attributes (e.g., surface flow, substrate composition, slash cover, gradient, geology, elevation) may influence temperature response to treatment.
- Evaluate cost effectiveness of smart buffer planning and implementation.

We expect this process may result in tools and guidelines for different situations where the development of smart buffer prescriptions will be feasible and cost-effective. Similarly, we will likely identify situations where smart buffers are not effective to implement.

2. Description of affected public resources.

Western Washington Type Np streams

3. Potential cause and effect relationships with forest practices management.

If smart buffer prescriptions appear to be promising at improving effective shade, minimizing water temperature response associated with harvest and are cost effective, the Forest Practices Board may

want to include them as an option to be evaluated in future Type N RMZ rule making for Western Washington.

4. Description of the proposal's study design.

The study is focused on monitoring shade and temperature in and adjacent to harvest units that are located on Type Np streams. Measurements of effective shade will be taken along each study stream during the pre-harvest period to provide site-specific data that will be necessary to derive an optimal design for reducing solar insolation and conserving shade. Effective shade is defined as the fraction of total possible solar radiation that is blocked by riparian vegetation. Effective shade is a function of stream orientation (valley aspect) as well as the density and height of riparian stands. Therefore, by knowing and mapping effective shade within a harvest unit we can guide the design of smart buffers to optimize the reduction in insolation.

Valley aspect, topography and stream size are key factors affecting insolation and thermal loading of streams. Therefore, it is desirable to have a range of study basins with different aspects, valley confinement, and size. Also, given variability in topography and stand composition, we want to examine the range of harvest unit configurations in terms of size and location (e.g., harvest of entire Np basin or harvest unit imbedded within Np basin). The intent is to collect sufficient data to explore how well we can design smart buffers given the typical range of conditions and harvest units on WFPA member lands. Therefore, we will measure effective shade both before and after harvest to determine the amount of shade conserved and to evaluate the relative effectiveness of the various RMZ treatments.

Water temperature will be measured before and after harvest at the treatment streams and at several reference streams (e.g., one per geographic region) to facilitate an evaluation of temperature responses that may be associated with the harvest treatments. In addition to shade, water temperature is strongly influenced by the ambient air temperature that varies temporally (weather) and spatially across the landscape. Therefore, reference data are necessary to distinguish changes in temperature that may be associated with treatments from changes due to inter-annual variability (e.g., warm or cool summers) or natural disturbance events. In comparison, changes in shade after harvest can be directly related to treatments baring a major disturbance event.

Multiple physical factors can influence thermal loading and temperature response (e.g., elevation, surface flow, substrate composition, slash cover, geology). Therefore, we plan to collect data on a suite of local attributes to be used as covariates in our analyses of shade and temperature responses to treatment. Because this is a pilot study and funds are limited, we will not try to stratify for any specific factor (e.g., aspect) at the onset. However, given the number of sites and associated physical characteristics, we would perform analyses to determine how post-hoc stratification, if possible, could improve our interpretation of the findings.

We expect the process for initially designing smart buffers to be an iterative and multi-step procedure that will involve interaction among project scientists, forest engineers, and policy representatives. First, project data for each harvest unit will be used to delineate (map) and rank all stream reach/riparian stands (e.g., 300-ft long segments) within the harvest unit according to their potential to provide effective shade and relative sensitivity of stream location to solar insolation. Given these data, various RMZ configurations and their relative effectiveness to retain pre-harvest shade (i.e., expressed in energy units of solar insolation) can be proposed. A key driver will be the retention of shade that is sufficient to meet some specified target. The second step is to provide forest engineers with the effective shade option maps and associated stream sensitivity rankings. This is expected to be followed by a

collaborative identification and evaluation of RMZ retention options that incorporate operational concerns (roads, yarding) and consideration for cost-effectiveness. Finally, or maybe jointly, policy input on shade targets and other concerns could be explored. For example, there are no specific shade targets for Np streams other than that provided by a two-sided, 50-ft wide RMZ for at least 50% of stream length. Therefore, we expect to use shade and temperature data from CMER studies (e.g., Type N Hardrock and Softrock) along with this study to inform the smart design process.

There are five WFPA members which offered to participate in the smart buffer study (Table 1). Based on current feedback from participants, there are at least 26 potential study sites, of which 19 may be treated with smart buffer prescriptions and seven will be unharvested reference sites. In addition, Weyerhaeuser is considering monitoring of four sites with standard Np RMZ treatment. Also, we plan to use one Type N Softrock study site (REF2) as an additional reference and may utilize existing data from several Type N Softrock treatment sites in the south coastal area (Figure 1). We recognize these numbers may change as we progress through the project. Note, the implementation schedule assumes all sites would have one or two years of pre-harvest and two years of post-harvest monitoring. Length of the pre-harvest time period is dependent on when temperature monitoring can be initiated (i.e., 2019 or 2020) and when harvesting occurs. Ideally, harvest should be planned for after September 2020 to facilitate getting at least one full season (June through September) of temperature data. We proposed two years of post-harvest monitoring because this is the minimum duration to evaluate annual variability in temperature and to assess response of the RMZ and shade to potential post-harvest windthrow. Therefore, on the proposed schedule, harvesting should be completed before May 2021. If feasible, it is recommended that post-harvest monitoring extend up-to five years. Based on the Type N Hardrock study findings and other research, we know two years of post-harvest data provides an initial measure of treatment response, and in many studies the largest change in temperature occurs during this period. However, longer monitoring facilitates an evaluation of response trends in temperature and shade, and reduces uncertainty concerning riparian stand structure and functions.

Table 1. Smart buffer study participants, proposed number of study sites and implementation schedule. Schedule assumes harvest would occur after September 2020 and before May 2021. Tre = treatment, Ref = reference.

	Number of sites monitored by year							
	Pre-harvest				Post-harvest			
	2019		2020		2021		2022	
Company	Tre	Ref	Tre	Ref	Tre	Ref	Tre	Ref
Hancock	5	0	5	0	5	0	5	0
Port Blakely	1	0	1	0	1	0	1	0
Rayonier	5	2	5	2	5	2	5	2
SPI	4	1	4	1	4	1	4	1
Weyerhaeuser	0	0	4*	4	4*	4	4*	4
All	15	3	19	7	19	7	19	7

* Weyerhaeuser is considering monitoring at four additional sites with standard Np RMZ treatment.

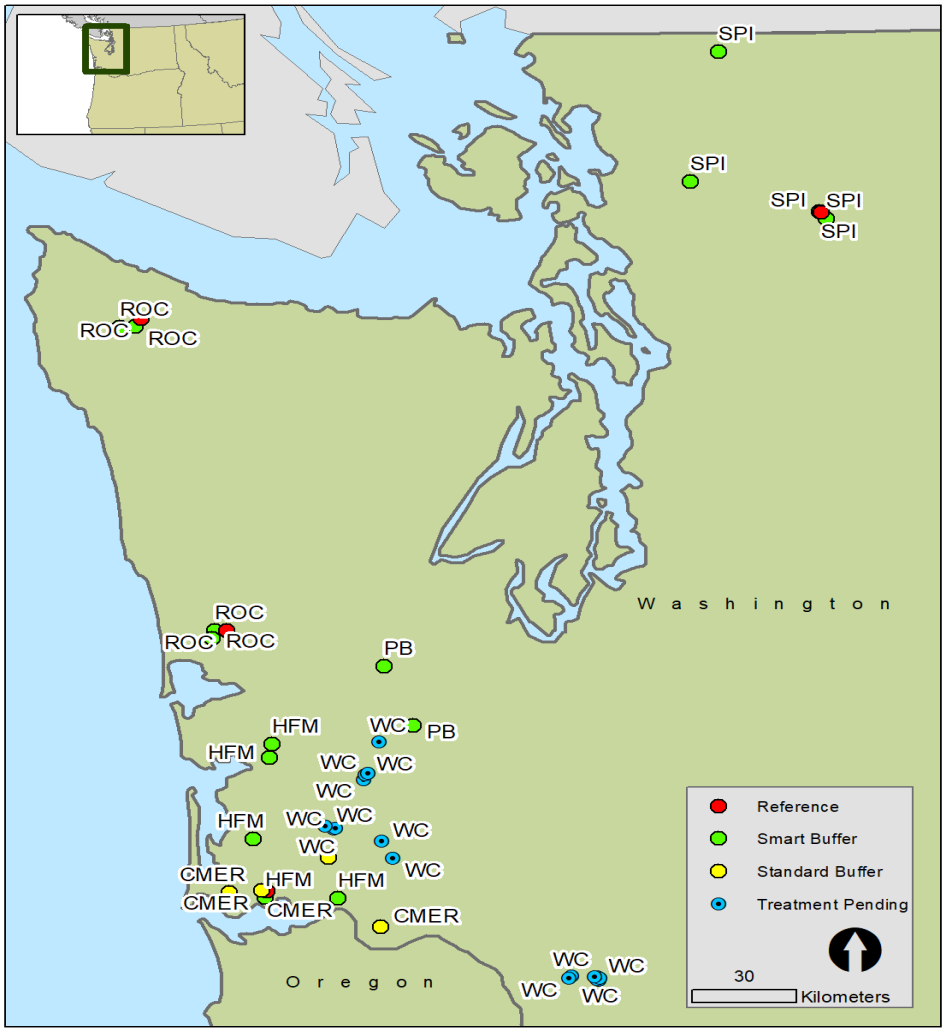

Figure 1. Locations of smart buffer study units.

5. Estimated timeline with milestones and costs associated with implementation of the proposal.

Assuming the FPB accepts this proposal initiation request, the following milestones/timeline may include but not be limited to:

a. Milestones

2020

February 12, 2020: Proposal presented to FPB; FPB directs AMPA to assess the proposal per BM 22 and assign a development track

March 5, 2020: Presentation to TFW Policy

March 24, 2020: Presentation to CMER

April 2020: AMPA assigns development track

May 13, 2020: AMPA reports development track to FPB, FPB approves CR 101 authorizing pilot project treatments

May - September 2020: Year 1 - 2 pre-treatment data collection at pilot project study sites, additional stand data collection at select Type N Softrock study sites

August 2020: Status update to FPB, TFW Policy, and CMER

Sept – Nov 2020: Landowners submit Forest Practices Applications consistent with CR 101 pilot project.
November 2020: Status update to FPB, TFW Policy, and CMER
Nov - Dec 2020: DNR approves FPAs.
Dec - April 2021: Landowners apply pilot project prescriptions.

2021
February 2021: Status update to FPB, TFW Policy, and CMER
May - September 2021: Year 1 post-treatment data collection
May 2021: Status update to FPB, TFW Policy, and CMER; consideration of how pilot project information can factor into Type Np RMZ rule-making deliberations
August 2021: Status update to FPB, TFW Policy, and CMER; consideration of how pilot project information can factor into Type Np RMZ rule-making deliberations
November 2021: Status update to FPB, TFW Policy, and CMER; consideration of how pilot project information can factor into Type Np RMZ rule-making deliberations
November 2021 - February 2022: TFW Policy develops draft Type Np rule language incorporating pilot project information

2022
May - September 2022: Year 2 post-treatment data collection
October - December 2022: Analysis and reporting

2023
January - October 2023: SAG, CMER, and ISPR process on completed report
May - September 2023: Continue post-treatment data collection as applicable

b. Costs

WFPA and its members have been funding the study design, site layout, data collection, analysis and reporting, in addition to the costs associated with modifying harvest units. Given our resources are limited, we invite any and all TFW caucuses to participate and contribute in any way they can.

References

Allen, M. and L. Dent. 2001. Shade conditions over forested streams In the Blue Mountain and coast range georegions of Oregon. ODF Technical Report #13, Oregon Department of Forestry, Forest Practices Monitoring Program.

Beschta, R. L., R. Bilby, G. Brown, L. Hoitby, and T. Hofstra. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pages 191-232 in E. O. Salo, and T. W. Cundy, editors. Streamside Management: Forestry and Fisheries Interactions. University of Washington, Institute of Forest Resources, Seattle, WA.

Chen, D. Y., R. F. Carsel, S. C. McCutcheon, and W. L. Nutter. 1998. Stream Temperature Simulation of Forested Riparian Areas: I.Watershed-Scale Model Development. Journal of Environmental Engineering 124:304-315.

DeWalle, D. R. 2010. Modeling Stream Shade: Riparian Buffer Height and Density as Important as Buffer Width1. JAWRA Journal of the American Water Resources Association 46(2):323-333.

Moore, R. D., D. L. Spittlehouse, and A. Story. 2005. Riparian microclimate and stream temperature response to forest harvesting: a review. JAWRA Journal of the American Water Resources Association 41:813-834.

Sridhar, V., A. L. Sansone, J. LaMarche, T. Dubin, and D. P. Lettenmaier. 2004. Prediction of stream temperature in forested watersheds. Journal of the American Water Resources Association 40(1):197-213

I. CMER Questions – M22-30

1. Relevance: Does the study inform a rule, numeric target, performance target, or resource objective?

Yes, all - see above.
Resource objectives and performance targets are identified in M22-30, fn 2, as "heat/water temperature, LWD/organic inputs, sediment, hydrology, and chemical inputs."

2. Relevance: Does the study inform the forest practices rules, the Forest Practices Board Manual guidelines, or Schedules L-1 or L-2?

Yes, all - see above.

3. Quality: Was the study carried out pursuant to CMER scientific protocols (i.e. study design, peer review)?

This is an opportunistic pilot project based on availability of harvest units meeting the criteria and planned for harvest over the next year or two. While sites were not randomly selected through an experimental design, the harvest units are geographically dispersed across western Washington and represent a range of geologic, hydrologic, and biologic conditions. Implementation of the pilot project is open to review, participation and contribution by any and all TFW caucus participants. Final reports may be subject to independent peer review.

4. Quality: What does the study tell us? What does the study not tell us?

We expect this pilot project may result in tools and guidelines for different situations where smart buffer prescriptions may be feasible and cost-effective. Similarly, we will likely identify situations where smart buffers are not effective to implement. Scope of inference may be limited due to sites not being selected through an experimental design; however, post-hoc comparison of pilot project site physical/biological characteristics with CMER Type N study site characteristics may provide insight into geographic applicability of the results.

5. Completeness: What is the relationship between this study and any others that may be planned, underway, or recently completed? Factors to consider in answering this question include, but are not limited to:
    a. Feasibility of obtaining more information to better inform Policy about resource effects.
    b. Are other relevant studies planned, underway, or recently completed?
    c. What are the costs associated with additional studies?
    d. What will additional studies help us learn?
    e. When will these additional studies be completed (i.e., when will we learn the information)?
    f. Will additional information from these other studies reduce uncertainty?

There are more than two dozen projects identified in the Type N Riparian Prescription Rule Group section of the CMER Workplan, less than half of which have been completed. The TFW Policy Type N workgroup charter specifically calls out six of the western Washington Type N projects in the CMER Workplan, either already completed or anticipated to be complete within the next ~12 months, to be considered. The workgroup may also identify knowledge gaps and utilize outside science/expertise to fill those gaps.

Schedule L-1 and the current CMER Workplan indicates alternative prescriptions should be tested, but that has not occurred to any significant degree in any of CMER's work. The Type N Hardrock study is the

only project which contained an alternative treatment (a continuous 50' RMZ). One planned study, the Riparian Characteristic and Shade (RCS) project, intends to vary RMZ width and density and measure effects on shade. However, the RCS project likely won't start field implementation until 2021. This pilot project may fill an information gap on a schedule which better comports with the desired rule-making timeline associated with the TFW Policy Type N workgroup process and CWA assurances extension.

6. Completeness: What is the scientific basis that underlies the rule, numeric target, performance target, or resource objective that the study informs? How much of an incremental gain in understanding do the study results represent?

In 2001 there was a fair amount of uncertainty regarding the effectiveness of the Type N rules at meeting resource objectives and performance targets. Since that time the uncertainty has been reduced considerably, particularly regarding target amphibian species in Type N streams. However, some uncertainty remains and there is more technical work to do, including evaluation of the long-term viability of target amphibian species, the landscape spatial/temporal context (e.g. frequency, magnitude, duration) of temperature response associated with forest management activities, and the attendant biological implications. Revisiting and refining the resource objectives and performance targets for Type Np streams has also been recommended by several CMER projects. This pilot project may help fill an information gap regarding the feasibility of alternative RMZ configurations at improving effective shade and minimizing water temperature response associated with harvest (compared to existing Type Np RMZs), while also minimizing cost impacts to landowners.

Pilot Rule Petition
Headwater Stream Smart Buffer Pilot Project
Forest Practices Board
February 12, 2020

Responsible Agency:
Washington Forest Practices Board

Petitioner:
Washington Forest Protection Association

Subject of Pilot Project:
Experimental treatments to optimize effective shade[1] on Type Np waters through a cost-effective planning process and strategic allocation of the riparian management zone (RMZ) area.

Statutes Authorizing the Forest Practices Board to Authorize Pilot Project:
The Forest Practices Board has authority to adopt forest practices rules. RCW 76.09.040, 76.09.050, and 76.09.370. A pilot project is authorized by RCW 34.05.313.

I. Summary

Washington Forest Protection Association (WFPA), a participating caucus member in TFW Policy and co-chair in CMER, requests that the Forest Practices Board (FPB) direct the Department of Natural Resources to file a CR 101 authorizing a pilot project to conduct experimental treatments to improve effective shade on Type Np streams in western Washington as compared to existing rules. Concurrent with the pilot project, a proposal initiation is requested in the Adaptive Management Program (AMP) to monitor and review the results of the treatments.

II. Current Rules and Purpose of Pilot Project

Riparian management zones (RMZ) are established by WAC 222-30-021 (Western Washington) and 222-30-022 (Eastern Washington). The purpose of the Type Np RMZ is to provide adequate shade, downed woody debris, streambank stability, prevent sediment delivery and promote riparian function to support amphibians and downstream fish habitat. For decades, DNR and its stakeholders have invested in research to evaluate the effectiveness of current Type Np RMZs to achieve these objectives while maintaining a viable forest products industry, as required by RCW 76.09.010(1). This pilot project will benefit the AMP by filling an information gap regarding whether reconfiguration of the Western Washington Type Np RMZ could efficiently improve effective shade.

III. Legal Authority for Pilot Project

WFPA submits this petition pursuant to RCW 34.05.330, which allows any party to petition an agency to adopt, amend, or repeal any rule. *See also* WAC Chp. 82-05, 222-08-100. The FPB's rule-making authority is found in RCW 76.09.040, .050, and .370.

The FPB may initiate rulemaking on Type Np streams in 2021, and the Department of Ecology requested the Board initiate rulemaking by the summer of 2021. A pilot rule is used during the development of a rule to test its feasibility, as well as identify simple, efficient, and economical alternatives to achieve the

[1]Effective shade is defined as the fraction of total possible solar radiation that is attenuated (blocked) by riparian vegetation.

goal of the rule. RCW 34.05.313(1). The FPB has authorized multiple pilot rules over the last 15 years to support CMER effectiveness research projects (Cupp et al. 2014, MacCracken et al. 2018, McIntyre et al. 2018, Ceder et al. 2019, etc.). Note none of the above referenced pilot rules were focused on examining cost effectiveness and operational feasibility. This pilot project is requesting waiver of provisions of WAC 222-30-021(2), Western Washington protection for Type Np Waters, for the study period during which volunteer landowners will test the viability of experimental prescriptions on up to 19 harvest units in western Washington. RCW 34.05.313(2).

IV. Rationale for Proposed Pilot Project Rule

The proposed pilot project is intended to accomplish the policies stated in RCW 76.09.010 without jeopardizing the economic viability of the forest products industry. RCW 76.09.370(. The pilot project rule will accomplish these objectives by testing various RMZs to determine whether it is possible to improve effective shading of Type Np waters by varying the configuration of RMZs while minimizing the cost impacts.

Washington's Type Np stream riparian rules were designed to protect water quality and provide riparian functions along non-fish bearing streams in western Washington. The proposed pilot project could result in new rules developed through the AMP process. *See* RCW 76.09.370(7), WAC 222-12-045. The pilot project will use sites volunteered by landowners to test various prescriptions on Type Np streams to identify whether modifications to the riparian buffers result in improved effective shading of the Type Np waters.

WFPA and volunteer landowners screened possible study sites and field work began in the summer of 2019 to measure initial conditions. Nineteen sites have been identified as potentially suitable for treatments, and up to seven as potential reference sites. If the FPB authorizes the pilot project, pre- and post-treatment data collection would occur during summers (Jun - Sep) 2020 and 2021-, respectively. The site-specific harvest treatments would be developed during winter/spring 2020 and implemented during winter 2021 (Jan - Apr). Analysis of stand and temperature data will be promptly conducted to provide as much information as possible during the rule-making timeline identified in the TFW Policy Type Np workgroup charter and Ecology's December 2, 2019 letter extending Clean Water Act Assurances until the end of 2021. During the pilot project, up to 19 harvest units will require waiver of the existing RMZ requirements in WAC 222-30-021(2) in order to test the effectiveness of different RMZ treatments. We haven't yet determined the details of alternative RMZs configurations, that analysis is currently taking place and will require some additional data collection early this year. However, we anticipate varying the length, width, location, and stand density as compared to existing Type Np stream RMZs. All other applicable forest practices rules will be adhered to at all sites.

The pilot study treatments will be designed to minimize the potential for damage to public resources while maintaining the quality of design and implementation necessary to address the study objectives, and to provide scientifically credible data on shade and temperature effects during the initial post-harvest period when the greatest impacts could occur. The 19 potential sites, and individual Forest Practice Applications (FPA), represent approximately 0.4% of the total number of FPAs processed each year by the Forest Practices program. The total Np stream length at the 19 sites potentially subject to the treatments is approximately 10,000 meters, or 33,000 feet. While total Np stream length in Western Washington is not known, in 1999 WFPA estimated there were approximately 60,000 miles of stream subject to the Forest Practices Rules, 50,000 in Western Washington. Assuming Np streams represent at least 50% of that length, approximately 0.03% of the Np stream length in Western Washington would be subject to the treatments. While admittedly a coarse estimate, it does serve to illustrate the low

resource risk associated with this proposal. Over the next two - three months we will confirm the exact Np stream length and determine if the treatment sites have any potential to impact 303(d) listed waters. Finally, since the treatments are targeting improvement in effective shade over existing Np RMZs, and completed CMER studies indicate existing Np RMZs present relatively low risk for other riparian functions, we do not expect treatments to present measurably increased risk of resource damage. However, if any damage to public resources is detected during the harvest treatments, the landowner representative and project lead will immediately contact the Forest Practices program, the Adaptive Management Program Administrator, and the Department of Ecology to determine appropriate mitigation steps which supports the research need while minimizing any damage.

V. Conclusion

WFPA has discussed the study with TFW Policy caucuses, including hosting a field trip to one of the potential sites in November 2019, and welcomes partnerships with other caucuses. The pilot project is currently being funded by WFPA members. WFPA will continue to coordinate with individual caucuses, TFW Policy, and CMER during the project, and would be pleased to brief the Forest Practices Board on the progress and results of the project.

WFPA looks forward to working with Board staff to implement the Board's decision. Initiation of a pilot project will demonstrate the Board's recognition of the importance of cooperative science work, cost effectiveness and operational feasibility in the AMP process, the Forest Practices HCP, and the Forests & Fish commitments. While WFPA acknowledges that scientific work remains on other aspects of RMZ effectiveness, it proposes that the most efficient approach to address Ecology's concerns about temperature in Type Np streams is continued use of a scientifically-based AMP process to develop to support any future rule changes.

References

Ceder, K., M. Teply, and K. Ross. 2019. Hardwood conversion study (HCS): SUMMARY REPORT. Cooperative Monitoring, Evaluation and Research Report, Washington State Forest Practices Adaptive Management Program, Washington Department of Natural Resources, Olympia, WA.

MacCracken, J. G., M. P. Hayes, J. A. Tyson, and J. L. Stebbings. 2018. Stream-associated amphibian response to manipulation of forest canopy shading. Cooperative Monitoring, Evaluation and Research Report CMER 18-100, Washington Department of Natural Resources, Olympia, WA

McIntyre, A. P., M. P. Hayes, W. J. Ehinger, S. M. Estrella, D. Schuett-Hames, and T. Quinn. 2018. Effectiveness of experimental riparian buffers on perennial non-fish-bearing streams on competent lithologies in Western Washington. Cooperative Monitoring, Evaluation and Research Report CMER 18-100, Washington State Forest Practices Adaptive Management Program, Washington Department of Natural Resources, Olympia, WA.

Cupp, C.E. and T.J. Lofgren. 2014. Effectiveness of riparian management zone prescriptions in protecting and maintaining shade and water temperature in forested streams of Eastern Washington. Cooperative Monitoring Evaluation and Research Report CMER 02-212. Washington State Forest Practices Adaptive Management Program. Washington Department of Natural Resources, Olympia, WA.