DEPARTMENT OF NATURAL RESOURCES

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MEMORANDUM

October 17, 2022

TO: Forest Practices Board

FROM: Saboor Jawad, Adaptive Management Program Administrator (AMPA)

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SUBJECT: Majority and Minority Recommendations: Type Np Action Development Dispute

The TFW Policy dispute over developing riparian management zone (RMZ) alternatives for non-fish bearing perennial streams (Type Np) concluded without consensus on 20 July 2022. Majority and minority recommendations emerging out of this dispute are now delivered to you to make the final determination as stated in WAC 22-12-045(h)(ii)(D).

This memo delivers two recommendations for your consideration:

1- Joint recommendations of Washington Association of Counties (WSAC) Washington Farm Forestry Association (WFFA), Washington Forest Protection Association (WFPA) representing county governments, small forest landowners and large forest landowenrs.

2- Joint recommendations of the following TFW caucuses: conservation; state (Department of Ecology, Department of Fish and Wildlife); Eastern Washington Tribal Governments; and, Western Washington Tribes.

Both recommendations include one common alternative on whole basin harvest[1]. This is denoted as Option 2 in the majority recommendation and as Prescription A in the minority recommendation. This alternative, while common among both, is not a standalone recommendation. Both sides are requesting your acceptance of the common option alongside their other preferred buffer alternative.

You will receive detailed presentations on both recommendations at your October 2022 special meeting. A panel comprised of TFW caucuses will also be available to answer your questions. Final majority and minority recommendations are attached to this memo. Also attached is the final report of Triangle Associates who mediated stage 2 of this dispute.

[1] A 75 ft, no-harvest and continuous buffer for the entire length of a Type Np stream when 85% or more of a Type Np basin greater than 30 acres is to be harvested within a five-year period.

Background and Timelines:

TFW Policy is mandated by rule to consider the findings of CMER research and make recommendations to the Board. The Board's guidance for the adaptive management program, furthermore, has established a 180 timeline for TFW Policy to develop alternatives when the committee determines that a CMER findings report warrants action. The following three CMER studies triggered TFW Policy's review function:

1- **Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington Study (Hardrock Phase I)**

- TFW Policy receives the findings package at their July 2018 regular meeting.
- The committee determined, by consensus, that the findings warrant action at their August 2018 meeting and begins to develop alternatives through a committee workgroup.
- The study's principle investigators present the findings to the Board on 08 May 2019. At the same Board meeting, TFW Policy brings forward a consensus recommendation that the findings warrant action and a request for Board approval to form a Technical Type Np Prescriptions Workgroup as supplemental element of the action alternative.
- At their 09 May 2019 special meeting, the Board accepts TFW Policy's recommendation and the amended timeline to address Type Np buffer prescriptions through a TFW Policy workgroup. The Board also approves additional changes to the workgroup charter at their August 2019 meeting.
- Type Np workgroup concludes its work in June 2021 and delivers three recommendations to TFW Policy[2].
- TFW Policy initiates discussions of the workgroup alternatives and receives additional alternative proposals from committee members. Citing lack of progress and the committee's inability to submit a buffer recommendation to the Board within the accepted timelines, the conservation caucus invokes dispute resolution at TFW Policy's November 2021 meeting.
- The dispute resolution process commences with the informal stage. In March 2022, the conservation caucus moves the dispute to stage 2 which requires mediation.
- Triangle Associates mediated the dispute in stage 2. Mediation occurred in a series of meetings from April to July 2022. On 20 July 2022, TFW Policy concluded the dispute without a consensus and began drafting majority and minority recommendations to the Board.

2- **Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington Study (Hardrock Phase II Extended Monitoring)**

[2] A continuous 75-foot buffer with managed outer 25 ft; a continuous buffer that varies from 25 to 75 ft based on stream orientation; and a site-specific buffer retaining that portion of buffer that provides effective shade (based partly on the Smart Buffer Study Design concept)

3- Effectiveness of Forest Practices Buffer Prescription on Perennial Non-fish-bearing Streams on Marine Lithologies in Western Washington (Soft Rock Study)

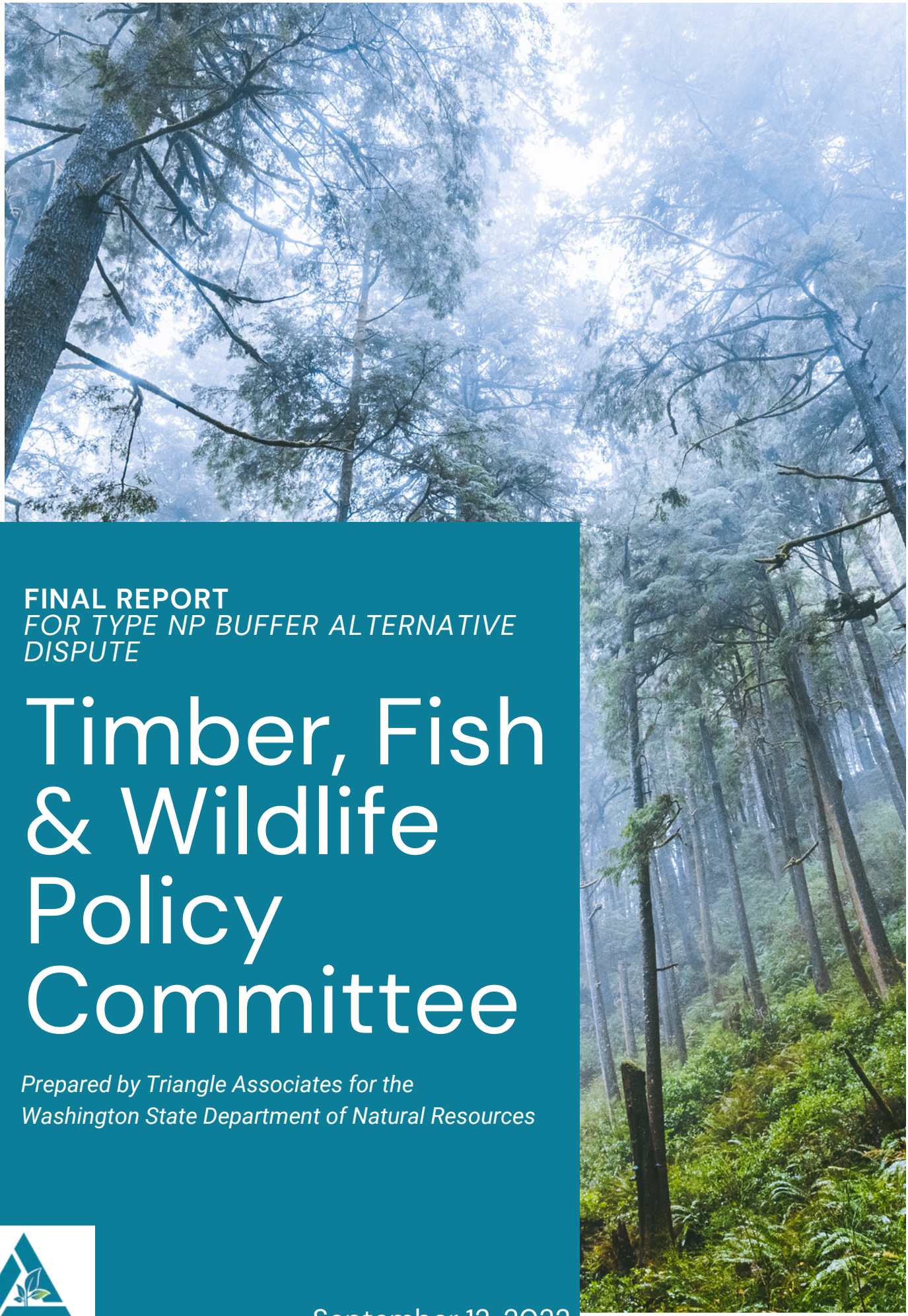
- TFW Policy receives the findings reports of both studies (Hard Rock Phase II and Soft Rock) at their January 2022 meeting. The committee determined at their February 2022 meeting that both studies warrant the same action as Hard Rock Phase I and decides to incorporate action as part of the ongoing deliberations on Np buffer recommendations.
- Principal investigators present study findings to the Board at their August 2022 regular meeting.

The alternative development process at TFW Policy has now concluded. You are receiving majority and minority recommendations and you are requested to make the final determination on this dispute. Your decision will also advance the adaptive management loop to its final stage as described in the Board's guidance for the program.

Please reach out to me if you have any questions or need additional information.

Attachments:

- Mediator's final report
- Joint recommendations of WFPA, WFFA and WSAC
- Joint recommendations of the conservation caucus; Department of Ecology; Department of Fish and Wildlife; Eastern Washington Tribal Governments and Western Washington Tribes.



FINAL REPORT
FOR TYPE NP BUFFER ALTERNATIVE DISPUTE

Timber, Fish & Wildlife Policy Committee

Prepared by Triangle Associates for the Washington State Department of Natural Resources

TRIANGLE

September 12, 2022

Timber, Fish and Wildlife (TFW) Policy Committee
Type Np Buffer Alternative Dispute
Final Mediation Report
(v. 9-12-2022)

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I. Executive Summary

This report serves as the final product of the Timber Fish and Wildlife (TFW) Policy Committee's (Policy) Type Np Buffer Alternative Stage II dispute resolution process. Stage II of the dispute took place between March 2022 – July 2022. The Triangle Associates (Triangle) meditation team was contracted by the Department of Natural Resources (DNR) Adaptive Management Program to mediate this dispute. This report summarizes the background on the dispute, the origin of the dispute, the steps taken to resolve the dispute, and the outcome.

The report sections are as follows:

- Executive Summary
- Background Information
- Steps to Resolve the Dispute
- Outcome of Dispute Resolution
- Meditation Methods and Lessons Learned

The Background Information section defines the dispute using language developed by the DNR and descriptions the mediator gathered from all parties; identifies the parties involved in dispute resolution; describes previous efforts to resolve the dispute; and explains the stages of dispute resolution.

The Steps to Resolve the Dispute section describes the process the mediation team went through to resolve the dispute with the parties; details the types of mediation meetings and progress made by parties at each meeting; highlights the documents developed to facilitate dispute resolution; and explains how the final Type Np buffer alternative proposals were developed.

The Outcomes of Dispute Resolution section describes the final outcomes of Stage II dispute resolution including the areas of consensus and the areas of continued disagreement.

The Mediation Methods and Lessons Learned section describes how the mediation team worked with parties to work toward resolution of the dispute and details mediator observations and lessons learned from the dispute resolution process.

II. Background Information

a. Dispute Language:

In July 2018, the TFW Cooperative Monitoring, Evaluation and Research Committee (CMER) completed and delivered a findings report titled *Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington* (Hard Rock Phase I) to Policy.

Policy then formed a technical Type Np Prescription Workgroup to develop and evaluate the Riparian Management Zone (RMZ) buffer prescriptions. The workgroup completed the development and evaluation of RMZ prescriptions in May 2021 and submitted a final report (Type Np report) in June 2021.

Policy followed the process outlined Forest Practices Board (FPB) Manual section 22 for the development of Policy recommendations in response to CMER findings report.

In December 2021, the Conservation Caucus invoked Stage I of the dispute resolution process siting a lack of progress from Policy on the development of Type Np buffer alternatives.

In March 2022, the Conservation Caucus invoked Stage II of the dispute resolution process as Policy was unable to reach a consensus decision on a Type Np buffer alternative recommendation for the FPB within the 150-day timeline outlined in the FPB Manual after receiving the Type Np report.

b. Caucuses that elected to be involved in in the dispute:

All the caucuses (parties) elected to participate in the dispute.

- Conservation
- Counties
- DNR
- Eastside Tribes
- Industrial Landowners
- Small Forest Landowners (SFL)
- State Caucus – Department of Ecology (Ecology)/Washington Department of Fish and Wildlife (WDFW)
- Westside Tribes

c. Stage I Dispute Resolution:

Stage I of this dispute resolution involved working for two months to resolve the issue outside of regularly scheduled Policy meetings. During this stage, Policy requested written responses from each of the parties to characterize the dispute, held informal dispute resolution meetings, and requested parties submit proposals for Type Np buffer alternative prescriptions.

Stage I did not resolve the dispute. Stage I documentation noted that the parties disagreed on when the 150-day timeline began for developing a consensus recommendation. Some parties felt the 150-days began at the release of the Type Np report while others felt it began in January 2022 when the Hard Rock Phase II and Soft Rock Studies were received. Since the parties agreed to develop a consensus recommendation on Type Np buffer alternatives through Stage II dispute resolution, the issue regarding timeline was determined to be no longer relevant to this dispute.

d. Stage II Dispute Resolution:

Triangle Associates (Triangle) was chosen as the contractor to serve as the mediator for Stage II as part of an on-call contract with the DNR. Triangle worked with the parties that had elected to participate to complete a mediation agreement to ensure understanding among the parties about the mediation process, the role of the parties, and the role of the mediator.

e. Defining the Dispute:

The first task under Triangle's scope was to ensure that all parties had an equal understanding of the dispute and to identify where parties agreed and disagreed with each other. Triangle compiled caucus descriptions of the dispute, summarized their understanding of the dispute, and met with Policy to define the nature of the dispute and a path forward for resolving it.

Areas of Agreement: Caucus members agreed the origin of the dispute was the timeline for developing recommendations to the FPB in accordance with the process outlined in the FPB Manual. The parties agreed that the purpose of this mediated dispute resolution process should be to develop Type Np buffer alternative recommendations for the FPB in advance of their workshop and field tour in October 2022 with an FPB decision in November 2022.

They also agreed the original timeline issue was no longer relevant as a subject in the dispute resolution process. The parties agreed to work towards consensus recommendation for Type Np buffer alternatives in the 90-day Stage II dispute resolution timeframe.

Areas of Disagreement: The central disagreement among the parties was regarding the amount of change in buffer prescriptions that would be needed from current rules to meet the anti-degradation water quality temperature standard, and thus receive Clean Water Act assurances from Ecology. The parties also disagreed on how broadly the CMER study results should be applied across the landscape.

i. While Policy agreed by consensus that both CMER Hard Rock Phase II and Soft Rock Studies warranted action, some parties felt more information was required to integrate the findings from these and other studies some Policy members felt were relevant, to assess how harvest practices impact temperature, and to understand the cost and benefits of the buffer recommendations being put forth by Policy.

ii. The prescriptions in the proposals developed by the parties in Stage I differed in how they approached two aspects of prescriptions: 1) Increased buffer widths and lengths needed to result in less than .3-degree Celsius increase in stream temperatures (to meet anti-degradation standards), and 2) How prescriptions should be described to be feasible and easy to implement while balancing prescription costs to landowners versus stream temperature benefits.

III. Steps to Resolve the Dispute

a. April 12th Mediation Kick-off and Defining the Dispute:

After Triangle compiled and summarized the descriptions of the dispute developed by each caucus, Triangle held a mediation kick-off meeting with all parties. The purpose of this meeting was to:

1) Confirm agreement among the parties for how the mediator characterized the dispute;

2) Review parties' positions and interests regarding the development of Type Np buffer alternatives; and

3) Determine the scope of the dispute and the process for dispute resolution.

Additionally, the parties considered including Structured Decision-Making in the process. The parties concluded that as it was used in the Hard Rock CMER study and there was not enough time or training to include it; the method would not be used.

The parties agreed that a small group should meet to determine the criteria and weighting to score each of parties' proposed Type Np buffer alternatives and to identify topics for the next dispute resolution meeting on May 12th.

b. May 6th Small Group Meeting:

The small group met to confirm the goals for the Type Np buffer alternative recommendations and to create an evaluation method for the parties to use to assess the differences between each caucus' proposal for buffer prescriptions.

To determine the goal of the buffer recommendations, group members each outlined what a successful buffer outcome would look like from their caucus' perspective and what is needed to achieve these goals. The group then discussed the criteria and approach for evaluating the prescriptions in the parties' proposals. The subgroup determined that to reach consensus, it would be more effective for the parties to sort proposals into categories based on each caucus' ability to "live with" the proposed prescriptions.

Following the meeting, the small group members reviewed a spreadsheet containing the prescriptions proposed by each caucus and begun identifying which element of each of the alternatives their caucus could live with, could not live with, or would require additional information to determine. If a caucus could not live with a prescription alternative, they were required to explain why they could not live with it and to share this explanation with the other parties.

c. May 12th TFW Policy Meeting:

The small group presented their recommended approach at a Policy meeting, and this included an exercise to sort the elements of the proposals into live with/not live with/more information needed categories. The parties discussed the details of the sorting exercise and the goal of identifying the elements of the prescription the majority could live with, areas a caucus could not live with, and areas where additional information was required. This exercise was conducted during the meeting.

After parties reviewed and sorted all the proposed alternative prescriptions, all parties indicated that they could likely live with most of the elements in the state caucus' proposal, as described at that time.

The parties agreed to use the state proposal as a starter proposal for communicating with their caucus members. Several parties noted there were still important details that would need to be discussed and worked through at future dispute resolution meetings. Beyond the prescriptions of the Type Np buffer alternative recommendations the parties identified the following additional areas that would require further discussion: operational flexibility, cost and benefits of the prescription to landowners, and the need for a monitoring program.

d. May 18th Standing Dispute Resolution Meeting:

The parties met to confirm the specifics of the proposal the parties would each use and remaining items to be negotiated, discuss other aspects of the proposal for FPB consideration, and confirm an approach to develop the consensus recommendation. The parties agreed to advance the prescriptions in the starter proposal based on WDFW and Ecology's recommendations. A new small group was designated to flesh out the details of the proposal so that the proposal was clear to all parties.

The parties agreed that the topics of operational flexibility, operational feasibility, and cost effectiveness of the buffer alternatives are interests to be considered and discussed as they develop the Type Np buffer alternative recommendation, but these would not to be included within the prescription criteria.

The parties agreed that other existing Type Np Forest Practice rules, such as equipment limitation zones (ELZs), sensitive sites and riparian management zones (RMZs), and perennial initiation points (PIPs), would still apply and remain unchanged.

Lastly, the parties agreed that their prescription recommendation would need to be accompanied by a monitoring program, which they proposed to be developed by CMER.

e. June 8th Small Group Meeting:

A small group met to reach agreement on a proposal that at least the small group members can live with and would recommend to Policy to approve. They identified the areas of agreement, discussed the areas requiring additional information, and documented the remaining areas of disagreement with the starter proposal. The areas of agreement were used to begin drafting a proposal for the parties to build on at the next dispute resolution meeting.

f. June 14th Standing Dispute Resolution Meeting:

The parties met to develop proposed options of Type Np buffer alternative prescriptions that all parties can live with and be able to support advancing to the FPB.

After reviewing the outcomes from the small group meeting, the parties further identified areas of agreement to be included in the policy recommendation. They identified members to fully draft a proposal based on the areas of agreement.

The parties agreed that they were making significant progress on resolving the dispute and moved to extend formal Stage II Dispute Resolution through July 20th. A full proposal, referred to as the June 14th proposal, was drafted and distributed to be reviewed internally within each caucus.

g. July 7th TFW Policy Meeting:

The parties used a section of a Policy meeting to share the feedback they received on the draft June 14th proposal from within each of their caucuses.

- The Ecology (State Caucus) expressed concern about meeting Clean Water Act and anti-degradation water quality standards with the June 14th proposal. They developed an amended proposal to increase the length of 75' no cut buffers the above the F/N break to 600' and extended buffers over the entire Np stream length. They indicated there was not a good alternative to

bankfull width to determine when to switch to smaller buffers. Their proposal reduced the bankfull width criteria from five-feet to three-feet to align it with their interpretation of study results.

- The DNR Caucus expresses support for the current concept of the proposal and recognized there may be changes to the specifics of the proposal based the ongoing discussion within Policy. DNR indicated they are comfortable with all the proposed options currently being discussed as they all make a significant improvement from the current rule.
- The Industrial Landowners Caucus expressed concern about using bankfull width to determine management prescriptions as a component of the proposed Type Np buffer alternative in the June 14th proposal and would not be supportive of including it. They also expressed concern with the field feasibility of including a management zone within the buffer and noted this method is largely avoided by landowners. They expressed support for the concept of the proposal but wanted it to be simpler to implement. Lastly, they recommended the proposal include an optional prescription for SFLs and proposed the following prescription for SFLs: 50' buffers between F/N break and the PIP with the first half 25' no cut buffer and the next 25' be an optional management zone.
- The Counties Caucus expressed support for the June 14th proposal without changes provided it is accompanied by an adaptive management plan.
- The SFL Caucus noted they would have difficulty getting support within their caucus for any proposal above a 50' manageable zone. They noted their position on the Type Np buffer alternative recommendation is dependent on the ongoing Low Impact Template efforts. In the SFL Caucus' original proposal, they included an alternative management prescription for SFLs, and they wanted to see this in the final recommendation.
- The Conservation Caucus expressed concern with the buffer sizes in the June 14th proposal. They were not confident that the 50' and 75' buffers would be able to meet the water quality standards for temperature based on the Hard Rock and Soft Rock studies and information provided by Ecology. They also expressed concern about upstream warming due to the small size of the buffers in the upper watershed. They expressed support for the current process of open discussion regarding the specifics of the Type Np buffer alternative recommendation within Policy.
- The Eastside Tribal Caucus expressed support for the concept of the June 14th proposal and the specifics in it. They indicated the June 14th proposal is an improvement to the current rules. They also recognized implementing the proposal with a monitoring plan would assist with their need for adaptive management in case the Type Np buffer alternative prescriptions change in the future. Additionally, they expressed support for including an alternative set of prescriptions for SFLs.

As a result of the discussion at this meeting, the parties noted that there had been a shift in support for the June 14th proposal as a concept, in particular from Ecology. The meeting resulted in two different philosophies around the use of bankfull width with some parties indicating it should no longer be part of the implementation approach for forest practices in relation to buffers and others indicating it needs to remain. Other differences included the width of the proposed buffers at the headwaters and what this indicates for width of buffers downstream. The parties agreed more work was required to resolve their differences and they scheduled a small group meeting between the Conservation Caucus, the State Caucus, the Industrial Landowner Caucus, and the Counties Caucus to work on the metrics of the proposal.

The parties were able to come to agreement on the whole basin prescription for larger basins. This prescription would apply when harvest that takes place over a 5-year period or less, in a full watershed of

30 acres or more, is harvested in its entirety (defined as >85% of basin). All caucuses, with some reservation expressed by the SFL Caucus, agreed that these watersheds would have a 75' no cut buffer extending through all NP streams in the basin to the PIP and ELZ above the PIP.

h. July 12th Small Group Meeting:

A small group met to work on the metrics of the Type Np buffer alternative proposal. The parties determined that there was not agreement around two central aspects of the buffer alternatives being discussed:

i. the length and width of buffer prescriptions: The parties had differing points of view on what level of change is needed from the current rule to have certainty in meeting the anti-degradation temperature criteria.
ii. Field feasibility of using bankfull width: Some parties removed bankfull from the proposal and instead, relied on the length of the stream and other factors. Other parties, including Ecology, indicated that while not perfect, bankfull width needed to remain in the recommended prescription, and it needed to be changed to three-feet instead of five-feet.

After the small group developed and considered possible alternative proposals to resolve differences between the caucus points of view, they identified any remaining areas of disagreement. Based on these areas of disagreement, the small group advanced the Ecology led proposal (see Ecology Proposal) and the Industrial Landowner led proposals (see Prescription A and B) for the parties to consider at the next meeting.

i. July 20th Standing Dispute Meeting:

The parties met to review the specifics of the two remaining Type Np buffer alternative proposals, and the full basin harvest option, to identify which should advance to the FPB. The parties agreed to advance the full basin harvest proposal (Prescription A) and the two remaining proposals (Prescription B and Ecology Proposal) to the FPB. The parties were in agreement that they had progressed as far as they could toward agreement. As this was the last day under the extended mediation timeline, the parties agreed to conclude the mediation with this decision.

The parties then agreed to continue meeting to finalize these proposals and to retain Triangle to provide facilitation to finalize the proposals. A motion was made to continue the dispute resolution process, but the motion failed, and Stage II dispute resolution was concluded without a consensus decision.

IV. Outcome of Dispute Resolution

After four months of work, two draft proposals were approved for inclusion in the majority/minority reports to the FPB for their consideration along with a full basin harvest proposal that the parties agreed to by consensus. The intent of advancing these proposals to the FPB is for the majority/minority parties to present Type Np buffers alternatives in which they support for FPB consideration and to provide specific buffer alternatives which upon FPB approval for inclusion in potential rule making, can undergo a cost analysis to better understand the feasibility of implementing the proposed prescriptions.

The majority/minority report will include the package of proposals and a Policy request for CMER to develop a monitoring plan and validation study to be implemented with the recommended Type Np buffer alternative rule. The FPB may also consider a CMER study of the recommended Policy options to obtain more information to help finalize which buffer alternatives should be implemented in rule.

V. Meditation Methods and Lessons Learned

a. Mediation Methods:

The mediation team used a three-step method to work toward consensus:

Step 1: Information Sharing:

This step included confirmation among the parties that all were in agreement about the information that informed the process including scientific studies conducted by CMER, the interests of each of the parties, and any other relevant information that should be known by all participants. For this dispute, the information sharing step had largely been explored in a previous dispute that had been brought by the Industrial Landowner Caucus and then withdrawn. This was referred to by the program as a "PI Dispute." In that dispute, the parties concluded that they would make the decision on Type Np buffers using the information available through the CMER science program. In the early meetings of the Type Np buffer alternative dispute, each of the parties explained their interests and goals for buffer alternatives.

Step 2: Generating Options:

This step included working with a spreadsheet of options that had been generated in Stage 1 of the dispute. This spreadsheet included specific criteria for Type Np buffer alternatives proposals from every caucus. Triangle developed a ranking exercise to help determine which aspects of the different proposals each party could live with and why, which proposal aspects they had questions about so were uncertain whether they could support it, and which aspects they could not support and why.

Step 3: Determining a Final Proposal and Agreement:

Through a series of small group and full group meetings, the parties whittled down the proposals into two options to recommend to the FPB, along with a full basin approach that all parties agreed to. These proposals represented different points of view about the amount of change from the current rule and therefore, certainty needed for how much to widen the buffers or change field methods to meet the temperature criteria and thus the Clean Water Act assurances. Ultimately, the parties determined they could not agree on one final proposal and agreed that the mediation process had taken them as far as they could go with the information currently available.

b. Lessons Learned:

Observations on lessons learned from the mediator's perspective include:

i. Challenges from Stage I:

The discussions that took place through Stage I of this dispute presented some challenges for setting up the dispute resolution process in Stage II. The parties had determined in Stage I that each caucus would put forward a Type Np buffer alternative proposal. However, the parties had not explored what the goals were for each caucus, and after the proposals were drafted had not schedule time to fully explore the rationale and reasoning for each proposal brought forward. This meant the parties were unable to thoroughly understand the reasoning for the proposals, the scientific foundation for each, nor reach a common understanding of each other's objectives.

At the start of the mediation, the mediator observed that most parties assumed they understood why an aspect of a caucus' proposal had been proposed without discussing and testing their assumptions with the author. This led to a series of misunderstandings that needed to be addressed and discussed as a full group and in small groups early in the Stage II.

The mediator also observed that the parties generally understood that they were developing Type Np buffer alternatives with a lack of agreement on how much change would be needed from the

current rule to achieve the temperature criteria under consideration. While it is generally accepted that all policy making happens with a lack of perfect information, in this case, the information available led parties to very different conclusions on the degree of buffer rule changes.

The parties had not come to agreement in Stage I on what the CMER science reports (Hard Rock and Soft Rock) indicated for buffer width or other forest practices measures, however the mediator had explored this line of discussion with the parties. The mediator found the majority were not interested in further discussing their different points of view about what the results did or did not signal for change from the current rule, although at several points in the process the Conservation Caucus asked for more information about this from each of the parties. This meant the parties were moving forward with discussion of specific proposals without agreement on what the proposals were intended to achieve.

To help remedy this lack of agreement on goals and objectives for the proposals, the mediator worked with each of the parties during and in between meetings to encourage discussion of not just the proposed Type Np buffer alternative, but the rationale for that proposal. The rationale and reasoning were explored verbally at many meetings and captured as part of the proposal development. In the end, with the time available, the parties were able to come to agreement on some aspects of an alternative to the current rule but remained in disagreement on the amount of change needed from the current rule to ultimately meet the anti-degradation temperature criteria.

One recommendation to address this issue in future dispute resolution efforts is to address differing points of view, especially around each parties' interpretation of the studies, in order to explore each parties' interests, objectives and goals early in the process and to avoid going too far with individual proposals. This way, the parties can start from an agreement on the goals and objectives they are working to achieve before moving to proposals and mutually align their goals to better reach consensus.

Standing Dispute Meetings:

After two months of trying to schedule dispute resolution meetings on an ad hoc basis, scheduling monthly prescheduled dispute meetings was an effective tool at streamlining and facilitating the Stage II dispute resolution process. Each standing meeting served as a milestone to resolve aspects of the dispute and to identify action items and next steps for the parties to complete before the next meeting. This process facilitated the timeline for dispute resolution and eased the scheduling burden for all parties and the mediator, which enabled everyone to focus on the content of the dispute. Lastly, standing meetings provided parties deadlines for feedback on the proposal options and dedicated discussion time to advance resolution. Triangle recommends that future dispute resolution efforts establish a standing, monthly or bi-weekly meeting time early in the process.

Capacity of Caucus Members:

While all caucus representatives indicated to the mediator that this was an essential dispute to resolve and important to prioritize, capacity to participate was an issue for some caucus members and their participation was limited. The DNR Adaptive Management Program has an obligation to assist with capacity issues and does provide resources for parties with limited capacity, but many members may not use these resources.

Additionally, organizational cultures for some parties may limit responses to a sole key decision-maker. While there may be inequities around engagement for caucus members, some ways to increase accessibility to the dispute resolution process include maintain remote options for those with limited capacity to travel, have secondary decision-makers where possible, utilize standing meetings and book this time as far in advance as possible, provide advanced time for review items and clear deadlines, and utilize individual calls if necessary to gather feedback on dispute resolution proposals.

TYPE N ACTION DEVELOPMENT DISPUTE

Majority/Minority Recommendations to the Forest Practices Board

TFW Policy Caucuses:
Large Forest Landowners
Small Forest Landowners
Washington State Association of Counties

October 10, 2022

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1- Background/Introduction

The final Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington Study (Hardrock Phase I) and findings report were transmitted to Timber Fish & Wildlife (TFW) Policy in mid-2018. This triggered the TFW Policy review process outlined in Appendix B of Board Manual (BM) 22, responding to questions 7 - 10 of the CMER/Policy Interaction Framework on page 22-30 and within the timeline on page 22-31.[1] TFW Policy initially struggled with determining appropriate action in response to the Hardrock Phase I study. Some caucuses proposed emergency rulemaking to establish 75-foot buffers on all Np streams; other caucuses proposed further evaluation of existing information and delaying policy recommendations until completion of a series of related Np stream studies by the Cooperative Monitoring, Evaluation & Research (CMER) Committee.

Np Workgroup Formed

Near the end of the 180-day period specified for TFW Policy deliberation in BM 22, TFW Policy decided to form a workgroup of technical experts (Np workgroup) to review the Hardrock Phase I study, along with a series of related Np stream studies, and make Np stream buffer recommendations for TFW Policy consideration. This TFW Policy consensus recommendation, along with a charter and timeline for the Np workgroup was initially transmitted to and accepted by the Forest Practices Board (FPB) at their May 2019 quarterly meeting. Based on FPB discussion at the May meeting, a revised Np workgroup charter and timeline was transmitted to and accepted by the FPB at their August 2019 meeting. The revised charter indicated the Np workgroup would convene in July 2019 and complete its work with recommendations to TFW Policy by September 2021. The workgroup actually convened in October 2019 and submitted their final report in June 2021.

The Np workgroup conducted a series of meetings between October 2019 and May 2021, which included one field trip to a CMER study site. The workgroup reviewed draft and final Np stream related CMER studies, received presentations from several CMER principal investigators and Ecology staff, and discussed non CMER science relevant to Np streams. CMER studies reviewed by the workgroup included:

1. Hardrock Phase I[2]
2. Changes in Stand Structure, Buffer Tree Mortality and Riparian-Associated Functions 10 Years After Timber Harvest Adjacent to Non-Fish-Bearing Perennial Streams in Western Washington (Type N BCIF)[3]
3. Type N Experimental Buffer Treatment Study: Post-harvest comparison of genetic diversity and demographic findings for three stream-associated amphibians (Amphibian Genetics)[4]
4. Stream Associated Amphibian Response to Manipulation of Forest Canopy Shading (Amphibian Buffer/Shade)[5]

[1] Board Manual 22 Guidelines for Adaptive Management

[2] fp_cmer_hard_rock_phase1.pdf

[3] bc_cmer_bcif_westside.pdf

[4] bc_cmer_post_harvest_genetics.pdf

[5] buffer shade study ppt (report not posted to web)

5. Extensive Riparian Status and Trends Monitoring Program-Stream Temperature Phase I: Westside Type S, F and Np Monitoring Project (Extensive Temperature Monitoring)[6]
6. Hardrock Phase II Study, Post Treatment Years 3-10 (Hardrock Phase II)[7]
7. Type N Experimental Buffer Treatment Study- Incompetent Lithologies (Softrock study)[8]

Np Workgroup Report & Recommendations

The Np workgroup evaluated several different potential buffer configuration alternatives through a Structured Decision Making (SDM) process which scored alternatives based on a series of criteria. The workgroup was instructed that antidegradation temperature targets established by DOE of ≤0.3° Celsius (C) were necessary to be met for all forestry-related activities in rulemaking associated with this research. Given this assumption, three alternatives were recommended and included in a final report to TFW Policy in June 2021. The three alternatives included:

1. a continuous 75-foot buffer with the outer 25 feet available for management,
2. a stream orientation-based continuous buffer which varied from 25 feet to 75 feet, and
3. a site-specific buffer based on the WFPA Smart Buffer Design concept with the addition of a specific shade loss target.

Recognizing the considerable variability associated with headwater streams and workgroup confidence, or lack thereof, in any given management approach meeting threshold-based resource protection objectives, the workgroup included an Uncertainties and Future Direction section in their report. This section describes alternative approaches to evaluating management effectiveness, including a need for larger sample sizes, direct measurement of the temperature standard rather than approximation, and different approaches of evaluating temperature response which may be more important to growth and survival and key aquatic species.[9] The Np workgroup process was a worthwhile effort and produced useful information to consider. However, their decision-making space was constrained by Ecology staff interpretation of the antidegradation temperature criteria of ≤0.3° C applying everywhere, all the time, in Np streams. This appears to be a unique interpretation of the standard, not applied to other non-point sources and is inconsistent with the intent of the Forests & Fish (F&F) report and the Forest Practices Habitat Conservation Plan (FP HCP). Some Np workgroup members noted the awkwardness of a regulatory agency using one or two completed experimental research studies to inform an after the fact, far-reaching interpretation of state policy and questioned the biological relevance of such small changes in temperature.

TFW Policy Consideration & Dispute Resolution

TFW Policy held a series of meetings after receiving the Np workgroup report and individual caucuses were invited to submit their own Np buffer proposals, which several caucuses did. Np buffer proposals were submitted by the Easter Washington (EWA) Tribes, Washington State Association of Counties (WSAC), Ecology/Fish & Wildlife, and the Conservation Caucus in the fall of 2021. Several of the caucus proposals were based on or had some similarity with the Np workgroup recommendations. By late 2021, TFW Policy had at least seven different Np buffer proposals to consider, some of which had multiple components. In November, the Conservation Caucus called for Dispute Resolution (DR) due to lack of progress on submitting an Np buffer recommendation to

[6] extensive temp study ppt (report not posted to web)
[7] bc_fpb_typen_studies.pdf
[8] bc_fpb_typen_studies.pdf
[9] type_n_workgroup_review_final

the FPB. Little progress was made in the informal stages of DR, so the Conservation Caucus triggered stage 2 of DR in March 2022. Near the end of DR stage 1 Washington Forest Protection Association (WFPA) and Western Washington (WWA) Tribes submitted Np buffer proposals. Triangle Associates mediated DR stage 2 with a series of meetings held between April and July 2022. While consensus was not reached in DR, TFW Policy did narrow the number of Np buffer alternatives down to three, one of which there appears to be agreement on. The other two alternatives represent divergent interpretation of the appropriate resource protection standard applicable to study results, the spatial and temporal scope/magnitude of the problem represented by the technical information available, and therefore suitable policy responses. The large/small landowners and WSAC proposal is a reasonable response to a relatively small, temporary problem which has substantial complexity, along with follow on monitoring and adaptive management to increase confidence over time.

2- Large/Small Landowner and WSAC Np Buffer Recommendation Description

The large/small landowner and WSAC Np buffer recommendation is a two-component prescription for Western Washington (WWA) Np streams and includes a small landowner option. Unless otherwise specified, all existing Forest Practices Rules regarding timber harvest adjacent to Np streams apply.

Prescription A - Area Control: Type Np stream basins greater than 30 acres and 85% or more harvested over a five-year or less period require a 75-foot wide, two-sided, unmanaged continuous buffer from the confluence of a Type S of F water to the upper point of perennial flow (Exhibit 1, 2).

Prescription B - 1,000-foot Buffer: In all other circumstances, harvest adjacent to Type Np streams require a 75-foot wide, two-sided, unmanaged buffer for 500 feet upstream from the confluence of a Type S or F water and a 50-foot wide, two-sided, unmanaged buffer for the next 500 feet for a total of 1,000 feet. Landowners are encouraged to leave non-merchantable trees, understory, and shrubs within the 30-foot equipment limitation zone (ELZ) upstream of the no-cut buffered areas to the upper point of perennial flow (Exhibit 3, 4). Like the current rule, the objective is to provide a minimum of 50% buffering of the total Np stream length (inclusive of the 1000' of continuous buffer from F/N break). If an operating area is located more than 2,000 feet upstream from the confluence of a Type S or F stream and the Type Np stream is more than 2,000 feet in length, and if the 50% stream length buffered objective is not met by protecting sensitive sites, potentially unstable landforms, and/or other buffered leave areas, then additional 50-foot buffers are required to meet the objective of 50% of the Np stream length buffered.

Small Forest Landowner Option: The small forest landowner option is the same as prescription A and B above, except the buffer configuration is a 50-foot wide, two-sided buffer with the outer 25 feet manageable at the landowner's option. Small landowners who choose to manage within the outer 25 feet buffer may remove half the available volume in a "thin from above" approach (Exhibit 5).

Note, Exhibits 1 and 3 are not drawn to scale. Exhibits 2, 4, and 5 are drawn to scale to illustrate different buffering schemes on a 4-foot-wide Np stream.

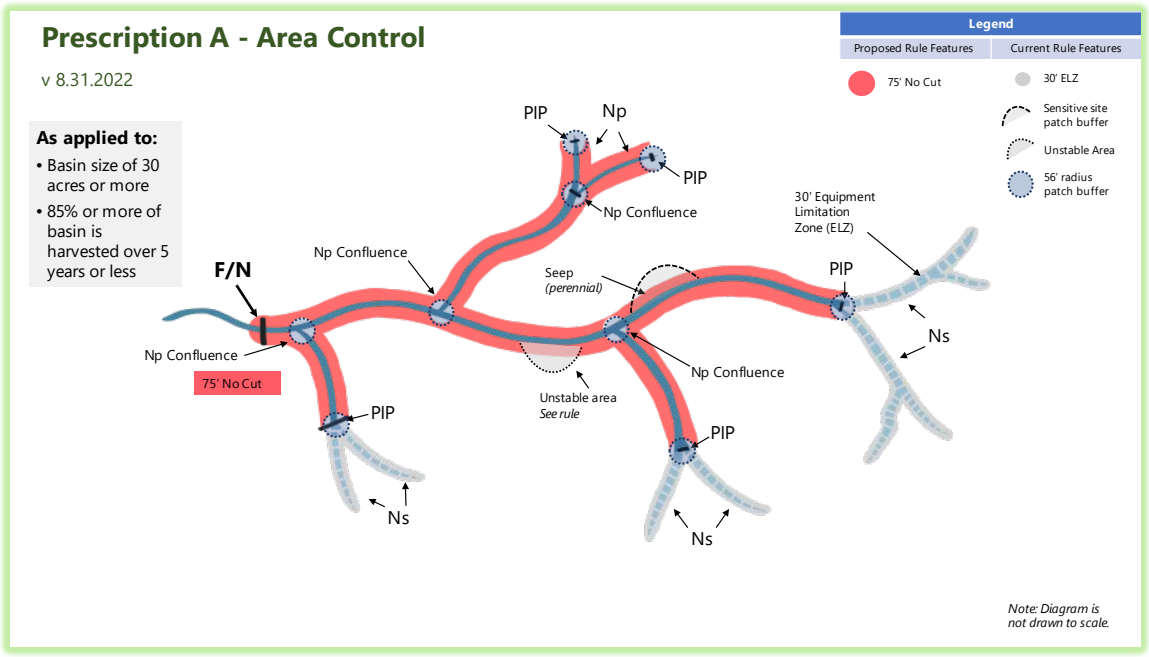

Exhibit 1. Prescription A, ≥85% Np basin harvest over 5-year or less time period. Not drawn to scale, does not represent an actual Np stream

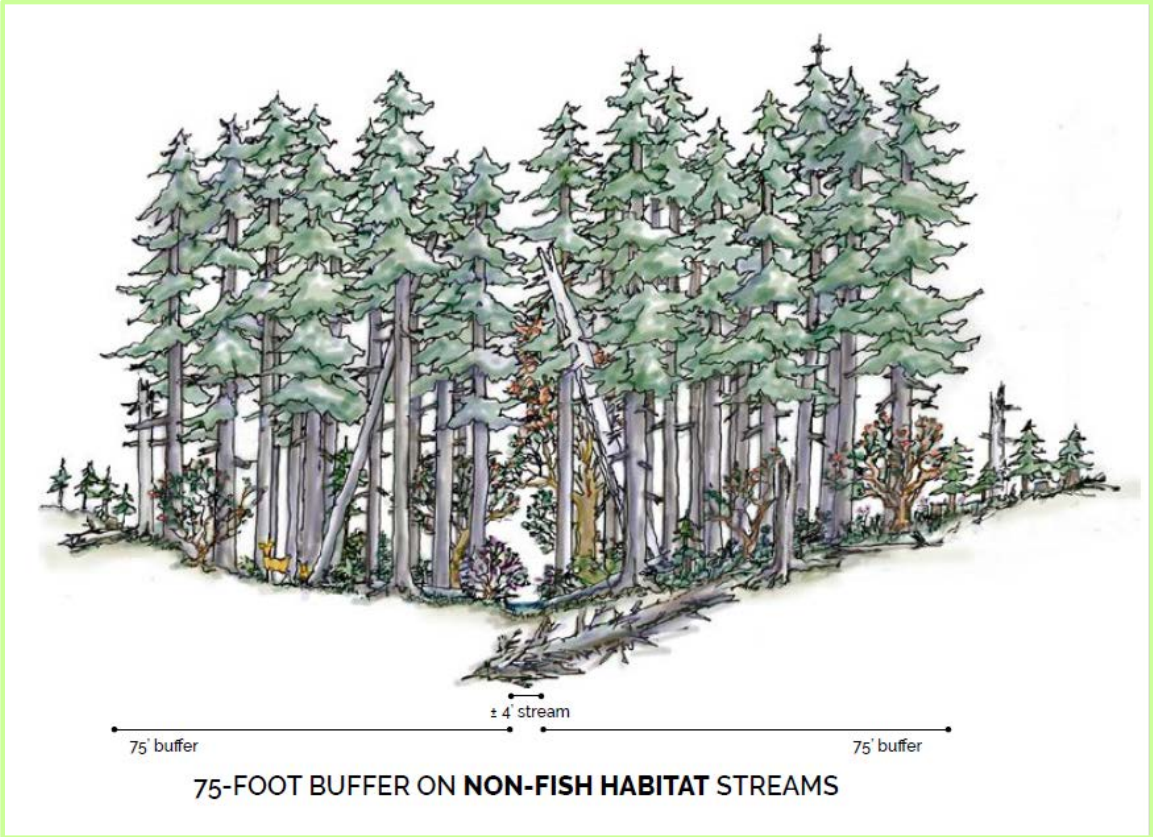

Exhibit 2. Profile view of 75-foot no-cut buffer. Drawn to scale, does not represent an actual Np stream

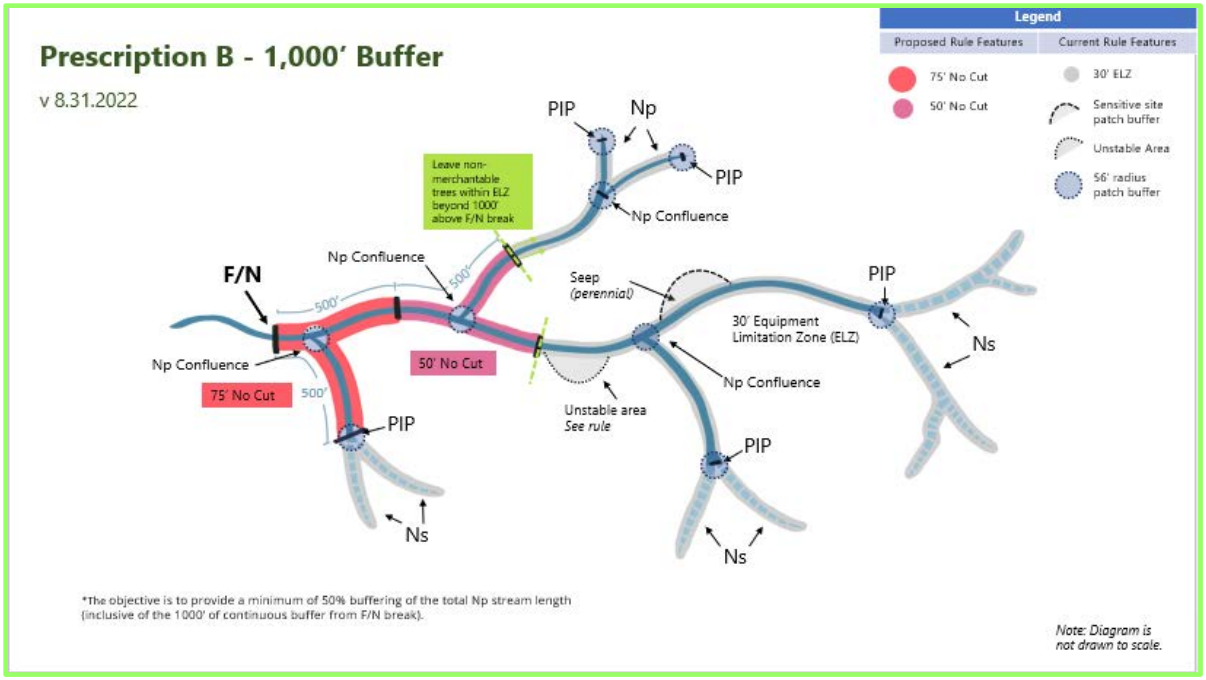

Exhibit 3. Prescription B, 1,000-foot buffer for all other harvest proposals adjacent to Np streams. Not drawn to scale, does not represent an actual Np stream

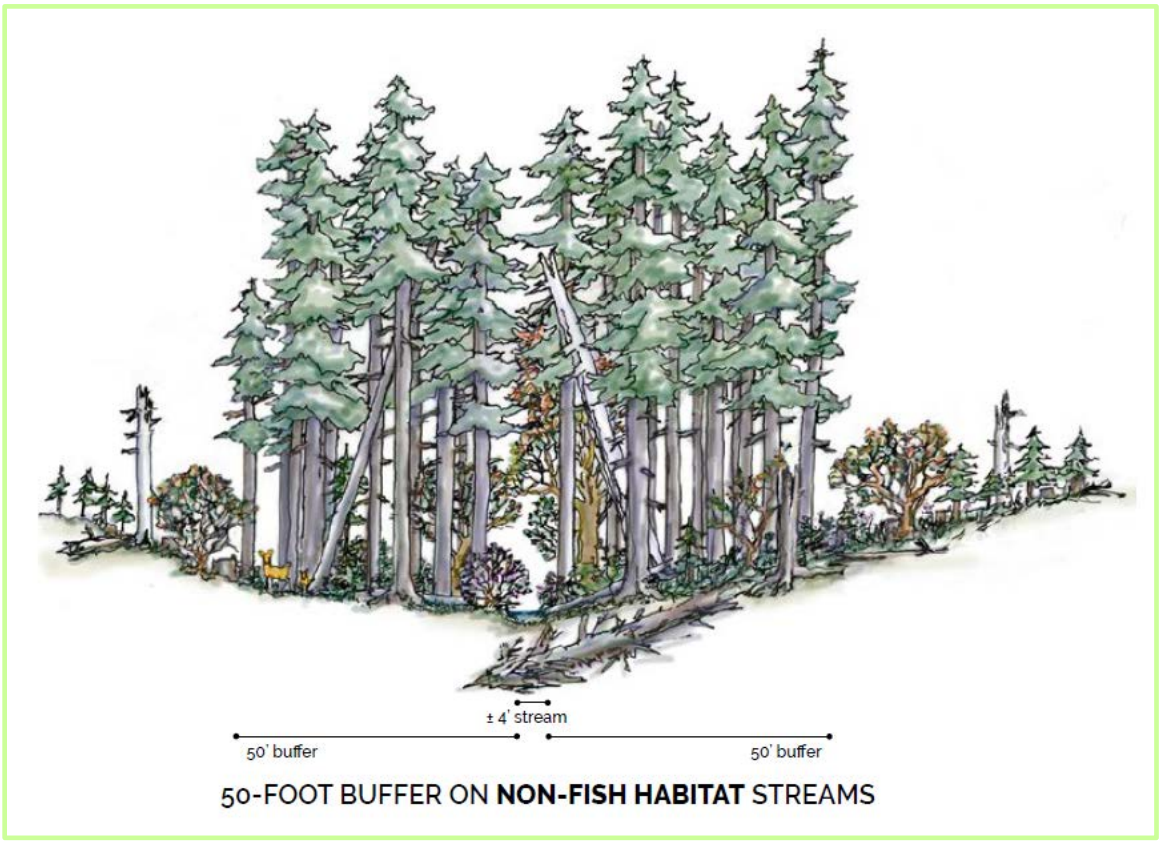

Exhibit 4. Profile view of 50-foot no-cut buffer. Drawn to scale, does not represent an actual Np stream

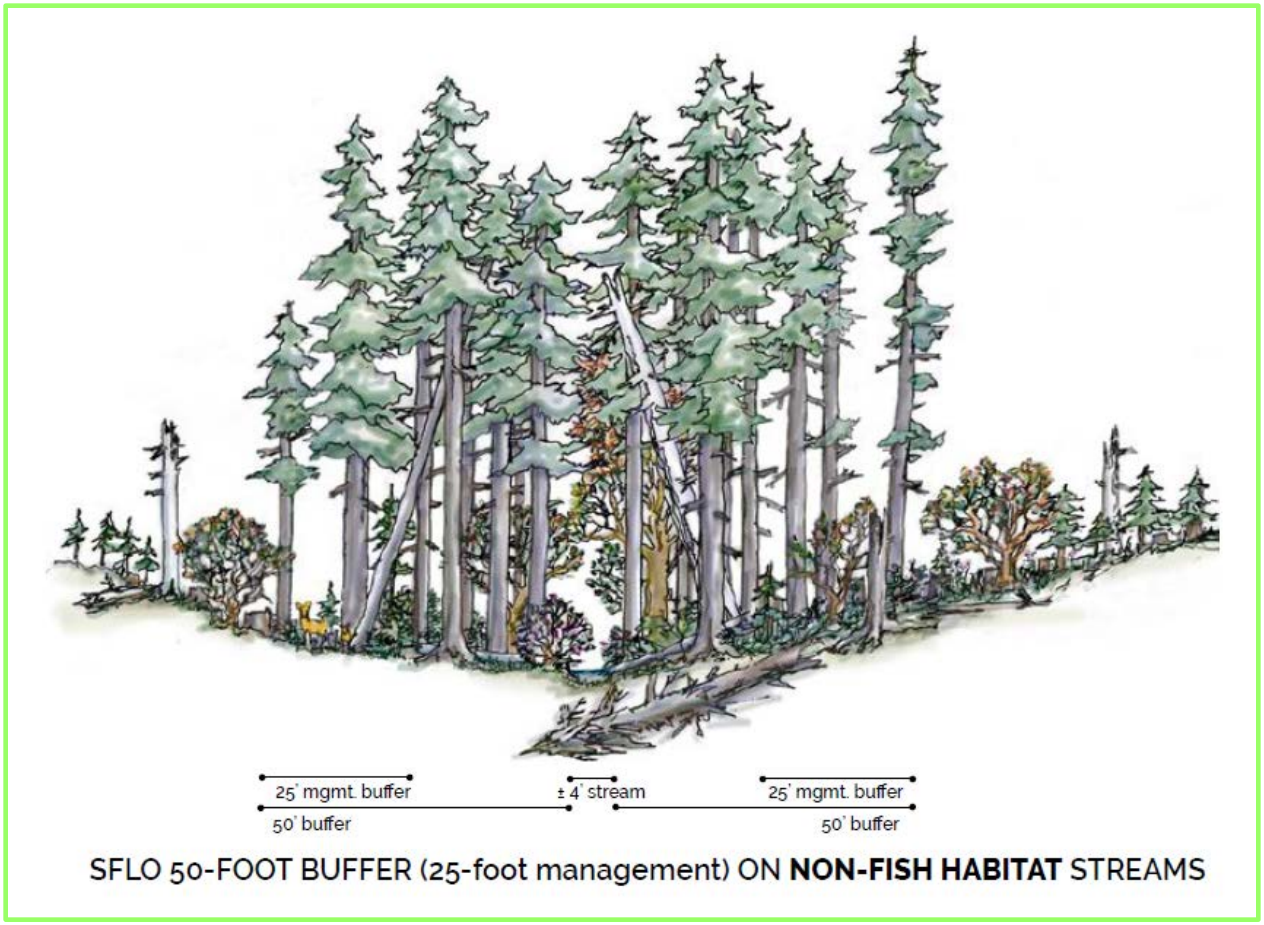

Exhibit 5. Profile view of 50-foot Small Forest Landowner managed buffer. Drawn to scale, does not represent an actual Np stream

Monitoring - The final component of this recommendation is a monitoring program. Monitoring of key aquatic resource inputs at multiple spatial and temporal scales was deemed critical to understanding the overall effectiveness of the Forests & Fish (F&F) rules. This research and monitoring framework was designed and agreed to by all parties in the early days of the formal Adaptive Management Program (AMP) yet has never been fully implemented 20+ years after adoption.[10] This is unacceptable to the landowner caucus, it should be to all caucuses, particularly the state agencies who have responsibility for implementing the Forest Practices Habitat Conservation Plan (FP HCP). We must make monitoring a priority. One of the key monitoring metrics is stream temperature, the current status of and if/how stream temperature regime distributions are changing across the landscape over time, and the intendant effect on the biology of covered species. Amazingly enough, we do not know very much about the answers to these questions 20+ years after F&F implementation. We should also have better landscape scale information on the extent of stream buffering and how those buffers are changing over time. Landowners attempted to get dialogue going about these issues and demonstrated how existing data sets can be used to begin investigating these important questions. Those requests were mostly rejected or ignored. Fortunately, over the last year TFW Policy was able to reach agreement that a monitoring program is

[10] MDT Rpt. Final 18 Jul 2002.doc

a good idea and recommended a budget allocation in the 2023-25 Master Project Schedule (MPS) to begin work. We will be looking to make considerable progress over the next year so that we can have a monitoring program in place prior to any new rules going into effect. We are also in need of more information on the biological effects and validation/refinement of performance targets, both of which can be addressed through intensive monitoring. Both Extensive Status and Trend and Intensive Cumulative Effects monitoring needs to be a priority in the AMP.

3- Rationale for Large/Small Landowner and WSAC Proposal

Prescription A responds directly to the treatments evaluated in Hardrock and Softrock studies, i.e., whole basin harvest of Np stream basins greater than 30 acres, by proposing continuous, wider buffers for activities which appear to have the greatest probability to result in a measurable temperature increase. Prescription B expands minimum buffer protection (length and width) for less intense harvest activities, i.e., less than whole basin harvest. In all cases, the proposed buffering approach results in more protection of Np streams across WWA while attempting to balance environmental benefits with operational and regulatory costs. Expanded buffering in Prescription B at least doubles the minimum buffer length over the current rule and widens the buffer lower in the Np stream network above the Type F/N stream break to ensure protection of stream temperature regimes consistent with the biological needs of fish. This component of the proposal also minimizes unintended consequences of increased operational shadows, orphaned timber due to overlapping buffers, and increased road/landing construction and stream crossings which tends to result from continuously buffering entire Np stream lengths in all situations. Finally, wider buffering immediately upstream of the Type F/N stream break provides a measure of risk mitigation for those situations where fish may occasionally move upstream seasonally or annually.

The small forest landowner option recognizes the disproportionate economic impact to small landowners from substantive regulatory changes. It also acknowledges small forest landowners tend to have smaller harvest units and harvest less often than large landowners. Incentivizing small forest landowners to remain on the landscape, managing their forests, should be a policy priority for the FPB and the State of Washington.

CMER Studies Reviewed by the Np Workgroup & TFW Policy

The AMP has completed approximately half of the Np stream studies identified in the 2020-21 Cooperative Monitoring, Evaluation and Research (CMER) workplan.[11] None of these studies were specifically designed to characterize temperature response to operational harvest practices as currently implemented under the current rules. While the Hardrock and Softrock studies were primary drivers in the TFW Policy response, a handful of other completed studies were also considered to varying degrees. These studies included the Hardrock Phase II study, Type N BCIF Study, the Amphibian Buffer/Shade Study, The Amphibian Genetics Study, and one round of Extensive Status/Trend Temperature Monitoring. Despite being far from complete with the Type N studies identified in the CMER workplan and very little effort specifically focused on characterizing the status and trend of stream temperature, the FPB is receiving a Policy response, primarily due to Ecology advocating for rule changes for Np stream buffers as a requirement to retain Clean Water Act Assurances.

[11] bc_fpb_cmerworkplan.pdf

Hardrock Phase I & II Study Results

The Hardrock study applied three Np stream buffer treatments: no buffer (0%), the current Forest Practices rule (FP), 50-feet wide for 50% of stream length, and a continuous 50-foot buffer (100%) and compared the treatments to unharvested reference sites. The current Forest Practices rules were applied to four study sites, but only three of the four FP treatments were used in the temperature evaluation due to the fourth having an incomplete data set. Even though the same Forest Practices Rules were applied at each site, the resulting buffer differed given site variability. One of the four treatment sites resulted in continuous or near continuous buffering from the F/N break to upper point of perennial flow, this site was not used in the temperature evaluation. The buffering was wider than the 50-foot minimum in some segments of some of the buffer treatments as well. These outcomes were primarily a result of applying potentially unstable landform and sensitive site protection. The initial average temperature change post-harvest across the three FP treatment sites was just over 1° C, similar to the 100% buffer alternative evaluated. All three FP treatments seven-day average daily maximum (7DADM) temperatures ranged from ~10° - 14° C both before and after treatment. This is ~2° - 6° C below the designated use temperature standard of 16° C applicable to most of these streams (Figure 1).

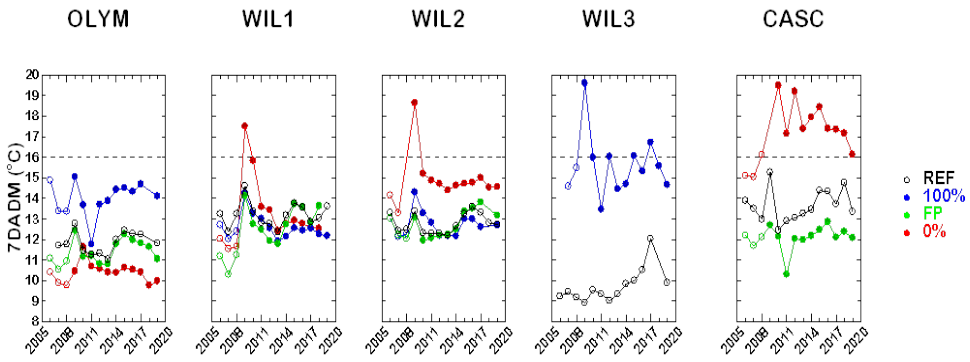

Figure 1. Hardrock treatment blocks showing none of the FP and only one 100% treatment exceeded 16° C designated use temperature standards (dashed line), range of variability in 7DADM over study period at reference sites was ~3 °C, from McIntyre et al., 2021

Hardrock Results Variable

Even though Np stream buffers with the same treatment looked different at different sites, the temperature data by treatment were combined and averaged in the reporting. While there is nothing inherently wrong with reporting results in this manner, it can obscure important site level details, particularly given the small sample size. For example, one of the three FP treatments in the Hardrock study had a considerably greater temperature response than the other two, an average of ~2+ °C across the nine-year post treatment period versus an average of less than ~1° C and less than ~0.5° C respectively for the other two treatment sites. The one FP treatment site with the greatest temperature response also experienced the greatest windthrow and had a gravel pit located just upslope from the upper point of perennial flow. While windthrow appeared to be a significant factor in canopy closure decreases at some sites, the degree to which these two factors combined affected the markedly different temperature response at the one FP treatment site is unclear. Reliably measuring small temperature changes in these highly variable systems is difficult, it requires a complex statistical procedure which approximates the change rather than directly measures it. Therefore, a change of ~0.8° C is what can be reliably detected (Pg. 4-73 Hardrock Phase II Report).

The degree of canopy closure remaining post-harvest was generally proportional to the degree of buffering of stream length. Also, the duration of temperature response measured at buffered sites tended to correspond proportionally to the degree of buffering, i.e., more continuously buffered sites tended to recover to pre harvest temperature sooner than others. For example, the 100% buffered sites began to recover by year two, whereas the FP buffered sites began to recover in year three. The FP sites' temperature went back up at year six before recovering again by year eight and nine. The 0% buffer treatments gradually recovered to pre harvest temperatures by year ten (Figure 2). The temperature recovery pattern at the FP sites is somewhat odd and inconsistent with the other Hardrock and Softrock treatments as well as published literature. This may reflect the lack of sufficient sample size necessary to consistently demonstrate a temperature response and/or other unknown site level factors having an influence. There was a weak relationship between degree of canopy closure and magnitude of temperature response, but the temperature response was inconsistent and had considerable variability. For example, in five of nine years the temperature response confidence interval at the FP treatment sites included 0.3° C (Figure 2), and as canopy closure recovered to ~80% or more, there was approximately an equal likelihood of being above and below a 0.3° C mean monthly temperature change in July (Figure 3). For reference, mature riparian stands with old growth like characteristics which tend to have high biological productivity exhibit canopy closure of ~75 - 85% which includes open gaps due to disturbance events. Reference sites used in the Hardrock (and Softrock) study had pre harvest canopy closure of ~95%. Streams with continuous, dense, stem-excluded riparian stand conditions are generally cold and dark with relatively low primary production (Kaylor & Warren, 2017). These are

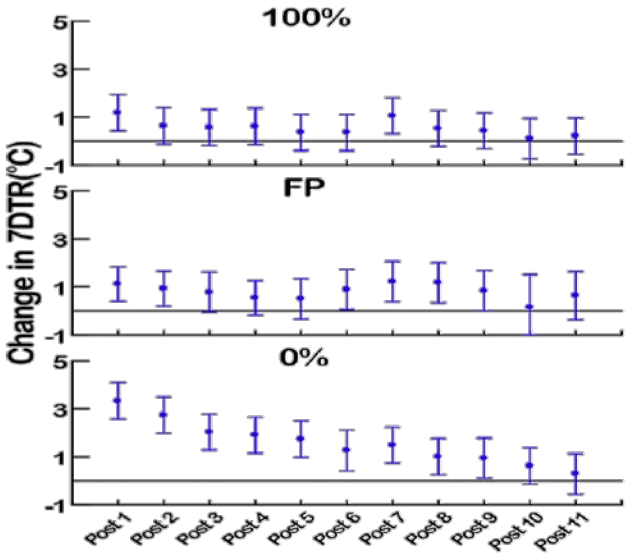

Figure 2. Hardrock average temperature recovered by year 2-3 at 100% buffered sites, year 4-5 and 9-10 at FP and 0% sites, from McIntyre et al., 2021.

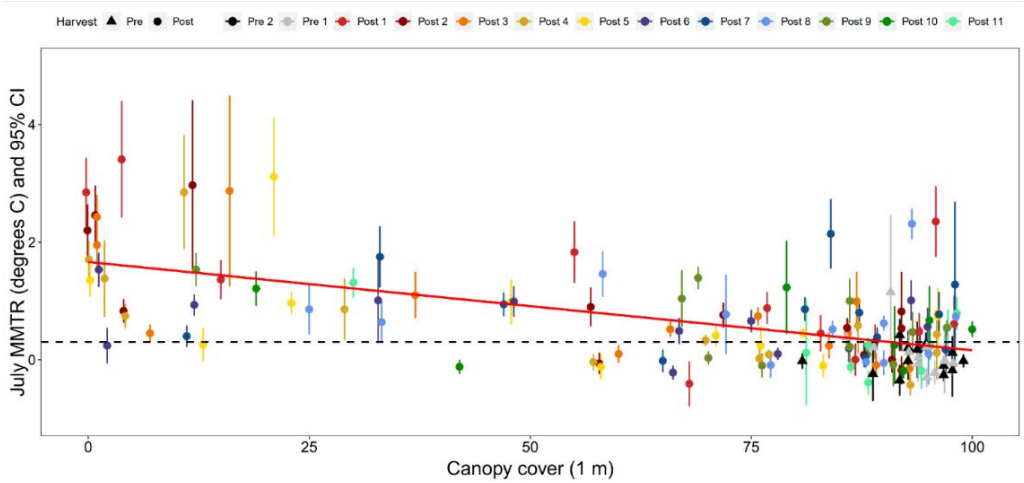

Figure 3. Hardrock canopy closure/temperature response across all treatment sites for all years, relationship highly variable, similar number of high canopy closure observations above and below 0.3 °C (dashed line).

not the desired future riparian conditions and arguably not what we should be using as a reference target. Mature riparian stand conditions are generally what we are aiming for, yet our reference sites are representative of ~50-year-old stand conditions where shade is typically much higher than would be afforded by older stands. Aquatic species need both functional habitat conditions and proper nutrition to survive and thrive, focusing only on one or two components while ignoring the others will likely inhibit progress towards the overall FP HCP goals.

Hardrock and Softrock FP Treatments Below 16º C Designated Use Standard for Fish Streams

The lack of specific performance targets, other than for temperature, precluded definitive conclusions about other important resources. Temperature response post-harvest and amphibian abundance changes measured eight to nine years post-harvest are the two primary areas of

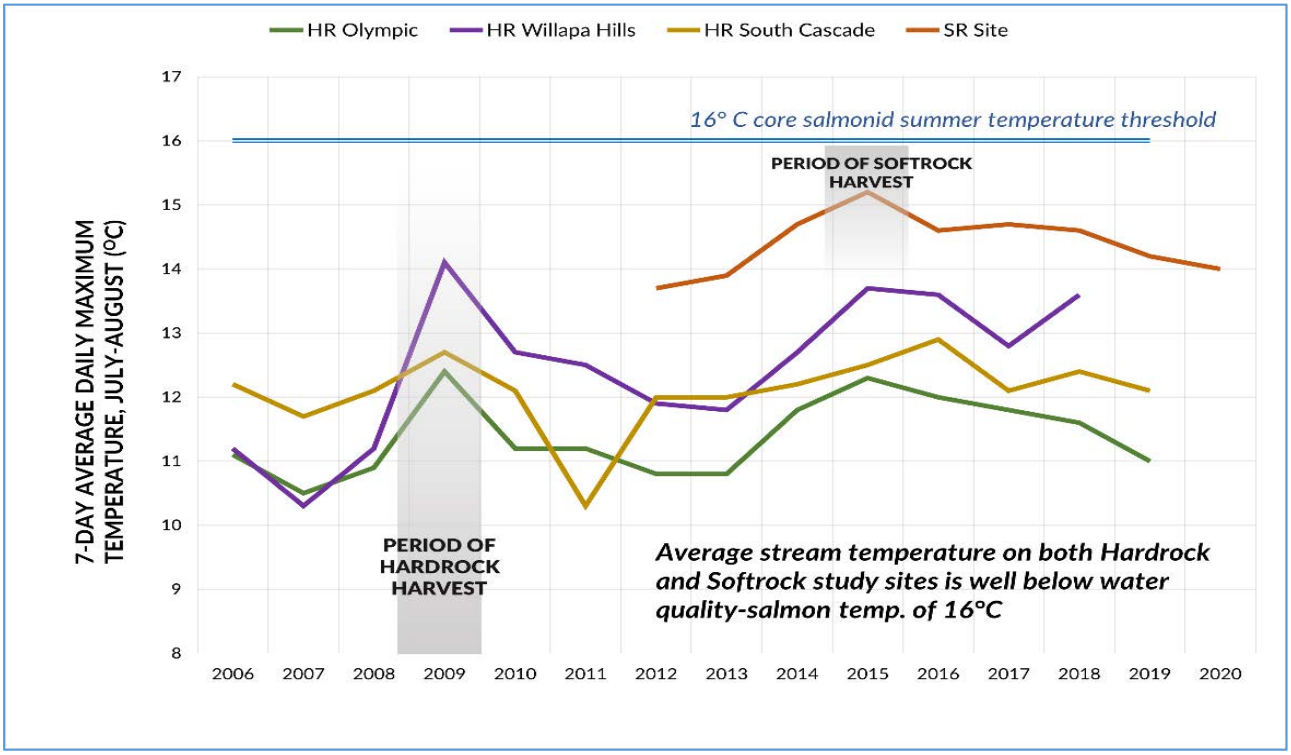

Figure 4. Hardrock and Softrock 7DADM temperature pre- and post-harvest

concern. While there has been great focus on the measurable change temperature standard of greater than 0.3° C, there has been little to no acknowledgement that most Hardrock (and Softrock) treatment sites were well below the 16° C designated use temperature standard both before and after harvest (Figure 4). All FP treatment sites in the Hardrock (and most Softrock sites) study were below this standard. This is great news. Having a measure of confidence, the Forest Practices Rules appear to be protective of temperature regimes in non-fish bearing waters for downstream fish habitat should be celebrated. Unfortunately, this information gets lost in the concerns about the Forest Practices rules "not protecting water quality" when evaluated against an unnecessarily precautionary and inconsistently applied antidegradation standard, when we should actually be delighted with the fact that it appears we do not have a fish or amphibian temperature problem. Of course, given the limitations of the Type N studies, additional research and monitoring is recommended to increase our understanding of public resource protection strategies and apply further adaptive management as appropriate.

Extensive Riparian Status & Trends Temperature Monitoring Results

Another important piece of information learned is that applying the Forest Practices Rules often results in more than the minimum of a 50-foot buffer for 50% of the stream length. This finding from the Hardrock (and Softrock) study is also supported by results from the one and only round of Extensive Temperature Monitoring in WWA Np streams. Results from the monitoring indicated WWA Np streams are well shaded on average with a mean and median canopy closure of 82% and 93% across 55 randomly selected sites respectively (Figure 5). The average temperature across all sites was ~15° C, below the 16° C designated use temperature standard for most fish streams. While most of the Np stream monitoring sites were well below 16 °C, approximately 8 sites were above, some substantially so. These same sites varied in canopy closure from a low of 28% to a high of 99% and averaged 70%. These results suggest there is more buffering of Np streams than conventional wisdom assumes, and stream temperature may not simply be a function of shade levels. Heterogeneity in timber age class, variable timing, and location of harvest adjacent to Np streams and operational feasibility considerations likely all contribute to high shade levels on any given Np stream at any given moment. Of course, other temperature standards apply to forestland subject to the Forest Practices Rules. While the 16° C standard is the most geographically common designated use standard, both cooler and warmer standards apply to specific areas. There are also seasonal spawning and rearing standards which apply to particular fish stream segments. The AMP needs a robust and ongoing monitoring program to provide a spatial context for riparian functions/conditions which is necessary for assessing the transferability of the information in hand.

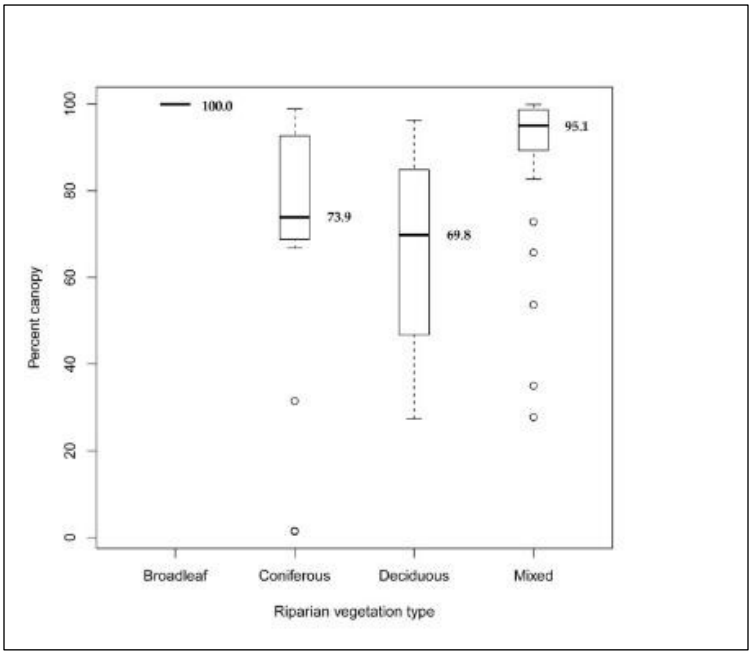

Figure 5. Riparian canopy closure by category of vegetation encountered along 55 Np stream study reaches in WWA, mean across all sites = 82%, median= 93%, from Ecology, 2019

Softrock Study Results

The Softrock study did not evaluate an alternative treatment to the Forest Practices Rules. One unharvested reference site was paired with six Forest Practices treatment sites, four of which had near continuous buffers due to potentially unstable landforms and sensitive site buffers. One other reference site was compared with one treatment for a total of seven treatments. Pre to post treatment temperature patterns were similar to the Hardrock study. However, 7DADM temperature was slightly higher than Hardrock study sites, ~14° C vs. 12° C, and July mean monthly temperature responses post treatment were less, ~0.5° C in the first three years after harvest versus ~1° C for Hardrock buffered sites. Again, most sites were below the 16° C designated use temperature standard applicable to the study streams both pre- and post-harvest (Figure 6). Recovery to estimated pre harvest temperatures occurred sooner at the Softrock treatment sites, beginning in year three and fully recovered by year five (Figure 7).

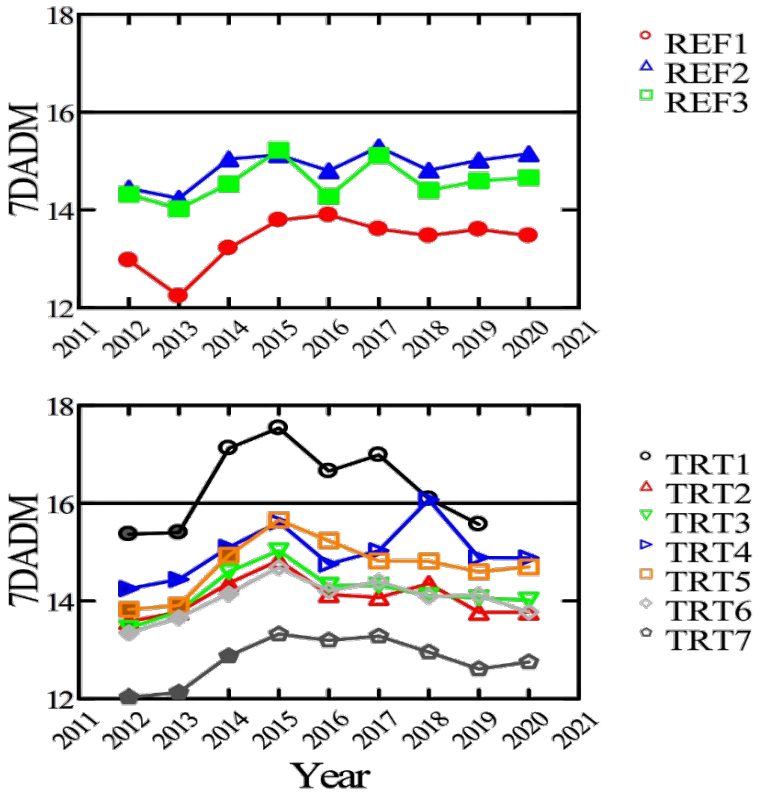

Figure 6. Softrock treatment sites for all years, designated use temperature standards mostly met, range of variability in 7DADM over study period for reference sites was ~2 °C, from Ehinger et al., 2021

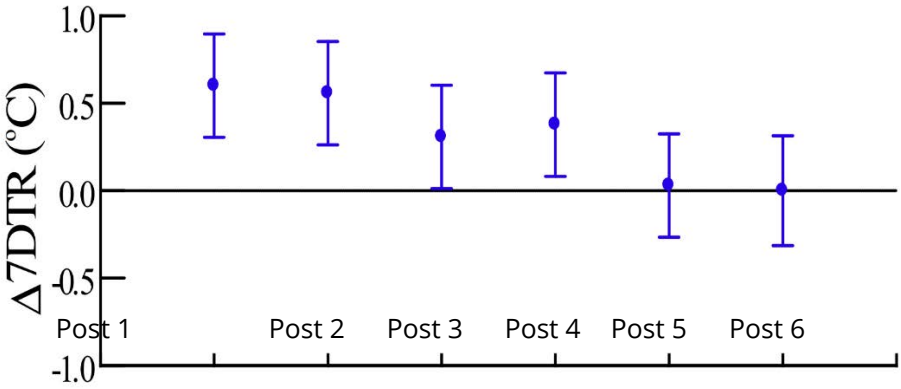

Figure 7. Softrock temperature recovery, post-harvest change in mean July 7day average temperature response by year, average temperature fully recovered by year 5, from Ehinger et al., 2021

Amphibian Buffer/Shade Study Results

The Amphibian Buffer/Shade Study directly manipulated riparian canopy to achieve specific shade targets and measured biological response of amphibians in treatment reaches. The intermediate shade treatment of 72% canopy cover resulted in small temperature changes, although not significantly different than reference sites, and more neutral to positive biological responses than greater or lesser canopy closure (Figure 8). These results are similar to other studies which have manipulated riparian cover to increase light levels in dense 2nd and 3rd growth riparian stands and measured a corresponding increase in biological productivity in the near term (Kiffney et al. 2004,

Kaylor & Warren 2017). Unfortunately, this study did not get much attention within the AMP because it did not evaluate a specific rule prescription. Rather than prioritize learning and applying that learning through ongoing adaptive management, the AMP tends to focus attention only on those studies which could be used to promote rule changes to increase protection standards regardless of the biological effect.

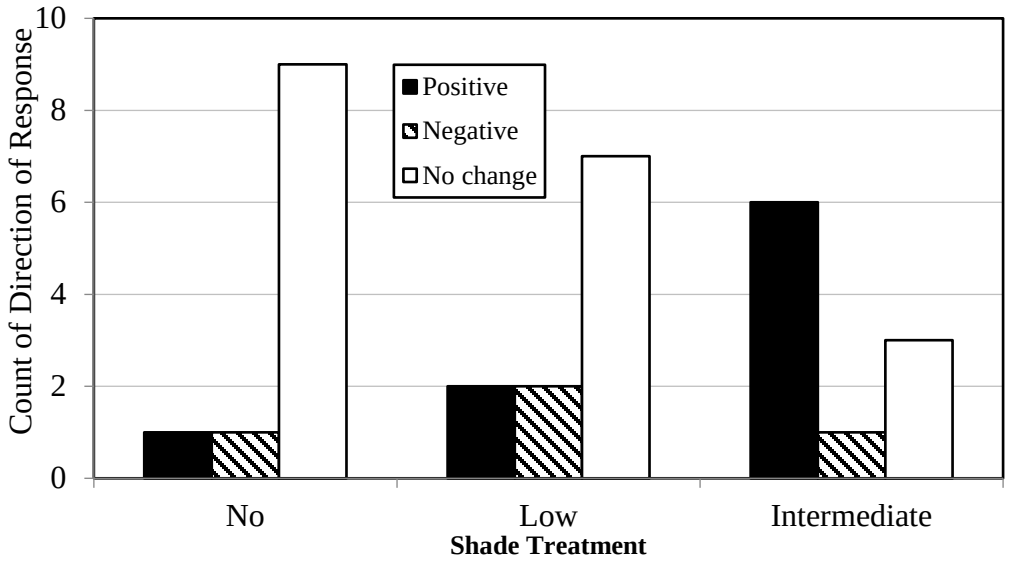

Figure 8. Amphibian abundance & body condition post treatment, from McCracken et al., 2018

Amphibian Genetics Study Results and Proposed Hardrock Phase III

The Amphibian Genetics study assessed the genetic response of stream-associated amphibian species at the Hardrock study sites seven to eight years post-harvest. Although some minor pre to post and between treatment differences were found, there was not clear evidence of a change in genetic diversity due to timber harvest and alternative riparian buffer treatments. The authors of the study rightly caution against applying results too broadly and recommend follow up monitoring post generational turnover of amphibian species of interest. TFW Policy recommended and the FPB approved this and next biennium's MPS which contains funding for Hardrock Phase III, a follow-up evaluation of amphibian abundance/density at several treatment sites 15+ years post-harvest. This study should reduce uncertainty about longer term effects to amphibian species of interest; however, applying study findings may be complicated by Np stream buffer rules changing prior to the study being completed.

Landscape Scale Status/Trend and Watershed Scale Cumulative Effects Monitoring Needed

There has been much speculation about downstream cumulative effects and the potential effects of climate change on stream temperature, and these possibilities have been used as rationale for wider continuous buffers on Np streams. However, the AMP has done little to no work on either of these topics. Having a robust landscape scale status/trend and watershed scale cumulative effects monitoring program would greatly assist our understanding of these potential issues, and we are hopeful the recent approval of funding for Extensive Monitoring will translate into tangible progress over the coming months.

WFPA GIS Analysis & AMP Proposal Initiation to Evaluate Hardrock/Softrock Site Selection Criterion

In February 2021 WFPA submitted a proposal initiation (PI) related to the site selection criterion used in the Hardrock and Softrock studies of Np basins of 30 acres or greater harvested in a single entry. The ability to infer a temperature response from the Type N study results across the broader managed forest landscape requires a sufficient sample size and a representative sample of harvest lay-out configurations to be evaluated. We had questions about the frequency of full-basin harvest activity as required in the Type N studies to be operationally applied in WWA, and how this site selection criterion influenced the pool of available treatment sites. How sites were selected, and experimental treatments were applied may result in bias that could affect inference space associated with study results. The Type N study authors acknowledged that treatments were applied to maximize the likelihood of detecting a response rather than a representative sample of how rules are implemented operationally (McIntyre et al., 2018, Pg. 2-10).

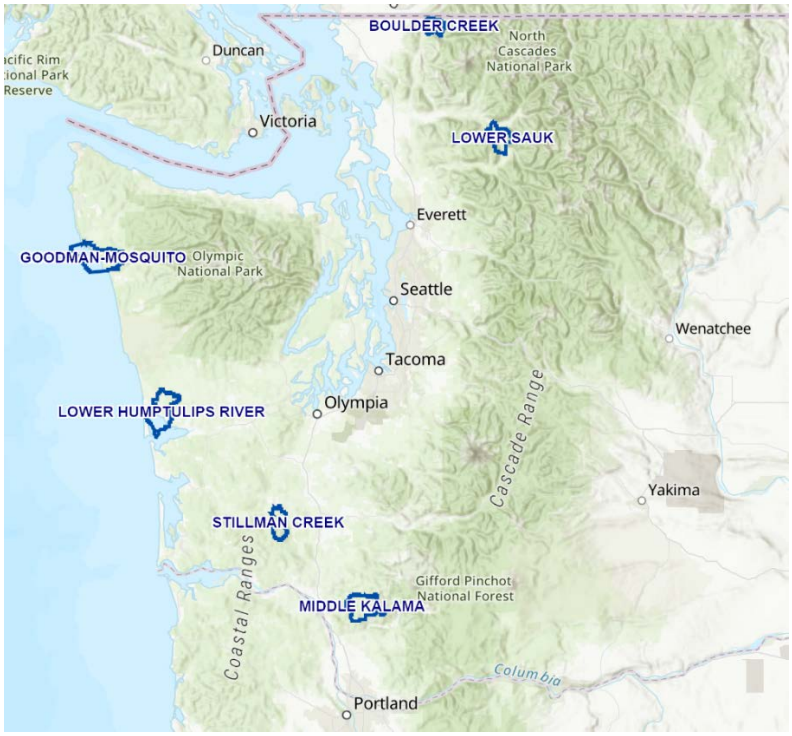

Figure 9. WFPA Focal Watershed Administrative Units outlined in blue

In response to this question WFPA examined several Np basins in WWA which met the acreage criteria and piloted a GIS technique for calculating proportion of basin harvested over time, called Focal Watersheds. Our pilot effort indicated the GIS technique would likely be suitable to answer the full basin harvest question and that the frequency of harvest meeting the Type N Study requirements may be low. Given these findings, we thought the AMP would find the information interesting and useful to inform the deliberation about proposed Np buffer changes. We were wrong. Our PI was first rejected by the Adaptive Management Program Administrator[12] and a majority of TFW Policy voted to not accept it[13]. We opted to conduct a broader investigation independently while the TFW Policy DR process over our PI occurred. After several months of DR, both informal and formal, it became clear there was little interest in a substantive discussion about the questions we had and the information we had gathered to inform the questions, so WFPA withdrew the dispute.

[12] bc_tfw_policy_wfpa_basin_analysis_pi_ampa_assessment.pdf

[13] bc_tfw_policy_may_meeting_minutes.pdf

The focal watersheds GIS tool we developed for the PI analysis has been populated with a variety of datasets in six geographically dispersed WWA watershed administrative units (WAU) which allows us to evaluate different stream buffering scenarios and harvest patterns over time (Figure 9 above). We evaluated how often 30+ acre Np basins occur in WWA and how often they are harvested in a single entry and over time. We evaluated more than 900 Np basins and found that 80 - 100% harvests in Np basins between 30 - 120 acres are not frequent, even over five to ten years it is infrequent. We found fewer than 15 basins (1.4%) of 30 - 120 acres or greater being included in a single Forest Practices Application over this time period (Figure 10).

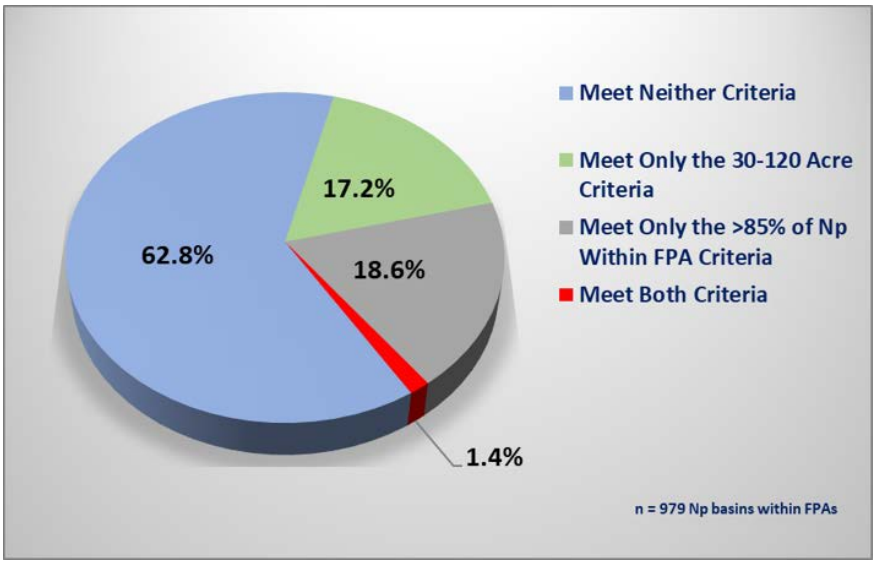

Figure 10. Proportion of 30–120-acre Np basins in FPAs with >85% harvested, 2010-2020

Probability Versus Non-Probability Sampling

The Hardrock and Softrock study sites were selected through purposeful sampling with specific site selection criteria. Approximately 36,000 Np basins were screened in order to find just 17 - 18 hardrock sites which met all the selection criteria (Page 2-11, Hardrock Phase I report). Once a pool of sites was chosen which met the numerous criteria, random assignment to treatments then occurred. While desirable in a before/after control impact (BACI) style study, where the focus is on maximizing likelihood of detecting a difference across treatments, purposeful sampling limits inference due to uncertainty of fit within the population of interest (Figure 11). Furthermore, the BACI approach reflects a scenario that the Type Np buffer rules were applied to every acre at once. We know that this does not occur because the landscape comprises multiple age classes and other constraints of green-up and harvest size. Type Np streams frequently define the border of harvest units, splitting Type N basins into multiple sub-basins that are not harvested in a single operational entry. As noted in the findings reports, these considerations can change the inference implications of the results.

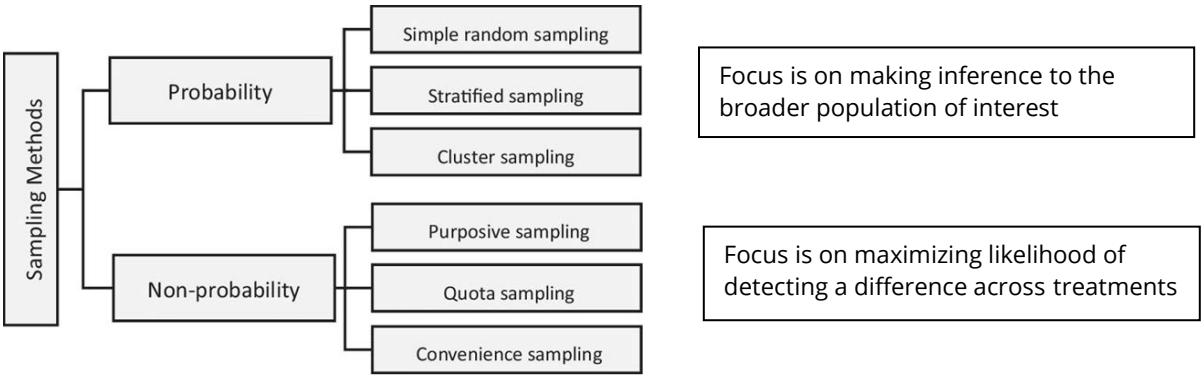

Figure 11. The use of sampling methods in advertising research: a gap between theory and practice. International Journal of Advertising, from Sarstedt et al. 2017.

WFPA GIS Analysis of Np Stream Length

Some caucuses expressed concern about Prescription B of the landowner proposal which caps total buffer length at 1,000 feet unless the Np stream is more than 2,000 feet long. Again, Prescription B is for less intense harvest activities where only a portion of Np stream length or basin area are harvested, versus the entire basin harvested in a single entry. Landowners were interested in the distribution of Np stream lengths and how Hardrock and Softrock study streams fit within it. We evaluated more than 2,200 Np streams in the six focal WWA watersheds, the mean length was ~1,217 feet, and the median was ~503 feet with a range of ~15 feet - 95,000 feet. There are some very long Np streams, particularly in NW Region; however, approximately 70% of the more than 2,200 Np streams evaluated are 1,000 feet or less in length, approximately 85% are 2,000 feet or less (Figure 12). Mean and median stream lengths in the Hardrock and Softrock study were approximately 3,580 feet and 3,245 feet respectively, which occurred in ~2% of WFPA's focal watershed streams. We have also found that longer Np streams tend to have adjacent harvest patterns of only a segment at a time or only on one side of the stream; this was noted in both the Hardrock and Softrock findings report as lessening the impact to shade and stream temperature to an unknown degree. Many of the very long Np streams in NW Region tend to have continuous buffers post-harvest due to the prevalence of potentially unstable landforms within or adjacent to the stream channel. While our analysis of Np streams is also not from a random sample, the large sample size over a broad area in WWA along with the results suggests further evaluation of the Np stream population is needed.

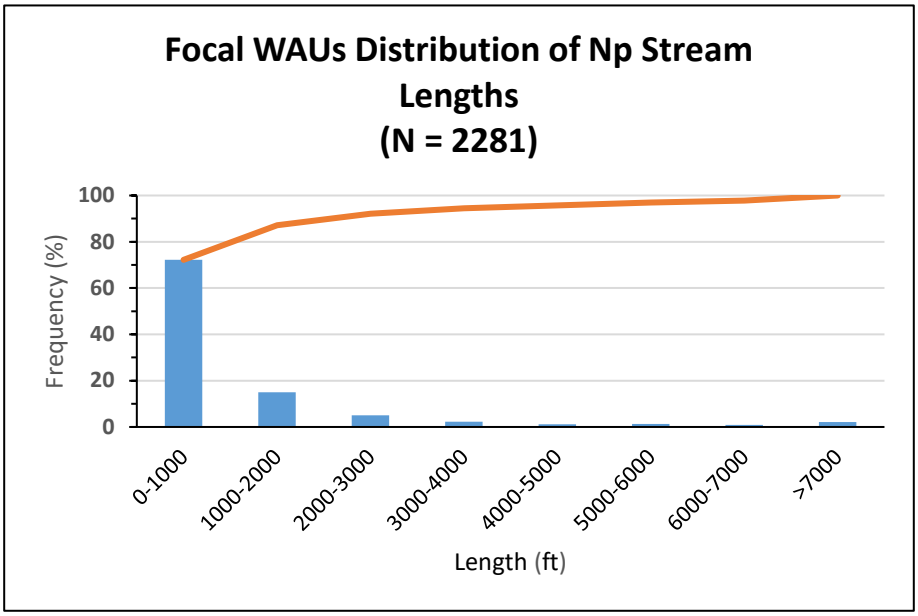

Figure 12. Np stream length distribution in six WWA WAUs

WFPA and Np Workgroup Recommend Examining Routine Harvest Practices

Both the Hardrock and Softrock studies reports explain the whole basin harvest site selection constraint as necessary to increase the probability of detecting treatment effects. While necessary in a BACI style study, this creates a study bias with an uncertain extent. While the treatments implemented in the Hardrock and Softrock studies may have been legitimate on paper, our GIS evaluation suggests they represent the extreme tail of the range of operational harvest practices and are uncommon in real world harvest operations. In an Oregon study of headwater streams, Bladon et al. (2018) found the greatest stream temperature responses to forest harvesting were in basins with a higher proportion of area harvested and were underlain by less permeable lithologies (i.e., hardrock). In practice, harvest units rarely encompass entire Np basins. Streams, property lines and roads often form a harvest unit boundary. Additionally, Np basins may comprise more than one age class which dictates merchantability and harvest rates. While many TFW Policy representatives were uninterested in these potential issues, we strongly believe they need evaluation before a

conclusion of widespread violation of the antidegradation standard is drawn. The final Np Workgroup Report (2021) commissioned by TFW Policy provides recommendations in the Uncertainties and Future Directions sections of the report about examination of the effects of representative real-world harvests on aquatic resources rather than experimental study treatments of entire watersheds as necessary to understand landscape scale harvest patterns and prescription effectiveness. We are hopeful the FPB will take them seriously and direct TFW Policy to take them up in the near future.

Drawing attention to these issues is not intended to be critical of the Hardrock or Softrock study, rather to emphasize important details to consider when interpreting the information and designing appropriate policy responses. It is also important to keep in mind a prescription scale experimental study must limit the number of samples to minimize confounding effects, which trades off spatial scope of inference. The Monitoring Design Team (2002) sample size estimate to reliably detect a ~1° C temperature change given background variability was more than 100 sites, 250 sites (50/year) were recommended as a good tradeoff between reliably estimating status and detecting trends in stream temperature.

Relevant Non-CMER Science

Research on stream temperature effects associated with timber harvest by Bladon et al. (2018) found that temperature increases upstream did not transfer downstream post-harvest (Figure 13).

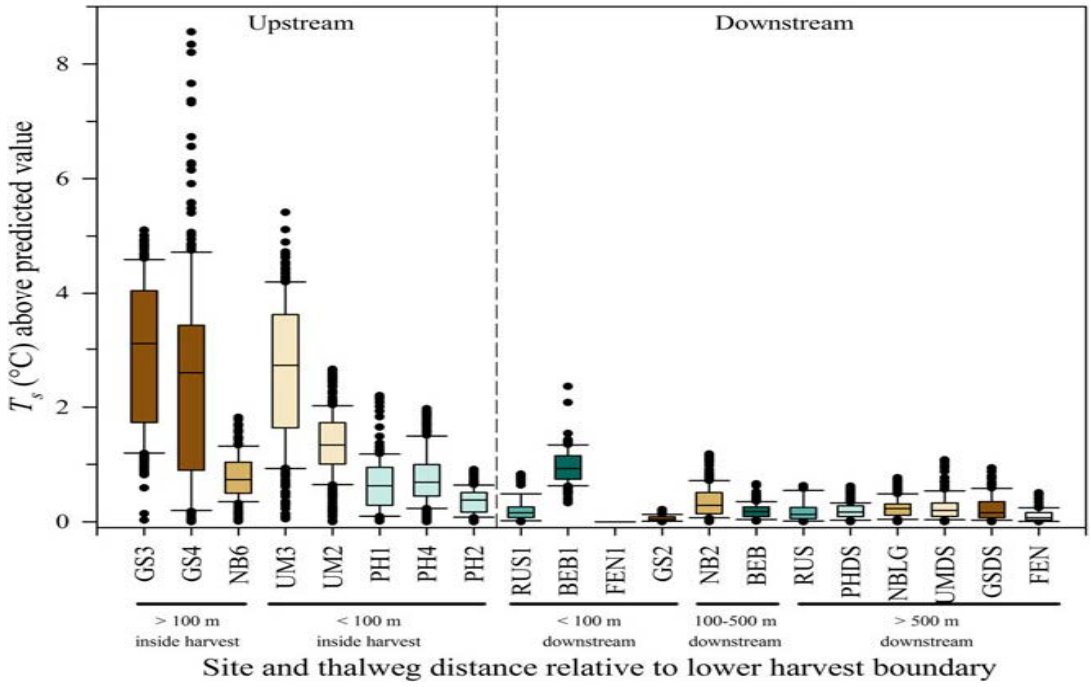

Figure 13. Downstream cooling associated with upstream harvest, from Bladon et al. 2018

Similarly, Gravelle and Link (2007) observed no significant increase in water temperature at downstream fish-bearing sites regardless of temperature increases of ~3+ °C in the directly impacted non-fish-bearing reaches upstream. Others have considered alternative ways to consider stream temperature data which is more meaningful to fish and other aquatic life. Most aquatic

organisms are tolerant of short-term increases and decreases in temperature within the natural range of variation, and duration of exposure can be a much more important factor on growth and survival (Np Workgroup, 2021). Reiter et al. (2020) compared summer season stream temperature distribution pre- and post-harvest between 15 meter wide buffered and reference sites and found little to no difference. Comparing stream temperature distribution during the summer growth period to the optimal temperature range for target fish or amphibian species (i.e., estimate percentage of temperature distribution within optimal growth range) is a useful approach to understanding potential biological effects (Reiter et al. 2020). WFPA provided an example to TFW Policy of how this could be done with temperature data from one of the Hardrock study sites (Figure 14). Unfortunately, there was no interest in conducting such an evaluation. However, TFW Policy should recognize that evaluating stream buffer effectiveness with temperature thresholds which do not consider natural cycles at multiple scales may be misguided. One option to address environmental variability is to identify regime-based standards describing desirable distributions of temperature conditions over space and time (Poole et al., 2004). Implementation of temperature regimes poses a challenge for managers, as they would need to identify and validate suitable temperature distributions across a variable landscape. However, if we are interested in achieving improved aquatic habitat for covered species, shifting our management focus from threshold-based targets to maintaining key ecological processes is recommended (Poole et al., 2004; Reeves et al, 2020).

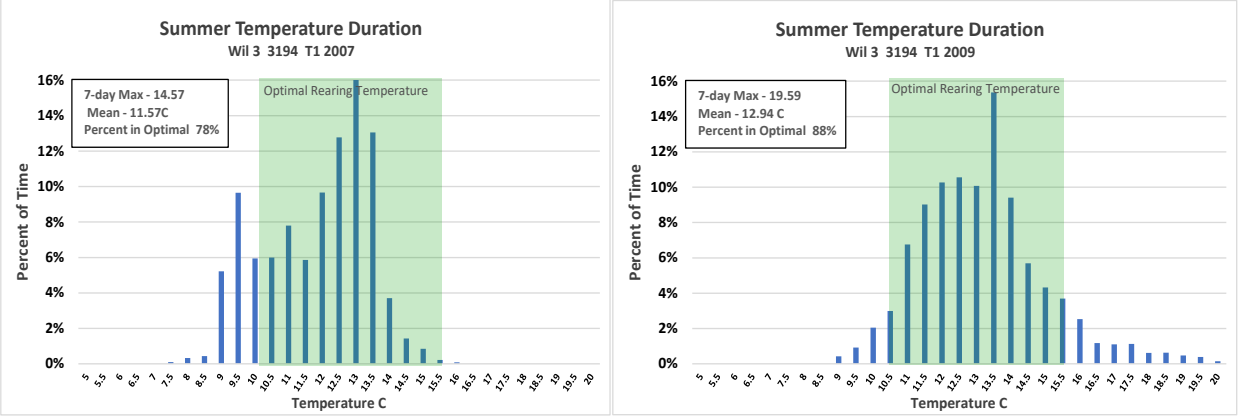

Figure 14. Hardrock Willapa 3 treatment site, duration of summer temperature regime in optimal range

In a BACI style study of different riparian buffer designs on small, headwaters streams in WA, Janisch et al. (2012) found temperature responses were highly variable. Stream shade level was not a strong predictor of stream temperature response. Other factors such as length of flowing water upstream of instrument locations, surface area of stream adjacent wetlands, and stream sediment texture appeared to be more strongly associated with temperature response. Janisch et al. concluded this raises the possibility that some headwater streams are thermally responsive to riparian management, and some are not. In a systematic evidence review of more than 20 studies in the Pacific Northwest, Martin et al. (2021) evaluated the effectiveness of buffering headwater streams to maintain stream temperature and amphibian populations. The review indicated substantial variability in temperature response to buffers, so much so that trends between summer stream temperature and buffer width were obscured. The review also indicated temperature response may be associated with factors other than shade retention post-harvest (geology, hydrology, topography, latitude, stream azimuth). The relationship between amphibian responses and post-harvest buffers

was mixed, with no strong evidence supporting positive population responses with larger buffers. Factors explaining variation in amphibian population responses were unclear. Martin et al. recommended future study should focus on alternative buffer treatments tailored to site and landscape characteristics. Uniform buffer prescriptions (i.e., one size fits all) to achieve a desired temperature threshold target are questionable given high spatial and temporal variability within and among watersheds.

4- Conclusion

Large/small landowners and WSAC recommends the FPB consider a two-component proposal for WWA Np stream buffer rulemaking. Prescription A (Area Control) is a 75-foot wide two-sided, continuous buffer and applies to harvest of 85% or more of an Np basin greater than 30 acres over a five-year or less period. This component of the proposal responds directly to the treatments evaluated in the Hardrock and Softrock studies, which indicated a temperature change of ~0.5° - 1.0° C was detectable for 3 - 9 years post-harvest. Prescription B (1,000-foot Buffer) is a 75-foot wide, two-sided buffer for 500 feet upstream from the confluence of a Type S or F water and a 50-foot wide, two-sided buffer for the next 500 feet for a total of 1,000 feet. Landowners are encouraged to leave non-merchantable trees, understory, and shrubs within the ELZ upstream of the no-cut buffered areas to the upper point of perennial flow. If an operating area is located more than 2,000 feet upstream from the confluence of a Type S or F Water and the Type Np Water is more than 2,000 feet in length, then additional stream length is buffered so the total buffer length is at least 50% of the total stream length. Prescription B doubles the minimum buffer length compared to the current rule and expands buffer width by 25 feet for 500 feet above the Type F/N break. This proposal also includes an ongoing, robust landscape and watershed scale monitoring program, prioritizing status and trend of stream temperature and riparian stand characteristics.

This proposal is fit to the technical information the AMP has accumulated relative to Np stream temperature conditions, both background and in response to different management treatments. Our understanding is that temperature in most Np streams is below the most geographically common designated use standard of 16° C both before and after harvest. Additionally, the range of variability in unharvested streams can be ~3+ °C, and some headwater streams are thermally responsive to riparian management, and some are not. The two primary studies driving the policy deliberation are the Hardrock and Softrock studies, both of which evaluated an extreme example of harvest activities in WWA designed to maximize detection of treatment effects. While the treatments were legitimate on paper, there was no attempt to validate the frequency of actual occurrence, investigate if routine harvest operations produce similar temperature results, and if the status/trend of stream temperature across the landscape is changing or not. WFPA investigated how often harvests which are similar to the study treatments occur and attempted to bring this information to the AMP. It was rejected by a majority of TFW Policy. Based on our understanding of how routine harvests occurs, the minor temperature response measured in the Hardrock and Softrock studies (~0.5° - 1.0° C) occurs over a relatively short period of time (3 - 9 years) compared to a harvest rotation of 40 - 60 years. When considering these findings in addition to other relevant CMER and non CMER studies, we believe this proposal addresses the perceived problem identified.
The currently approved 303d list of temperature impaired water bodies maintained by Ecology (2018) contains more than 4,000 stream and river segments across all land uses[14]. While some of

[14] Assessment of state waters 303d - WDOE

the segments on forestland are the result of contemporary, geographically specific monitoring (including some of the no buffer sites in the Hardrock study), a cursory review indicates many of them are from data collected ~20 - 30 years ago. The status/trend of temperature in many of these listed stream segments is unknown today and therefore still on the 303(d) list. Temperature and sediment listings from the 1990s were one of the primary drivers of F&F, yet we've done very little towards tracking progress of those original listings. Despite the lack of interest on the part of many in the AMP, and Ecology noting the first cycle of Extensive Monitoring as "complete" in the last CWA Assurance milestone update[15], an ongoing, systematic, multi scale monitoring effort is essential to understanding the overall effects of F&F over time and space and making future adaptive management adjustments, as necessary.

Forests & Fish Goal is to Meet Water Quality Standards Over Time

The goal of F&F was to meet water quality standards across the managed forested landscape, more than nine million acres, over time. While there was an expectation in Schedule M-2 of "…improved water quality in the short term and meeting water quality standards in the long term…" no specific timeframe was identified other than the reference in Schedule M-2 of "ten years being a reasonable amount of time to determine some initial water quality trends"[16]. Unfortunately, it took nearly 10 years to get one round of landscape scale temperature monitoring accomplished and another 10 years to complete the report, after which the AMP abandoned the effort. Instead, we have focused on prescription scale BACI style studies to drive AMP decision making across the landscape. Temporary impacts from forest practices disturbance are limited to a few events over decades of management. Importantly, the FP HCP anticipated small temperature increases in Np streams and recovery within 5 - 15 years to pre-harvest conditions. [17] Applying a standard of no change greater than 0.3° C everywhere, at all the times is inconsistent with this larger policy vision. HCPs are not intended to be zero impact propositions; they are aimed at conserving covered species. Applying a strict, essentially no impact standard to a highly variable non-point source environment can miss the point; the important questions should be how much different than the standard, for how long, over how broad an area and most importantly what is the resulting biological effect? Unfortunately, these questions do not get much attention in the AMP. Forest management activities are poorly represented by the antidegradation standard of 0.3° C because they are not point-sources which create persistent and permanent change. The full scope and scale of forest management over time should be considered in the context of the natural variability inherent in forested watersheds, and impacts should be viewed over the full rotation.

Reasonable Antidegradation Policy Interpretation

The antidegradation policy in WAC 173-201A-300 has several intent objectives, amongst them is *"…ensure that waters of a higher quality than the criteria assigned in this chapter are not degraded unless such lowering of water quality is necessary and in the overriding public interest."* In cases where water temperature is lower than the designated use standard, the antidegradation policy intends to maintain the higher quality of the water as much as possible. This objective is aimed at not allowing human activities to use up the assimilative capacity of a waterbody. For example, a stream which is "naturally" 13° C, and the designated use standard is 16° C should not be permanently impacted up

[15] fpb_cwaassuranceupdate_20210512

[16] F&F Report Schedule M-2

[17] FP HCP Chapter 4d (pgs. 239-241)

to the standard due to human activities. This makes sense. However, what does not make sense is applying an everywhere, all the time interpretation of the antidegradation policy to forestry which tends to have small and temporary temperature impacts, well within the natural range of water temperature variability in the absence of recent harvest activity. Allowing some small and temporary impacts as long as designated use standards are not exceeded appears to be within Ecology's discretionary authority and was explicitly authorized in the WAC until revisions occurred in 2019.

Benefits & Costs

More than a year ago WFPA calculated preliminary estimates of expanding Np buffer length and width assuming 55% to 75% of the Np stream length is buffered under the current rule. This information was shared with TFW Policy, unfortunately most of TFW Policy was uninterested in factoring the information into the Np buffer deliberation. Costs associated with continuous, wider buffering ranges from ~$140 million to over $500 million dependent baseline assumptions of existing and proposed buffering. These are coarse estimates based on limited knowledge of the number of Np streams in WWA, total Np stream miles and the actual proportion of stream buffered under current rule. Further, these costs represent only the direct costs of forgone asset value. They do not include higher operational costs associated with increased road/landing and stream crossing construction, nor the indirect costs to the forest products market, jobs, and economic impact in rural counties. WFPA intends to update these cost estimates based on updated information about Np streams, and we would be happy to work with FPB staff on developing representative Np stream information to be used in future cost/benefit analysis.

The benefits of the same buffering are difficult to determine when the focus is on reducing the frequency of a temporary ~0.5° C - 1.0° C temperature change to a ~0.3° C or less, assuming it applies broadly and could be reliably measured. There would be no benefit to covered fish (or presumably amphibians) since most Np streams appear to meet designated use protection standards for fish. Ecology's own Cost/Benefit Analysis from 2006 indicated application of the antidegradation temperature criteria were indeterminant across all land uses for both point and non-point sources "*Quantifying the benefits of antidegradation, however, is very difficult and cannot be reliably done because of the conditions, limits and allowances built into the rule on when and how antidegradation is applied. Therefore, in estimating the qualitative costs of temperature and dissolved oxygen, the net benefits of an antidegradation program were not specifically factored in.*"[18]

It is difficult to reconcile a high cost, low benefit proposal with the Clean Water Act's (CWA) goal of cost effective and reasonable best management practices for non-point source control. In approving Ecology's 2003 revisions to the state's water quality standards, the Environmental Protection Agency (EPA) indicated a temperature increase of 0.3°C is insignificant regarding impacts on designated uses. Further, studies on temperature effects on salmonids are generally based on change increments of 1 °C or more[19]. This feedback pertained to point source discharges to water bodies naturally warmer than the designated use criteria. EPA did not act on Ecology's 2003 antidegradation proposal for nonpoint source discharges to water bodies naturally cooler than the designated use criteria since it is not a water quality standard under Section 303(c) of the CWA.

[18] Preliminary Draft CBA for Proposed Amendments to Washington's Surface Water Quality Standards

[19] February 1, 2008, letter from Michael Gearheard, Director of Office of Water & Watersheds, to David Peeler, Water Quality Program Manager, Ecology

Incentive Based and Mitigation Tools Needed

Regulatory proposals which have a wide gap between costs and benefits may be common from here forward given the substantial gain in resource protection resulting from the F&F rules, and unfortunately the FPB has an extremely limited set of tools to respond to such scenarios. This will make for difficult decision making and likely be dissatisfying to many interests. The FPB and the agencies should consider developing other response tools such as landowner incentives, particularly if the primary benefits are for downstream uses, and/or off-site mitigation opportunities to achieve identified and/or indeterminant benefits of regulatory proposals.

Clean Water Act Versus Endangered Species Act

Applying a yes/no interpretation of the antidegradation policy to this situation is unnecessarily creating conflict between the CWA and the Endangered Species Act (ESA). Many forest landowners in the Pacific Northwest and around the country have entered into voluntary conservation agreements for aquatic species with the U.S. Fish & Wildlife Service and/or NOAA Fisheries in order to have long term regulatory stability and predictability in their investments. Having a state regulatory agency supersede those agreements and apply a higher standard after the fact will have a chilling effect on voluntary conservation agreements, here in WA and around the country. The public interest is not well served by requiring regulations with high costs and little to no measurable benefit. This is akin to regulation for regulation's sake. Rather, the public would be better served by implementation of reasonable and cost-effective controls, considering both costs and benefits. The remainder of our limited resources can then be more wisely spent on other environmental and social goals which can achieve greater benefits.

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TYPE NP ACTION DEVELOPMENT DISPUTE

Majority Recommendations to the Forest Practices Board

TFW Policy Caucuses:
Westside Tribal Caucus
Eastside Tribal Caucus
Conservation Caucus
Department of Ecology/
Washington Department of Fish and Wildlife

October 15, 2022

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Executive Summary

Washington's Adaptive Management Program (AMP) evaluates the effectiveness of the state's forest practices rules at meeting resource objectives. When necessary, the AMP makes changes to these rules. Recently, the science committee published two studies, Hard and Soft Rock, that had been designed and approved at all levels of the AMP. Hard and Soft rock were prioritized by the AMP because of the high level of uncertainty associated with the non-fish perennial (Type Np) buffers in western Washington.

These studies found the current rules are not adequate in meeting Washington's water quality standards. To assist their response to the studies, the AMP Policy committee formed a workgroup of technical experts. This workgroup provided the Policy committee with three recommended alternatives that would protect stream temperature. All three alternatives employed a full-length buffer. The majority caucuses proposed recommendation to the Board is based upon two of these alternatives.

Background and Introduction

This recommendation has been prepared for the Forest Practices Board's (Board) consideration and is supported by the majority of Timber Fish and Wildlife (TFW) Policy Committee caucuses (majority caucuses). The majority caucuses are the Eastside Tribal Caucus, Westside Tribal Caucus, Conservation Caucus, Washington Department of Fish and Wildlife, and Department of Ecology. It is being delivered to the Board as a response to two Type Np studies: *Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington* [1](Hard Rock; McIntyre et al. 2021) and *Effectiveness of Forest Practices Buffer Prescriptions on Perennial Non-fish bearing Streams on Marine Sedimentary Lithologies in Western Washington*[2] (Soft Rock; Ehinger et al. 2021).

The Adaptive Management Program (AMP) is tasked with evaluating the effectiveness of forest practices rules in achieving resource objectives. One resource objective of the AMP is to meet the state water quality standards (WQS) that are adopted under the federal Clean Water Act (CWA). WQS are the state's response to the CWA requirement that every state submit standards to the Environmental Protection Agency (EPA) for approval. If they fail to submit standards consistent with the CWA, the EPA will write the standards for the state. The WQS are discussed in more detail below.

When the Forests and Fish Report rules were being evaluated by the Board for adoption in 2001, the Final Environmental Impact Statement for the new rule package found perennial non-fish bearing (Type Np) streams in western Washington to have a "moderate to high risk of temperature increases". The

[1] McIntyre, A.P., M.P. Hayes, W.J. Ehinger, S.M. Estrella, D.E. Schuett-Hames, R. Ojala-Barbour, G. Stewart and T. Quinn. 2021. *Effectiveness of Experimental Riparian Buffers on Perennial Non-fish-bearing Streams on Competent Lithologies in Western Washington - Phase 2 (Nine Years after Harvest)*. Cooperative Monitoring, Evaluation and Research Report CMER 2021.07.27, Washington State Forest Practices Adaptive Management Program, Washington Department of Natural Resources, Olympia.

[2] Ehinger, W.J., W.D. Bretherton, S.M. Estrella, D.E. Schuett-Hames and S.A. Nelson. 2021. *Effectiveness of Forest Practices Buffer Prescriptions on Perennial Non-fish-bearing Streams on Marine Sedimentary Lithologies in Western Washington*. Cooperative Monitoring, Evaluation, and Research Report CMER 2021.08.24, Washington State Forest Practices Adaptive Management Program, Washington Department of Natural Resources, Olympia.

Board, understanding this risk, prioritized studies to determine the effectiveness of the riparian buffers in meeting WQS on Type Np streams.

The Hard Rock and Soft Rock studies were collaboratively developed and executed by the Cooperative Monitoring, Evaluation, and Research Committee (CMER) with consensus approval by Policy and the support of the Board. Study design development for the first of these studies, Hard Rock, began in 2002, with site selection commencing in 2004. The Hard Rock study was completed in late 2017 and delivered to Policy in June 2018. A second phase of the Hard Rock study was completed and delivered to Policy in 2021. Soft Rock was subsequently delivered in 2022.

Upon receipt of the Hard Rock study, Policy representatives were concerned by the temperature findings of the report. Based on these concerns policy delivered a consensus recommendation to the Board stating that rulemaking would likely be necessary because of temperature increases associated with the current rules buffers. As part of that recommendation, Policy proposed the formation of an expert panel, the Technical Type Np Prescription Workgroup (Technical Workgroup), to advise Policy in developing new Type Np buffer rules.

Upon Board acceptance of the recommendation, the AMP developed a budget and charter for the Technical Workgroup. The Technical Workgroup delivered their report to Policy recommending three alternatives for consideration in the development of new Type Np rules in western Washington. Policy accepted the report from the experts on the Technical Workgroup and began to develop a recommendation for the Board. Unfortunately, despite attempting to find consensus Policy did not agree over what level of protection was needed in Type Np streams. Thus, Policy was unable to deliver one recommendation to the Board. The Hard Rock and Soft Rock studies demonstrated the current rules do not adequately protect stream temperature (violating WQS) in Type Np streams in western Washington. It is the conclusion of the majority caucuses that the completed CMER science and report from the Technical Workgroup demonstrates a continuous buffer, from the end of fish-bearing waters (F/N break) to the uppermost point of perennial flow of Type Np waters is required to meet Washington's Water Quality Standards.

Type Np Buffer Recommendations

The majority caucuses are recommending two harvest prescriptions to the Board for consideration. Option 1 is based on the recommendations of the Technical Workgroup. In this report, we will discuss the details of this option at length. Option 2 represents a consensus Policy product that, when conditions for its use occur, provides the most protection for stream temperature. The Board could adopt one or both of the prescriptions. If the Board chooses to accept only one option, the majority caucuses recommend the Board adopt Option 1.

Option 1 could be applied across the entirety of the western Washington Type Np landscape. Option 2 alone would not be sufficient to protect water quality as it would only apply in certain basins and situations.

Option 1

This proposal requires all Type Np streams to be buffered by a two-sided 75-foot no harvest buffer for the first 600 feet upstream from the F/N break, or for the lowest 600 ft. of the Type Np stream in the case of isolated Type Np streams which have no downstream confluence.

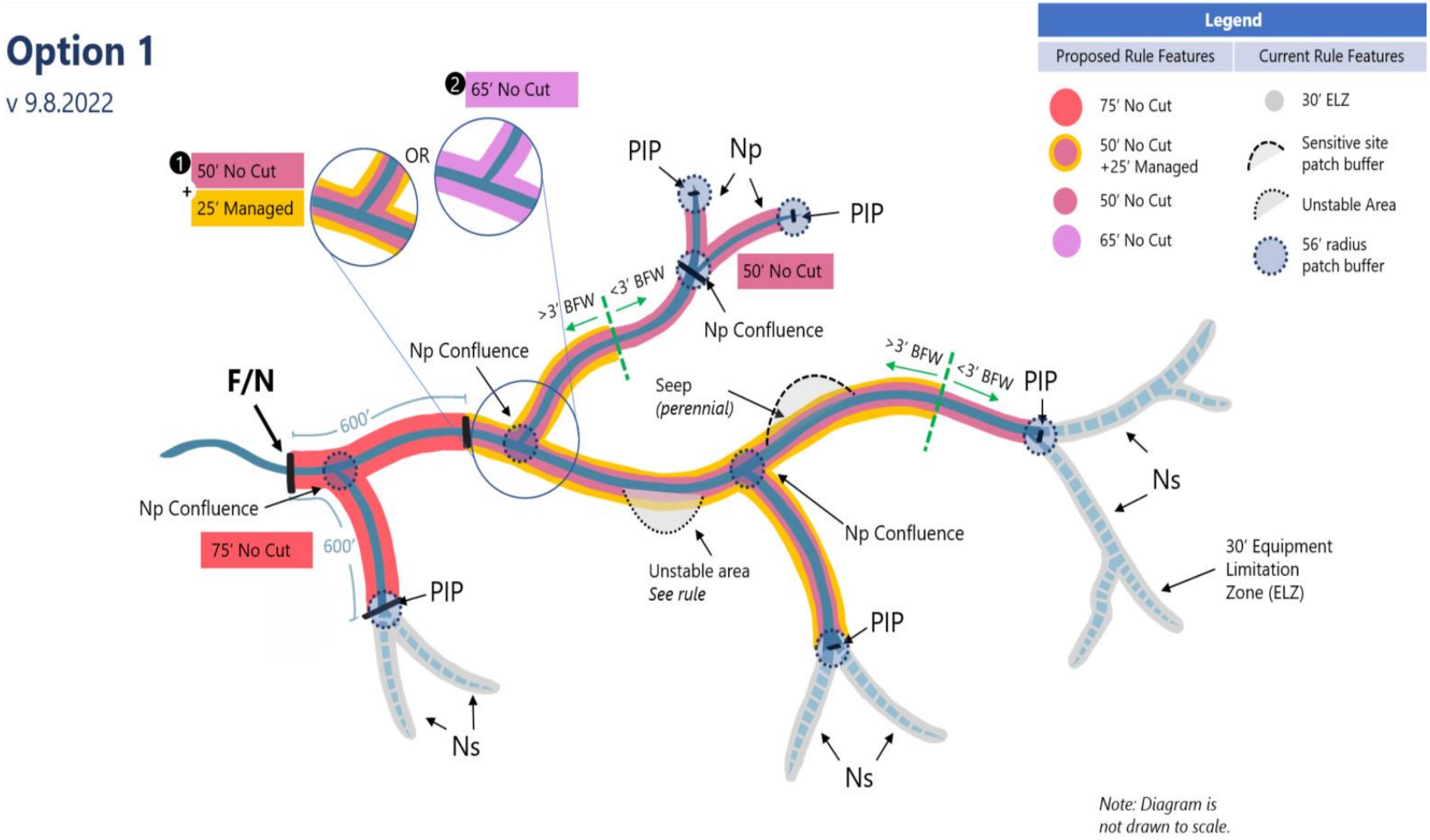
Upstream from the first 600 feet of a Type Np stream, the two-sided buffer width is determined by the bankfull width of the stream (BFW).

- Where Type Np streams have a 3-foot BFW or greater, one of the following prescriptions is required:
    1) Two-sided 75-foot buffer where the inner 50-foot management zone is no harvest and the outer 25-foot zone can be managed (see management prescription below); or a
    2) Two-sided 65-foot fixed-width no harvest buffer.

- Where Type Np streams average less than 3-foot BFW, a two-sided 50-foot fixed-width no harvest buffer is required.

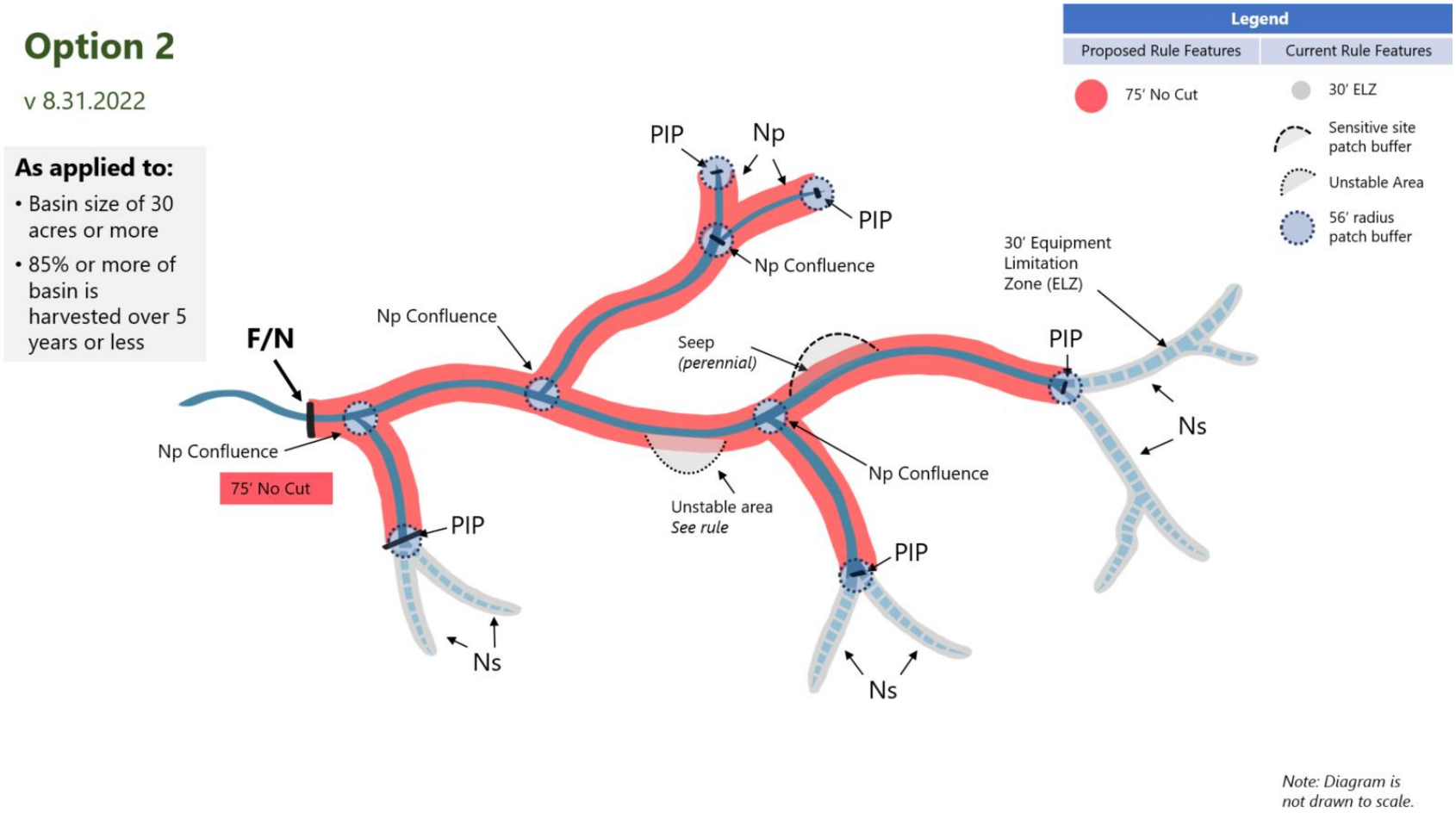
All existing equipment limitation zones, sensitive sites, forest practices hydraulic project, roads, yarding corridors, and unstable slope rules will continue to be applied to the full length of all Type Np waters.

75-foot management prescription:
This prescription applies *upstream from the first 600 feet* of a Type Np stream for streams having a 3-foot BFW or greater. The management zone is limited to the outer 25 feet of the Type Np buffer. Using an evenly spaced thinning strategy, such as by diameter class or relative density, 50% of the trees must be retained. The thinning strategy should be both implementable and enforceable.


Option 1
v 9.8.2022
Legend
Proposed Rule Features
Current Rule Features
75′ No Cut
50′ No Cut +25′ Managed
50′ No Cut
65′ No Cut
30′ ELZ
Sensitive site patch buffer
Unstable Area
56′ radius patch buffer
1 50′ No Cut + 25′ Managed
OR
2 65′ No Cut
PIP
Np
PIP
50′ No Cut
Np Confluence
>3′ BFW
<3′ BFW
Np Confluence
F/N
600′
Seep (perennial)
>3′ BFW
<3′ BFW
PIP
Ns
Np Confluence
75′ No Cut
600′
Np Confluence
Unstable area See rule
30′ Equipment Limitation Zone (ELZ)
PIP
PIP
Ns
Ns
Note: Diagram is not drawn to scale.

Option 2

The majority caucuses support the Policy consensus Option 2 (minority caucus Prescription A) This prescription is applied when 85% or more of a Type Np stream basin greater than 30 acres is to be harvested within a five-year period. The prescription requires the Type Np streams to be buffered with a two-sided 75-foot wide no harvest buffer for the entire length of the Type Np stream.



Rationale

Summary of study findings

The majority caucuses Type Np water buffer proposal (Option 1) was developed in response to the temperature findings of the CMER studies which were:

- The Hard Rock Phase I and Phase II studies found that all of the riparian buffer treatment options resulted in a stream temperature increase greater than 0.3°C, exceeding the WQS. The study found:
    - The forest practices buffer (current forest practices rules) and 100% buffer (50-foot wide two-sided continuous buffer) treatments each averaged an increase of 1.2°C two years post-harvest;
    - For the forest practices buffer treatment, the stream temperature increase remained greater than 0.5°C for 10 years post-harvest;
    - For the 100% buffer treatment, the stream temperature increased more than 0.3°C for 4 of the 11 years post-harvest, in one site as much as 2.4°C; and
    - 4 harvested sites increased above the water quality threshold criteria of 16°C. One of these streams received the 100% buffer treatment.
- The Soft Rock study found the stream temperatures exhibited a 0.3°C or greater increase in sites harvested according to current forest practices rules. This increase was observed for the first 3 years post-harvest despite some sites having buffers wider and longer than the minimum required by current forest practices rule due to the presence of unstable slopes requiring additional buffer protections. In fact, four of the seven harvest treatment sites had buffer lengths greater than 92% of the stream length. The study found:
    - In the first two years post-harvest, the study found a temperature increase of 0.6°C after accounting for natural variability; and
    - One site exceeded the numeric criterion of 16°C for all 4 years.,
- The science team conducting the studies found that results were comparable to other studies conducted looking at relationship of shade removal and temperature.

Water Quality Standards

In July 2018, upon receiving the final report of the Hard Rock Phase 1 study, Policy began meeting to understand the implications of the results. Policy requested and received a briefing from the Department of Ecology (Ecology) staff on how Washington's WQS are applied to forestry.

The WQS incorporates designated uses (aquatic life, wildlife, swimming, fish harvest, and other miscellaneous uses such as navigation and aesthetics). The designated uses are protected through both numeric and narrative criteria as well as an antidegradation policy. All aspects of WQS are independently applicable.

The WQS require the protection of the most sensitive aquatic life in both fish-bearing and non-fish-bearing waters and have been approved by the EPA in consultation with US Fish and Wildlife Service and the National Marine Fisheries Service.

The EPA states “One of the principal objectives of the Clean Water Act is to “maintain the chemical, physical and biological integrity of the Nation's waters.” Antidegradation requirements provide a framework for maintaining and protecting water quality that has already been achieved”. The antidegradation policy consists of:

- Tier I - protection and maintenance of existing and designated uses;
- Tier II - protection of waters of higher quality than the standards. Tier II does not allow a “measurable change” for waters that do not exceed the designated use criteria; and
- Tier III - protection of outstanding resources waters.

Tier II applies to waters that are not impaired where lowering of water quality is allowed to a limited extent, defined for temperature as not greater than “measurable change” defined as 0.3° C. Tier II of the antidegradation policy applies to “pollution control programs” of which Ecology considers the implementation of the Forest Practices rules and the administration of studies through the Adaptive Management Program (AMP) to be one.

The WQS apply to all surface waters, whether they are fish bearing or not. Type Np waters are an important source of nutrients, cool water, and other beneficial uses to fish bearing (Type F) waters lower in the watershed. Type Np waters also support other aquatic organisms such as amphibians and macroinvertebrates, which are an important food source for fish. While the impact of a single timber harvest may be limited in time and only affect a small area, the cumulative impacts of multiple adjacent harvests over time may significantly degrade a watershed.

The AMP has committed to complying with the WQS with the inclusion of Schedules L-1 and M-2 in the Forests and Fish Report. The State has further committed to meeting the WQS in Section 5.2.1 of the Forest Practices Habitat Conservation Plan. Since the temperature monitoring data of the Hard Rock and Soft Rock studies found harvest activities conducted under the current Type Np buffer rules can and do exceed the criteria for temperature, the AMP must develop new rules to protect water quality.

Meeting the requirements of the CWA is a priority of the AMP. As EPA states, antidegradation requirements provide a framework for maintaining and protecting water quality that has already been achieved. When Washington adopted antidegradation provisions, as required by EPA, it was made clear that the Forest and Fish rules would need to meet the Tier 2 antidegradation requirements. Thus, the majority caucuses understand warming of Type Np streams should be limited to 0.3°C in accordance with the state’s Tier II antidegradation standards.

Technical Type Np Prescription Workgroup

Per the Forest Practices Board Manual, once Policy received the Technical Workgroup report it had six months to formulate a response to the Hard Rock study. Policy agreed by consensus “a rule change was likely” given the temperature results. However, participants also understood the Hard Rock study only looked at a portion of western Washington Type Np stream lithologies. Harvest prescriptions on the remaining Type Np stream lithologies were being evaluated in the Soft Rock study which was to be completed within a year. Further, stakeholders understood that a hastily designed rule change could come with a significant financial cost to the timber industry. Policy decided, in consensus, its initial response to the Hard Rock study would be to form the Technical Workgroup, tasked with developing

harvest prescriptions that meet the antidegradation standard across all lithologies. The Technical Workgroup would give Policy the time to receive the Hard Rock Phase II and Soft Rock study results, and the expertise to evaluate how potential new rule configurations could protect water quality while minimizing cost to landowner.

In the spirit of the original TFW Agreement, Policy's direction to the Technical Workgroup elevated two fundamental priorities of the Forests and Fish Report and the AMP "to meet the requirements of Clean Water for water quality…" and to "keep the timber industry economically viable in Washington State." Specifically, the Technical Workgroup was asked to design prescriptions that would meet the state's WQS but also "minimize additional economic impact."

The Technical Workgroup consisted of technical experts with both academic expertise and substantial field experience. Upon reviewing the studies, the Technical Workgroup agreed with the Policy determination that the Hard and Soft Rock studies were well designed and demonstrated the current rules for Type Np streams are not maintaining temperatures in accordance with the WQS. According to the authors, the studies used "a reasonable approach for evaluating the measurable change standard" and found "the current Forest Practices Type Np buffer prescription did not categorically protect against stream temperature increases."

In their discussion of temperature, the Technical Workgroup reviewed the literature and determined that a 75-foot buffer "is required to maintain post-harvest temperature increases to less than 0.3°C." This conclusion was drawn from the work of Groom et al. (2018[3]). This study also equated a 75-foot two-sided buffer to a 7% reduction in shade. Thus, the Technical Workgroup evaluated all proposals against this level of shade protection.

[3] Groom, J.D., Madsen, L.J., Jones, J.E. and Giovanini, J.N. 2018. Informing changes to riparian forestry rules with a Bayesian hierarchical model. *Forest Ecology and Management* 419: 17-30.

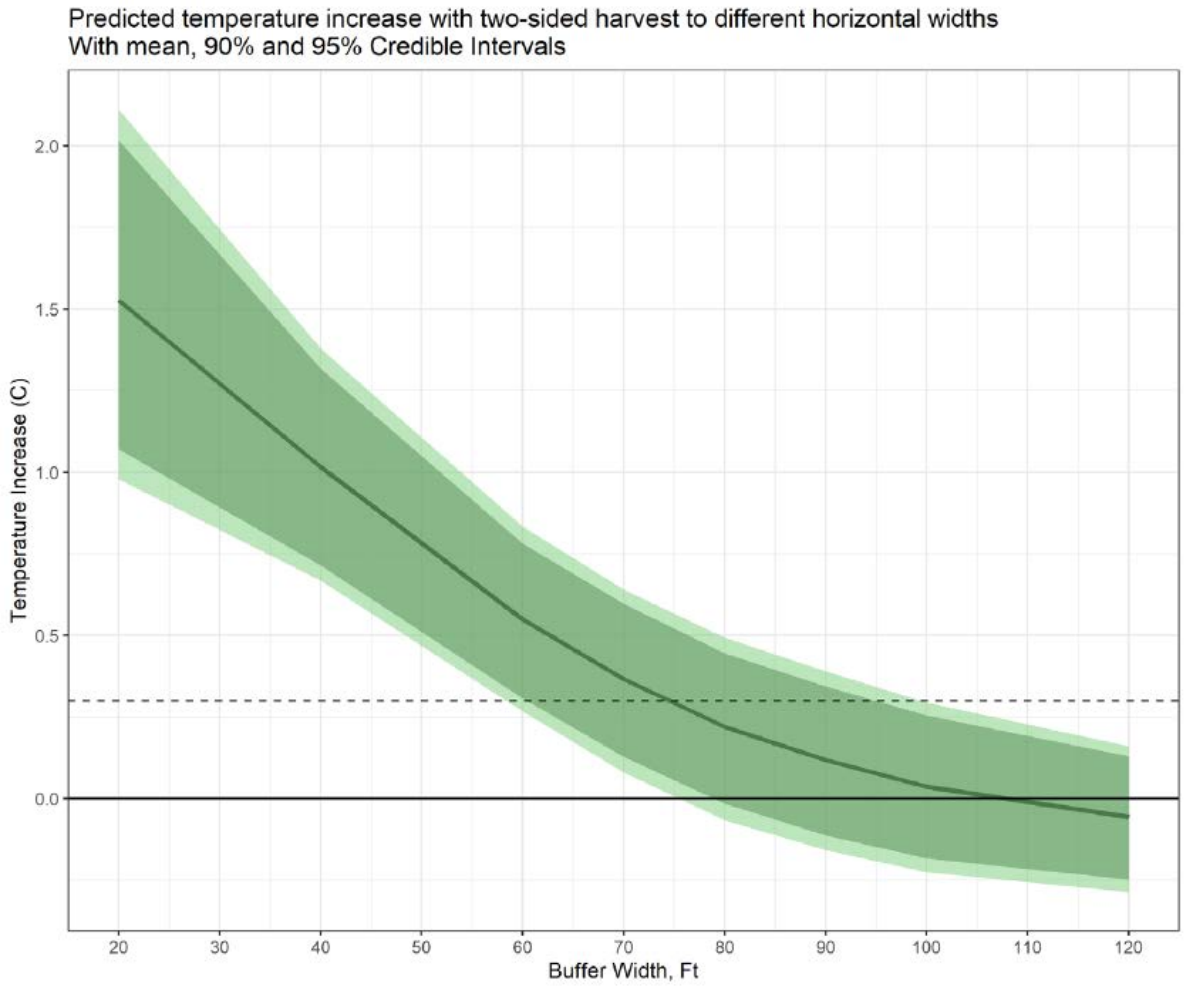


Figure 3. Predicted relationship between two-sided buffer width and stream temperature increase post-harvest. This prediction was based on the data and analysis approach of Groom et al. (2018).

Designing an effective buffer alternative to protect stream temperature is difficult given the natural variability across the landscape. The Technical Workgroup did, however, agree that "clear-cut portions of stream channels generally warm following harvest." This determination necessitated the adoption of a full-length buffer to protect stream temperature. Ultimately, the Technical Workgroup evaluated seven prescriptions and recommended that Policy consider three of these alternatives. All three recommended alternatives employed a continuous buffer from the F/N break to the upper-most point of perennial flow.

The need for a continuous buffer made it impossible to recommend a prescription that would avoid economic impact. To minimize that impact while meeting the WQS, it was inevitable the recommended alternatives would have some level of uncertainty as to their effectiveness of meeting the WQS.

Rooted in the original TFW Agreement, the AMP must continue the cooperative attitude among its participants and listen to the concerns of each other while attempting to minimize economic impact and

maintaining compliance with the WQS. The majority caucuses accepted the Technical Workgroup report and began discussing alternatives with this in mind. Our prescription was developed from the information Policy received from the Technical Workgroup as well as the Hard Rock and Soft Rock studies.

Option 1

Guided by the Technical Workgroup's discussion on temperature, Policy's deliberations quickly centered on 75-foot buffer proposals. **The majority caucus proposal applies two-sided 75-foot buffers on all** T**ype Np streams within the first 600 feet upstream of the F/N break**. The Technical Workgroup report gives us confidence this will protect water temperature in these vitally important reaches.

When a harvest unit is greater than 600 feet upstream from the F/N break (or the downstream end of the Type Np stream, if isolated), the majority proposal applies full length buffers, but the width varies depending on the BFW of the stream within the harvest unit. If the stream is wider than 3-foot BFW, landowners may apply a 75-foot buffer with the option of thinning within the outer 25 feet or a 65-foot fixed-width no harvest buffer.

This prescription was derived from two of the Technical Workgroup's three recommended prescriptions. Technical Workgroup authors understood that introducing a thinning to a 75-foot buffer prescription increases uncertainty as to the likelihood of stream temperature change remaining below 0.3°C. However, the authors note the Groom study, upon which the alternatives were compared, evaluated fish streams that were likely moving more slowly than the average Type Np stream in forestland. They agreed the thinning "may reduce the efficacy of the buffer, but we do not know to what extent". While concerning, they also expressed doubt it would be common practice to maximally thin the buffers**. As a result, the Technical Workgroup believed the 75-foot buffer with thinning in the outer 25 feet would generally be as protective as a 75-foot no harvest buffer.**

The majority caucuses accept the Technical Workgroup's framing of this prescription and offer it as a component of our proposal for a rule package.

The majority caucuses recognize that a 75-foot buffer with a 25-ft outer thinning zone may be difficult for landowners to implement. Thus, the majority recommendation also comes with the option of a continuous 65-foot two-sided no harvest buffer. This is a simplified alternative for landowners, particularly small forest landowners. The 65-foot no-harvest buffer option was a component of one of the Technical Workgroup's recommended alternatives. The authors felt this alternative, with all of its components, would "have a reasonable chance" to meet the WQS. The majority caucuses determined the other components of this recommendations were too complicated and untested to be adopted by rule, but saw opportunity for a simplified prescription. Therefore, the majority recommendation proposal also offers landowners an option of a 65-foot two-sided no-harvest buffer.

Where the stream averages less than 3-foot BFW, **a continuous two-sided 50-foot fixed-width no harvest buffer is required upstream of the first 600 ft. from the F/N break. The majority caucuses are less confident about this prescription meeting the WQS.** The Technical Workgroup did evaluate a 50-foot buffer and found it would not protect stream temperatures. The basis informing their evaluation

came from the results of the Hard and Soft Rock studies. However, the CMER studies did not specifically evaluate the rules on streams less than 3-foot BFW.

Given that shade is a significant driver of stream temperature and the Technical Workgroup's recommendations for a continuous buffer on all prescriptions, the majority caucuses agree a no-harvest buffer is necessary to protect water temperature in headwater streams. We are not certain a 50-foot continuous buffer on Type Np streams less than 3-foot BFW will be adequate at meeting the WQS. Nonetheless, in an attempt to meet the spirit of the TFW Agreement, we included this prescription despite our uncertainty because these smaller streams were not specifically evaluated**. As a result, the majority caucuses strongly recommend monitoring of harvest activities and additional study to determine the effectiveness of this prescription.**

Finally, the majority caucuses would like to discuss the overall buffering strategy. Our recommended buffers upstream from the 600 feet above F/N break come with a level of uncertainty. For the first 600 feet of a Type Np stream, we are confident the full 75-foot buffer will protect water temperature. This design, where streams with less protective buffers flow into streams with more protective buffers, was developed to somewhat mitigate the risk of stream warming to fish streams. We know from Bladon et al. (2018)[4] "heated water from harvested sites rapidly decreased in temperature after flowing into stream reaches with full forest cover." The Hard and Soft Rock studies also found water temperatures decreasing downstream of the harvest units upon entering full forests. We recognize a 75-foot buffer does not qualify as "full forest cover", but it would likely decrease the potential warming coming from the narrower upstream buffers. This design gives us more confidence to offer a proposal with buffers that are at the margins of what is known to be necessary to protect stream temperature in order to provide more flexibility to landowners.

Offering this package is also done with confidence in the AMP. As we discuss below, it is imperative that the AMP evaluate the effectiveness of this new buffering scheme for Type Np streams in western Washington once the options are placed into rule.

Option 2

Option 2 was developed from a proposal that was delivered to Policy by the industrial landowner caucus. As we understood it, their proposal was developed to meet the WQS for harvests most closely aligned with the harvests evaluated in the Hard Rock study. Like the Technical Workgroup's report, the proposal presented continuous 75-foot buffers on Type Np streams to protect stream temperature. However, it sought to limit the prescription to basins larger than 30 acres that would be entirely harvested.

Policy participants evaluated the proposal against the prescriptions implemented in the Type Np studies. It was found entire basins were not always harvested due to the presence of sensitive sites and rule identified landforms. Thus, the basin harvest size requirement was adjusted to 85% or more of a 30 acre or larger basin.

[4] Bladon, K.D., Segura, C., Cook, N.A., Bywater-Reyes, S. and M. Reiter, M. 2018. A multicatchment analysis of headwater and downstream temperature effects from contemporary forest harvesting. *Hydrological Processes* 32:293–304.

Finally, Policy discussed the likelihood of entire basins to be harvested at one time. Concerns were raised that portions of a basin would be harvested on different schedules, resulting in an entire basin being harvested in a short period of time. The Type Np studies found that the duration of elevated temperatures spanned multiple years. This led Policy participants to agree that harvests over a 5-year time period would qualify as a whole basin harvest and the 75-foot buffer would apply within the basin.

The majority caucuses support this proposal for adoption because we believe it will protect stream temperatures on these Type Np streams. It does come with some implementation issues the Board should consider. Of primary interest to the majority caucuses is a clear definition of a complete Type Np basin and how to evaluate for compliance when an entire basin is not owned by a single landowner or when applications are submitted in different years.

Other Recommendations and Considerations

Recommendations

It is critical that monitoring and future evaluation is a part of this rule package. Some of the majority caucuses' policy decisions presented here are based on uncertainty due to a lack of existing data. During the dispute, all parties agreed that an effectiveness monitoring program must accompany the Type Np buffer prescriptions. The majority caucuses envision a monitoring program, to be developed by CMER, which would evaluate the ability of the new rule(s) to meet the state's WQS. The study design should be developed within the AMP following the normal CMER processes and procedures with Policy review and approval. Based on the majority caucuses recommended prescriptions, a few potential areas to monitor are;

- does a two-sided 75-foot no harvest buffer with a length of 600' reduce impacts to temperature from when water enters the buffer until it leaves;
- does a 75-foot buffer (50-foot core, 25-foot managed) provide enough shade to limit temperature increase to less than 0.3°C; and
- how does stream temperature respond in Type Np streams less than 3-foot BFW when harvested under the new rule.

The majority caucuses also recommend the Schedule L-1 objective for stream shade be updated. Currently, the Westside shade objective is an approximation of the current rule. Since the rule does not protect water temperature as needed, this objective is obsolete. We recommend the Forest Practices Board reopen Schedule L-1 for updating.

Other Considerations

The majority caucuses did not recommend a small forest landowner option as we were not able to define an option that would meet the "equal in overall effectiveness" language in the Forests and Fish law. If, however, the Board considers a small forest landowner option, the majority caucuses strongly recommend that there be a harvest limit to individual ownership harvests and/or collective ownership harvests within single watersheds watershed, limited by distance of streams treated under any option to minimize potential adverse effects to Washington's water quality standards and stream temperatures.

The majority caucus's recommended alternative is designed to address the temperature concerns found in the Soft and Hard Rock studies. We note that review of the studies and subsequent discussions amongst the caucuses elicited other concerns. As such, we would like to share those concerns with the Board.

Stream Associated Amphibians

Stream-associated amphibian population viability is one of several overall Performance Goals of the Forests and Fish (FFR) agreement. Stream-associated amphibians were selected as a key performance goal because stakeholders identified them as one of the important biotic resources to be protected in Type N Waters (USFWS 1999[5]). Stream-associated amphibians are sensitive to changes in stream habitats that are often associated with upland timber harvest, including changes in shade, stream temperature, and instream sediment storage.

In the Hard Rock study, streamside tree removal during timber harvest and blowdown of trees in riparian buffers resulted in shade reductions and subsequent increases in stream temperature for all riparian buffer treatments. Instream sediment storage also increased in both the 0% and FP riparian buffer treatments eight years following harvest. Over the same period there was a decline in basin-wide larval Coastal Tailed Frog abundance in all buffer treatments (-65%, -93%, -84% in the 100%, FP and 0% treatments). Similar declines were observed for tailed frog post-metamorphs in the 100% and FP treatments. This differed from a general lack of negative response for stream-associated amphibians in the two years immediately following harvest (i.e., Phase I results).

While the Hard Rock study was not designed to identify the mechanisms for potential changes in amphibian abundance in response to timber harvest, we have certainty in the fact that something at harvested sites changed in response to harvest in a way that negatively affected amphibians, given that we did not see similar declines in abundance at unharvested reference sites over the same period.

Windthrow

Multiple CMER studies have found that current 50' buffers on Type Np streams have high rates of windthrow compared with the studies' reference sites:

Type N Experimental Buffer Treatment Study in Soft Rock Lithologies

- Wind and physical damage from falling trees accounted for approximately 75% of mortality in the RMZ FP Buffers and 81% of mortality in the PIP FP Buffers, compared to <10% in the reference site RMZs and PIPs.[6]

Type N Experimental Buffer Treatment Project in Hard Rock Lithologies

- Windthrow was the primary cause of mortality and tree fall in both RMZ and PIP buffers. There was substantial variability in windthrow mortality among and within sites. We observed higher rates of windthrow in the RMZs of the coastal blocks (Willapa 1 and Willapa 2) than in sites located further inland in both the pre- and post-harvest periods.

[5] USFWS. 1999. Forests and Fish Report. US Fish and Wildlife Service and 11 other organizations. Washington Forest Protection Association, Olympia, WA.

[6] CMER/TFW Policy Interaction Framework Six Questions:
Type N Experimental Buffer Treatment Study in Soft Rock Lithologies; November 4, 2021

- Higher tree mortality in PIP buffers was likely due to their exposed locations and vulnerability to windthrow.[7]

Westside Type N Buffer Characteristics, Integrity and Function (BCIF) Study – Extended 10-year post-harvest report

- Mortality was variable, but extensive mortality occurred at some sites. About one-quarter of the RMZ buffers and two-thirds of the PIP buffers had substantial mortality (>5%/year), resulting in reduction of density, canopy shade and wood recruitment potential, but tree fall from wind supports the resource objectives by providing a pulse of large wood.[8]

Windthrow is inevitable in riparian areas, though wider buffers are intrinsically more windfirm than narrower buffers. We think the additional 15' to 25' of buffer on streams wider than 3' will help mitigate the potential for catastrophic windthrow events.

Climate Change

Climate change will inevitably affect riparian stands and stream temperatures across western Washington. While the studies did not specifically consider impacts related to climate change, stream temperature warming due to climate change increases the risk of future exceedance of water temperature standards. Wider buffers can help mitigate this potential warming of headwater streams. Additionally, climate change will likely lead to more intense storm events, further supporting the need to establish wider, more wind resilient buffers that can better withstand these events.

Conclusion

The AMP is tasked with reviewing, evaluating, and, when warranted, making changes to the forest practices rules. The Policy approved study designs for both Hard Rock and Soft Rock underwent rigorous scientific review by CMER and independent scientists. The studies were designed to address fundamental concerns brought forth through the Final Environmental Impact Statement preparation for the Forests and Fish Report, where the environmental effects of the proposed rule had a "Moderate to High risk of temperature increases along non-fish bearing streams."

The Hard Rock and Soft Rock studies produced results showing the current rules are not adequate in meeting the Washington's water quality standards. The majority caucuses find that to address the temperature increases as reported in the Hard Rock and Soft Rock studies, Type Np buffer prescriptions which protect the full length of Type Np waters and are wider in overall width than the current forest practices buffers are required. The Technical Workgroup report evaluated many potential buffer prescriptions, all of which had full-length buffers. They agreed upon three that were delivered to Policy. The majority caucus's proposal is primarily based on two of these recommendations.

[7] CMER/TFW Policy Interaction Framework Six Questions:
Type N Experimental Buffer Treatment Project in Hard Rock Lithologies; February 27, 2018

[8] CMER/TFW Policy Interaction Framework Six Questions:
Westside Type N Buffer Characteristics, Integrity and Function (BCIF) Study – Extended 10-year post-harvest report; November 15, 2019