STATE OF WASHINGTON
FOREST PRACTICES BOARD

PO Box 47012
Olympia, WA 98504-7012

Regular Board Meeting – August 10, 2016
Natural Resources Building, Room 172, Olympia

Please note: All times are estimates to assist in scheduling and may be changed subject to the business of the day and at the Chair's discretion. The meeting will be recorded.

DRAFT AGENDA

9:00 a.m.	**Welcome**
9:00 a.m. – 9:30 a.m.	**Executive Session** To discuss anticipated litigation, pending litigation, or any other matter suitable for Executive Session under RCW 42.30.110.
9:30 a.m. – 9:35 a.m.	**Introductions** Safety Briefing – Patricia Anderson, Department of Natural Resources (DNR)
9:35 a.m. - 9:45 a.m.	**Approval of Minutes** *Action: Approve May 11, 2016, meeting minutes.*
9:45 a.m. – 10:00 a.m.	**Report from Chair**
10:00 a.m. – 10:15 a.m.	**Public Comment** – This time is for public comment on general Board topics. Comments on any Board action item that will occur later in the meeting will be allowed prior to each action taken.
10:15 a.m. – 10:35 a.m.	**2017-2019 CMER Master Project Schedule and Proposed Budget and Legislative Report** - Hans Berge, DNR
10:35 a.m. – 10:50 a.m.	Break
10:50 a.m. – 11:00 a.m.	**Public Comment on 2017-2019 CMER Master Project Schedule and Proposed Budget and Legislative Report**
11:00 a.m. – 11:10 a.m.	**2017-2019 CMER Master Project Schedule and Proposed Budget and Legislative Report** – Hans Berge, DNR *Action: Consider approval of CMER Master Project Schedule and associated budget.*
11:10 a.m. – 11:35 a.m.	**TFW Policy Committee's Recommendations and Timelines on the Unstable Slopes Proposal Initiation** – Hans Berg, DNR
11:35 a.m. – 11:45 a.m.	**Public Comment on TFW Policy's Recommendations**
11:45 a.m. – 12:00 p.m.	**TFW Policy Committee's Recommendations and Timelines on the Unstable Slopes Proposal Initiation** – Hans Berg, DNR *Action: Consider recommendations for proposal timeline.*
12:00 p.m. – 1:00 p.m.	Lunch
1:00 p.m. – 1:15 p.m.	**Public Comment** – This time is for public comment on general Board topics. Comments on any Board action item that will occur later in the meeting will be allowed prior to each action taken.

Future FPB Meetings

Next Meeting: November 10, 2016
Check the FPB Web site for latest information: http://www.dnr.wa.gov/
E-Mail Address: forest.practicesboard@dnr.wa.gov Contact: Patricia Anderson at 360.902.1413

1:15 p.m. – 1:25 p.m.	**Northern Spotted Owl Conservation Advisory Group** - Marc Engel, DNR
1:25 p.m. – 1:35 p.m.	**Public Comment on Spotted Owl Conservation Advisory Group**
1:35 p.m. – 1:45 p.m.	**Northern Spotted Owl Conservation Advisory Group** - Marc Engel, DNR *Action: Consider revising group.*
1:45 p.m. – 2:05 p.m.	**Clean Water Act Assurances** – Mark Hicks, Department of Ecology
2:05 p.m. – 2:50 p.m.	**TFW Policy Committee's Type F Matrix Update** – Adrian Miller, and Ray Entz, Co-chairs
2:50 p.m. – 3:10 p.m.	**LiDAR Pilot Report** – Hans Berge, DNR
3:10 p.m. – 3:25 p.m.	Break
3:25 p.m. – 3:45 p.m.	**Forest Pesticide Update/Recommendations** – Donelle Mahan, DNR
3:45 p.m. – 4:00 p.m.	**Staff and Annual Reports** A. **Adaptive Management Update** - Hans Berge, DNR B. **Board Manual Development Update** - Marc Ratcliff, DNR C. **Compliance Monitoring Update** - Garren Andrews, DNR D. **Northern Spotted Owl Implementation Team and Safe Harbor Agreement Update** - Lauren Burnes E. **Rule Making Activity Update** - Marc Engel, DNR F. **Small Forest Landowner Advisory Committee and Small Forest Landowner Office Update** -Tami Miketa, DNR G. **TFW Cultural Resources Roundtable Annual Report** – Jeffrey Thomas and Karen Terwilleger, Co-chairs H. **TFW Policy Committee's Priorities Annual Report** – Adrian Miller and Ray Entz, Co-chairs I. **Upland Wildlife Working Group Update** - Terry Jackson, Washington Department of Fish and Wildlife (WDFW)
4:00 p.m. – 4:15 p.m.	**2016 Work Planning** - Marc Engel, DNR *Action: Consider changes.*

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FOREST PRACTICES BOARD
Regular Board Meeting
May 11, 2016
Natural Resources Building, Room 172
Olympia, Washington

Members Present
Stephen Bernath, Chair, Department of Natural Resources
Brent Davies, General Public Member
Carmen Smith, General Public Member/Independent Logging Contractor
Court Stanley, General Public Member
Heather Ballash, Designee for Director, Department of Commerce
Joe Stohr, Designee for Director, Department of Fish and Wildlife
Lisa Janicki, Elected County Official
Patrick Capper, Designee for Director, Department of Agriculture
Rich Doenges, Designee for Director, Department of Ecology

Members Absent
Bill Little, Timber Products Union Representative
Bob Guenther, General Public Member/Small Forest Landowner
Dave Herrera, General Public Member
Paula Swedeen, General Public Member,

Staff
Joe Shramek, Forest Practices Division Manager
Marc Engel, Forest Practices Assistant Division Manager
Patricia Anderson, Rules Coordinator
Phil Ferester, Senior Counsel

WELCOME AND INTRODUCTIONS
Stephen Bernath called the Forest Practices Board (FPB or Board) meeting to order at 9:00 a.m. Introductions of the Board were made.

APPROVAL OF MINUTES
MOTION: Joe Stohr moved the Forest Practices Board approve the February 10, 2016, meeting minutes.

SECONDED: Court Stanley

ACTION: Motion passed unanimously.

REPORT FROM CHAIR
Bernath reported on the following:
- Supplemental budget
- 2017-19 biennial budget
- Possible Board field trip in late fall

- Compliance monitoring to go through Independent Science Peer Review
- Board's Practices and Procedures Rule Making postponed
- Department of Natural Resources (DNR) conducting unstable slopes training

PUBLIC COMMENT (AM)
Jim Peters, Northwest Indian Fisheries Commission, provided comments on the commitments made on the Clean Water Act (CWA) Assurances. He said all the stakeholders have recommitted to meeting the ten year mark to ensure water quality standards are being met.

Jim Peters representing himself also provided comments on cultural resources. He said tribes view plants, fish, shellfish, wildlife, birds, trees, water, and air as cultural resources. He said he was taught to value and take care of these resources even while harvesting them. He said it is very important to protect these resources as they are part of the ecosystem and are important to future tribal generations and should be to the state of Washington and its citizens.

Ken Miller, Washington Farm Forestry Association (WFFA), voiced concern about the length of time the TFW Policy Committee (TFW Policy) has taken to finalize the alternate plan template. He also provided commonalities between small landowners and the tribes. He concluded by saying that if the voluntary, neighborly aspects of the current cultural resource process goes away, everyone loses.

Peter Goldman, Conservation Caucus, said they are concerned that the Board's November 2016 deadline to receive recommendations on a permanent water typing rule will not be met. He urged the Board to provide direction to TFW Policy on the Board's expectation on whether to receive a consensus product or accept differing opinions on how best to move forward.

Tom Laurie, Department of Ecology, said he supports Jim Peters' comments on the CWA Assurances. He also said that the cultural resources component for today's meeting is an important aspect to forest practices. He said cooperation and communication are key and encouraged the Board to be open to recommendations on how to improve the system for clarity, efficiency, and accountability.

Karen Terwilleger, Washington Forest Protection Association (WFPA), said they believe progress is being made on a permanent Type F rule. She indicated that TFW Policy is working through the matrix approved by the Board and anticipates a consensus recommendation to be delivered to the Board. She also provided an historical perspective on the water typing rule, including a background on the implementation of physical defaults.

Jeffery Thomas, Puyallup Tribe, said the TFW tribal perspective is that they are "the people of the land" and reflect on the treaties and the implementation goals of the tribes. He said tribal culture encompasses the people's day-to-day lifestyle, and is derived from the interaction between people and the land.

CULTURAL RESOURCES
Bernath welcomed the tribal community attending the meeting today. He said the purpose of the presentations and discussions are to gain an understanding of what cultural resources are, and why it is important to protect them.

Introduction to what is a cultural resource and why is it important.
The tribal presenters included Mary Leitka and Vivian Leigh, tribal elders of the Hoh Tribe, Dave Burlingame, Cowlitz Tribe, and John Sirois, Upper Columbia United Tribes. They described the importance of cultural resources, how they are interwoven into their culture, and the need to protect them for future generations. The speakers also provided an insight to how they use the land and the teachings passed down from their elders.

Current State Agency Practices
Marc Engel, DNR and Dr. Allison Brooks, Department of Archaeology and Historic Preservation (DAHP) provided an overview of their respective agency's process for protecting tribal cultural resources.

Landowner Perspective
Dave Morrill and Robert Bass, Hancock Forest Management, presented their company's process for managing cultural resources during forest practices activities and through the application process. They noted in their process that the collaboration was the most successful approach.

In addition to the presentation by Hancock Forest Management, the following landowners provided additional comments on how best to manage cultural resources.

- Tom Nelson, Sierra Pacific Industries, emphasized fostering better communication between landowners and tribes.
- Steve Barnowe-Meyer, WFFA, emphasized small forest landowner's on-going commitment to protecting cultural resources and the need to provide small forest landowners with guidance and training for continued success.
- Jason Sedaro, SDS Lumber Company, encouraged improving communication on the ground rather than rule making to protect resources.

CULTURAL RESOURCES
Phil Rigdon, Yakama Nation, said the reason for today's discussion stems from their frustrations in not receiving a response to their March 2015 letter to the Board and DNR. He said the letter outlines concerns on how WAC 222-20-120 is being interpreted by DNR and provides suggestions on how to resolve these issues. He said the Board's failure to respond resulted in the Yakama Nation proposing legislation during the 2016 Legislative session to ensure DNR has the authority to protect cultural and archaeological resources information as a public resource.

Court Stanley asked what Rigdon believed was the best forum and the pathway forward to address their concerns. Rigdon replied that the concerns need to be raised to a higher level to address the recommendations in the letter.

Bernath stated that DNR is in the process of contracting with a facilitator for the TFW Cultural Resources Roundtable to address some of the communication concerns. He also said that DNR is

committed to having a discussion at the leadership level with the tribes, landowners, and agencies for resolving these concerns.

Rigdon expressed a desire for a written response to their letter dated March 2015.

Jeffrey Thomas, Puyallup Tribe, mentioned the following on behalf of the TFW Tribal Caucus:

- they would provide a more formalized set of comments and recommendations pertaining to today's discussions;
- invited Board Members to attend the next meeting of the TFW Tribal Caucus which is being scheduled for the second week of June; and
- requested a memo from the Board describing the action the Board is planning to take next.

PUBLIC COMMENT (PM)

Vic Musselman, WFFA, provided comments on the alternate plan template currently within the Adaptive Management Program. He urged that any rejection or acceptance of the proposed prescriptions be based on best available science.

Ken Miller, WFFA, said he is an advocate for the alternate plan harvest prescriptions the Forests and Fish Report required be available for small forest landowners. He is concerned that the Board and TFW Policy do not have a clear understanding of their proposal. He invited the Board to plan a field tour at his property to illustrate the proposal on site.

Elaine Oneil, WFFA, provided an update on their forthcoming Eastside riparian template. She indicated that the proposal will most likely come before the Board in November.

Mary Scurlock, Conservation Caucus, encouraged the Board to give careful attention to the recommended action items in the CWA Assurances report. She also provided a brief status update on other projects within TFW Policy.

Chris Mendoza said he supports the CWA Assurances memo from Mark Hicks. He also commented on Cooperative Monitoring, Evaluation, and Research Committee's (CMER) process for how studies are initiated and completed as outlined in Board Manual Section 22.

Heather Hansen, Washington Friends of Farms & Forests, provided a brief overview of her organization. She said they are a resource for pest management issues. She said they believe the Forest Practices Application does not provide clear, easy to understand information and have been in communication with DNR to provide clearer guidance.

Karen Terwilleger, WFPA, said they are committed to meeting the CWA Assurances. She suggested the Board review the studies related to the CWA Assurances when reviewing the budget as well as work load priorities for CMER and TFW Policy. She also indicated how important it is for the stakeholder principals to be involved in the process and recommit to the TFW ground rules, Forests and Fish Report and the CWA Assurances milestones.

Peter Goldman, Washington Forest Law Center (WFLC), shared his perspective on board manual guidance versus a rule requirement. He said the board manual is technical guidance that

supports rule; however there is a lot of overlap and provided some examples. He cautioned the Board to not approve a board manual that undercuts a rule and to not add language to the board manual that should be in rule.

Bruce Barnes, Elk Hunters, shared his concerns of pesticide use and the effect on future generations using the forest. He urged the Board to convene a public committee to investigate the chemicals being used. He also questioned why the State of Washington is not getting on the same page as Oregon and legislate doing away with aerial herbicide spraying.

WESTERN GRAY SQUIRREL (WGS) ANNUAL REPORT
Terry Jackson, Washington Department of Fish and Wildlife (WDFW) and Brandon Austin, DNR, provided a brief overview on the 2015 tracking data, voluntary landowner efforts, and results from the periodic status review conducted by WDFW, which was presented to the Fish and Wildlife Commission (Commission) in January 2016. Jackson said the Commission took action to keep the WGS as "state threatened" based on the species' relatively small population size, continued threats to the squirrel, and lack of information.

In addition to the on-going efforts, the following is needed:
- additional funding/resources for data collection on species distribution and abundance to better inform the success of the voluntary protection approach;
- additional opportunities for landscape management approaches; and
- developing economic incentives for small forest landowners.

WESTERN GRAY SQUIRREL PETITION FOR RULE MAKING
Marc Engel, DNR, presented the petition for rule making received on April 20, 2016, requesting the Board amend WAC 222-10-040 (1) and (2) by adding WGS conservation measures and amend WAC 222-10-040 (3) to include the 1996 WGS guidelines attached to the petition.

He said the annual WGS Report from WDFW stated that in January 2016 the Commission decided to maintain the status of the WGS as a state threatened species based on the recent WDFW periodic status review. He said WDFW determined that until further data is collected, there is insufficient evidence to conclude that the species has declined since 2005. Furthermore, he said that based on forest practices tracking data, there is no conclusive evidence that additional rules are needed to adequately protect the squirrel.

PUBLIC COMMENT ON PETITION FOR RULE MAKING
None.

WESTERN GRAY SQUIRREL PETITION FOR RULE MAKING
Marc Engel, DNR, recommended the Board continue to receive annual reports that include updates on voluntary protection measures, opportunities for landscape management approaches and small forest landowner incentives.

MOTION: Court Stanley moved the Forest Practices Board deny the petition for rule making on Western Gray Squirrel habitat. Based on Department of Fish and Wildlife's periodic status review there is insufficient evidence to conclude that there is a need to changing the Board's approach to protecting the species. He further moved the Forest Practices Board continue to annually revisit the status of the voluntary protection approach.

SECONDED: Heather Ballash

Board Discussion:
Joe Stohr said he agrees with the staff recommendation. He said the squirrel is not doing well but more data needs to be gathered before taking any action.

Court Stanley recognized Hancock and SDS Lumber Company's voluntary protection efforts as providing some good innovative approaches for managing the species.

Brent Davies said she supports finding funding for landowner incentives for all species.

ACTION: Motion passed unanimously.

SMALL FOREST LANDOWNER WESTSIDE TEMPLATE UPDATE
Marc Engel, DNR, said the Board accepted and directed the Adaptive Management Program Administrator (AMPA) to present the small forest landowner Westside Low Impact Template Proposal Initiation to TFW Policy.

He said TFW Policy received the recommendations and initiated a subcommittee to review the proposed prescriptions to determine if they meet the criteria of a template; and to affirm the AMPA's recommendation to contract a literature synthesis of riparian function.

He said the review has taken considerable time because the proposed template features a full suite of prescriptions and site conditions for conifer and hardwood riparian forests for application on Type F and N Waters.

To complete the subcommittee's analysis for Type F Waters, additional work was required by the small forest landowner community to identify how to apply the remaining conditions and additional prescriptions for consideration. The subcommittee will meet on May 23rd to review the additional prescriptions and conditions.

When the Type F prescription evaluation is completed, the subcommittee still needs to:
- Repeat the same evaluation process for the Type N prescriptions;
- Develop questions to be evaluated from the riparian function literature synthesis; and
- Determine if any of the proposed prescriptions have merit for inclusion in Board Manual Section 21, *Alternate Plans*.

BOARD MANUAL SECTION 16 UNSTABLE SLOPES

Marc Ratcliff, DNR, requested the Board's approval of Board Manual Section 16 *Guidelines for Unstable Slopes and Landforms*.

He said the qualified expert work group reviewed and made recommendations on two documents related to screening for complex deep-seated landslides and using LiDAR for assessing past deep-seated landslide deposits.

The group agreed to:

- expand the existing deep-seated landslide section to include information on the successive movement within landslides;
- include additional LiDAR examples showing various geomorphic features characteristic of deep-seated landslides; and
- provide information on how LiDAR can be used to identify historic deep-seated landslide deposits within a given geographical area.

Ratcliff addressed WFLC's letter expressing concerns and potential deficiencies or gaps in the manual by reporting that the group fully vetted all technical materials and proposed language during these meetings. Not all the information could be incorporated because some of the material contained rule prescriptions not applicable for guidance or contained material needing additional research. He requested the Board approve the manual today and wait until the science can further answer the questions contained within the unstable slopes Proposal Initiation.

Brent Davies stated there is a lot of talk on the difference between guidance and rule and asked for additional information to understand the concern about the board manual undercutting any kind of rule.

Ratcliff responded that he would not say it undercuts the rule. He explained the rules are clear that proposals on or near the five different types of rule identified landforms need to be assessed by a qualified expert. He said the board manual provides guidance for conducting various assessments, but the process and analysis is up to the qualified expert.

PUBLIC COMMENT ON BOARD MANUAL SECTION 16 UNSTABLE SLOPES

Kara Whitaker, WFLC, acknowledged the efforts made to address gaps in Board Manual Section 16, however, she said significant gaps still remain. She said these gaps were identified in a letter to the Board dated April 29, 2016. She stated that as long as these gaps remain, the board manual does not provide adequate technical guidance to implement class IV-special rule identified landforms.

Karen Terwilleger, WFPA, said they encourage the Board to approve the revisions to Board Manual Section 16. She also requested the Board's continued support for the unstable slopes Proposal Initiation.

Ken Miller, WFFA, encouraged the Board to approve the board manual. He also requested the Board's continued support of the unstable slopes Proposal Initiation.

BOARD MANUAL SECTION 16 UNSTABLE SLOPES
Marc Ratcliff, DNR, requested the Board's approval of Board Manual Section 16.

MOTION: Carmen Smith moved the Forest Practices Board approve Board Manual Section 16, Guidelines for Evaluating Potential Unstable Slopes. She further moved the Board allow staff to make minor editorial changes if necessary prior to distribution.

SECONDED: Rich Doenges

Board Discussion:
Brent Davies expressed her appreciation for all the work put into the document and acknowledged the issues remaining that have yet to been addressed. She said she is hopeful the proposal initiation will resolve those remaining issues.

ACTION: Motion passed unanimously.

UNSTABLE SLOPES PROPOSAL INITIATION UPDATE
Hans Berge, DNR, provided a status update on the proposal initiation. He said he completed the recommendations and presented it to TFW Policy at their March meeting. He said TFW Policy has begun their review and is making progress.

FOREST CHEMICAL APPLICATION
Bernath said the Board received two rule making petitions on pesticide application, specifically focused on adjacent landowner notification and reporting. He provided a brief history on the Forest Practices Application/pesticide use, multi-year applications, and chemical patents expiring resulting in less transparency for the public. He said an informal group had been working on this and when the rule making petitions were received he asked the petitioners to consider withdrawing their petitions and join the informal group to identify solutions. He said they agreed and suggested the Board hear their concerns.

Donelle Mahan, DNR provided an overview on the regulation of aerial chemical application under forest practices and Kelly McLain, State Department of Agriculture provided an overview of pesticide registration and use in Washington State.

Wyatt Golding, WFLC, provided a brief introduction to their petition for rule making. He said the petition's focus is to make modest changes to the Forest Practices Rules regarding the notification of pesticide use. He said better communication to the public is needed.

Diane Hardee, Skykomish Valley Environmental and Economic Alliance, said she would rather communicate proactively to discuss concerns and prevent problems rather than deal with the after-effects of the chemical applicator not knowing where the community is, and possibly accidently contaminating properties and water supplies. She said it was difficult to know when aerial spraying would occur, and now that FPA's are approved for three years and cover a larger area, it is nearly impossible to know when and where it might occur. She said because of this, a statewide plan to notify people who may be affected by spraying is needed.

Elizabeth Ruther, Defenders of Wildlife, expressed concerns affecting streams, wildlife, plants, and amphibians after aerial spraying of pesticides. She said the recommendations in the petition will help reduce impacts to specific species with more accurate information on time, frequency, and location that would be gained from more detailed post-operation forest chemical reporting.

Todd Wildermuth, University of Washington Regulatory Environmental Law and Policy Clinic, described the purpose of the clinic and said the project was taken on because it had a compelling set of clients who presented a straightforward ask--requesting better notice and recordkeeping of what is already being applied.

Wildermuth said the students drafted rule language that:

- is based on the existing Forest Practices Application/Notification framework;
- did not require going through the adaptive management process;
- was within the existing authority of the Board; and,
- is tailored to cover only aerial applications of forest chemicals.

He said the draft language provides a good starting place for a discussion.

Patrick Capper thanked the petitioners for considering this pathway and the trust given to the Board to take the time to go through this process.

Bernath stated that the petitioners always have the option to submit their petition for rule making if they do not feel progress is being made within the informal group. He said an update will be provided at the August meeting.

Brent Davies asked why the records submitted to Department of Agriculture are insufficient. Golding responded that the records are not easily available to the public as they are held privately with the applicator.

Davies asked why they are proposing a rule and not some other approach. Golding responded a more comprehensive and consistent process is needed; however they are open to other options.

2015-2017 CMER BIENNIAL BUDGET ADJUSTMENTS

Hans Berge, DNR, presented an adjusted budget for 2016 and for 2017. He said the adjustments made to the 2016 budget are focused on purchasing equipment for CMER research projects and the adjustments made to the 2017 budget include equipment purchases for the Eastside Type N Riparian Effectiveness Project, analysis and reporting of genetic tissue samples from amphibians collected in 2015 and 2016, and initial funding of a project related to effectiveness monitoring of wetlands following the strategy approved by the Board in August 2015.

PUBLIC COMMENT ON 2015-2017 CMER BUDGET

Karen Terwilleger, WFPA, acknowledged the work done by Berge, Todd Baldwin, and Doug Hooks on getting the budget done and in a manner that makes sense.

2016-2017 CMER BUDGET
Hans Berge, DNR, requested approval of the budget.

MOTION: Heather Ballash moved the Forest Practices Board approve the 2015-2017 updated CMER budget dated April 29, 2016.

SECONDED: Lisa Janicki

Board Discussion:
Joe Stohr asked if the budget supports the CWA Assurances and Berge responded that it does.

Stohr also asked what the funding strategy is for the small landowner template. Berge responded that it is a separate process and current studies in process will provide updated information from what we already have.

Rich Doenges asked about the increase in funding for positions. Berge responded that there was a shortfall in spending due to vacancies in the Adaptive Management Program and have redirected the monies towards projects.

ACTION: Motion passed unanimously (Court Stanley not available for vote)

2017-2019 CMER MASTER PROJECT UPDATE
Hans Berge, DNR, reported that the current budget is sufficient and TFW Policy agreed that there is no need to seek additional funding.

STAFF REPORTS
Northern Spotted Owl Implementation Team and Safe Harbor Agreement
Lauren Burnes, DNR, said the primary focus has been the development of the programmatic Safe Harbor Agreement. She said a work group has been convened to develop recommendations for the draft agreement. She said the team expects to have a draft Safe Harbor Agreement to the Fish and Wildlife Service by early 2017.

Clean Water Act Assurances
Bernath noted the comments received today on the CWA Assurances and said a full report and discussion will occur at the August meeting. He also said DNR is committed to working with Department of Ecology between now and August regarding the operational issues.

Bernath also encouraged CMER and TFW Policy to identify where the issues are within the CMER projects and provide a status report at the August Board meeting.

TFW Policy Committee's Work Priorities
Adrian Miller, Chair, provided a brief progress report on identifying a second co-chair, on-going work regarding recommendations for a permanent water typing rule, small forest landowner's alternate plan template, and the unstable slopes Proposal Initiation.

Due to time constraints, there were no questions or additional comments for the following reports:

- Adaptive Management
- Board Manual Development
- Compliance Monitoring
- Rule Making Activity
- Small Forest Landowner Advisory Committee and Small Forest Landowner Office
- Upland Wildlife Working Group
- TFW Cultural Resources Roundtable
- Taylor's Checkerspot Butterfly Annual Report

2016 WORK PLANNING

Marc Engel, DNR, reviewed the changes to the work plan as a result of the meeting.
The following was added or the completion date was adjusted:

- TFW Policy's Recommendations and Timelines on the unstable slopes Proposal Initiation - August
- Board's administrative process rule making - November
- CMER Master Project Schedule - August
- Report to legislature on Master Project Schedule due 10/1/2016 - August
- Cultural Resources - November
- Forest Chemicals – August

MOTION: Brent Davies moved to approve the 2016 work plan presented today along with the additional items approved today. TFW Policy needs to continue to make water typing be their first priority so that recommendations come to the Board in November.

SECONDED: Heather Ballash

Board Discussion:
Bernath said that the motion sends a clear message to TFW Policy and asked Adrian Miller if it is helpful. Miller responded yes as it reinforces the Board's existing priorities and that when Policy does have time constraints it is clear what needs to be worked on.

ACTION: Motion passed unanimously (Court Stanley not available for vote).

EXECUTIVE SESSION

None.

Meeting adjourned at 5:00 p.m.

DEPARTMENT OF NATURAL RESOURCES

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July 18, 2016

MEMORANDUM

TO: Forest Practices Board

FROM: Marc Engel, Assistant Division Manager, Policy and Services
Forest Practices

SUBJECT: Spotted Owl Conservation Advisory Group Update and Membership

WAC 222-16-010*"Spotted owl conservation advisory group"* requires an annual update regarding evaluations by the Spotted Owl Conservation Advisory Group.

This group evaluates the need, based on available habitat, to maintain northern spotted owl site centers while the Board completes its evaluation of rules affecting the owl. The Advisory Group is convened to conduct evaluations when the Washington Department of Fish and Wildlife (WDFW) approves surveys demonstrating the absence of northern spotted owls within the suitable habitat supporting a northern spotted owl site center.

Within the last year there were no northern spotted owl surveys submitted for review and approval to the WDFW. As such, the Spotted Owl Conservation Advisory Group did not meet.

The rule describing this group, WAC 222-16-010, states:

> **"Spotted owl conservation advisory group"** means a three-person advisory group designated by the board as follows: One person shall be a representative of Washington's forest products industry, one person shall be a representative of a Washington-based conservation organization actively involved with spotted owl conservation, and one person shall be a representative of the department's forest practices program. Members of the group shall have a detailed working knowledge of spotted owl habitat relationships and factors affecting northern spotted owl conservation. On an annual basis, beginning November 2010, the board will determine whether this group's function continues to be needed for spotted owl conservation."

At your August meeting I will request you confirm the Board's support of the Spotted Owl Conservation Advisory Group, and your approval of Stephen Bernath, Deputy Supervisor for Forest Practices, to serve as the Department of Natural Resources representative on this group.

Should you have any questions please feel free to contact me at 360-902-1309 or marc.engel@dnr.wa.gov.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

Memorandum

July 19, 2016

TO: Forest Practices Board

FROM: Mark Hicks, Ecology Forest Practices Lead
SUBJECT: Clean Water Act Milestone Update

The Washington State Department of Ecology (Ecology) committed to provide the Forest Practices Board (Board) with periodic updates on the progress being made to meet milestones established for retaining the Clean Water Act (CWA) Assurances for the forest practices rules and associated programs. Our last update to the Board occurred at your May 2016 Board meeting.

Under Washington state law (Chapter 90.48 RCW and 76.09.040 RCW) forest practices rules are to be developed so as to achieve compliance with the state water quality standards and the federal Clean Water Act (CWA). The CWA assurances establish that the state's forest practices rules and programs, as updated through a formal adaptive management program, will be used as the primary mechanism for bringing and maintaining forested watersheds in compliance with the state water quality standards. The CWA assurances were originally granted in 1999 as part of the Forests and Fish Report (FFR). Those original assurances were to last for only a ten year period. After conducting a review of the program and hearing from stakeholders that they were committed to making the program work, Ecology conditionally extended the assurances for another ten years. This extension was based on the expectation that the program meet a list of process improvements and performance objectives. These are the milestones reported on in this update.

The 2009 CWA Assurance milestones were established to create a path of steady improvement. The milestones were intended to spur efforts to gather critical information to assess the effectiveness of the rules in protecting water quality as mandated by state law. Equally important, was the intent to encourage process changes that would lead to cooperators working more productively together to create a more effective research program to test and adjust the rules long-term.

At the May 2016 Board meeting Ecology provided written material highlighting the agency's growing concern the programmatic improvements and specific corrective milestones the agency was seeking remain elusive. Board Chair Bernath committed the time of his staff to re-examine their ability to complete the remaining Non-Project operational milestones, and asked the Adaptive Management Program Administrator and the TFW Policy co-chairs to return at the August 2016 Board meeting to explain what is being done to meet the remaining milestones.

Since that May meeting, Ecology has met with DNR staff, and the milestones were discussed at the July 7th TFW Policy meeting in the context of funding items for the 2018-2019 biennial budget. This Ecology memo provides supplementary information on the outcome of these conversations and how they may affect current status and future plans for meeting the CWA milestones.

Enclosed are two tables showing the CWA milestones and summarizing their current status. The first table shows the non-CMER project milestones. These milestones are implemented outside of the CMER research program and are largely within the control of the Forest Practices Operations Section of the Department of Natural Resources (DNR) or the Timber Fish and Wildlife Policy Committee (Policy). For these non-CMER projects, three are off track and one has been started but is well behind schedule. The second table lays out the progress being made on the CMER research study milestones. Of the CMER milestones, two are off track and five are well behind schedule. Changes in status since your last briefing and points of note are highlighted in red font to support more effective communication.

Please contact me if you have any questions or concerns (360) 407-6477.

Enclosure

Summary of CWA Assurances Milestones and current status:

Non-CMER Project Milestones		
	Summarized Description of Milestone	**Status as of July 2016[1]**
2009	July 2009: CMER budget and work plan will reflect CWA priorities.	**Completed** October 2010 Key research projects slipped well behind schedule affecting the overall priorities.
	September 2009: Identify a strategy to secure stable, adequate, long-term funding for the AMP.	**Completed** October 2010
	October 2009: Complete Charter for the Compliance Monitoring Stakeholder Guidance Committee.	**Completed** December 2009 DNR intends to strengthen the cooperative approach used to involve the committee in design and prioritization decisions of the Compliance Monitoring Program.
	December 2009: Initiate a process for flagging CMER projects that are having trouble with their design or implementation.	**Completed** November 2010 The AMPA plans to review and update the existing process and use it to inform Policy at their monthly meetings.
	December 2009: Compliance Monitoring Program to develop plans and timelines for assessing compliance with rule elements such as water typing, shade, wetlands, haul roads and channel migration zones.	**Completed** March 2010
	December 2009: Evaluate the existing process for resolving field disputes and identify improvements that can be made within existing statutory authorities and review times.	**Completed** November 2010 DNR and Ecology will periodically remind staff of the formal process for resolving filed disputes.
	December 2009: Complete training sessions on the AMP protocols and standards for CMER, and Policy and offer to provide this training to the Board. Identify and implement changes to improve performance or clarity at the soonest practical time.	**Completed** May 2016 Initial training completed with an expanded training regime incorporated as a standard procedure into the AMP. Issues identified for improvement were added to the Policy and CMER task lists for future action in 2010. Since that time Policy has reviewed FFR Schedule L1

Non-CMER Project Milestones		
	Summarized Description of Milestone	**Status as of July 2016[1]**
		research questions for both the Type N and the Unstable Slopes Research Programs. CMER has additionally updated 6 chapters of its' Protocol and Standards Manual and is working on Chapter 7. In May 2016 Policy updated its task list and reaffirmed items important to improve the program. Policy will regularly revisit the list to ensure these items are considered when prioritizing new work. This milestone is completed with recognition it includes a longer term obligation for implementation.
2010	January 2010: Ensure opportunities during regional RMAP annual reviews to obtain input from Ecology, WDFW, and tribes on road work priorities.	**Completed** September 2011
	February 2010: Develop a prioritization strategy for water type modification review.	**Completed** March 2013
	March 2010: Establish online guidance that clarifies existing policies and procedures pertaining to water typing.	**Completed** March 2013
	June 2010: Review existing procedures and recommended any improvements needed to effectively track compliance at the individual landowner level.	**Completed** November 2010
	June 2010: Establish a framework for certification and refresher courses for all participants responsible for regulatory or CMP assessments.	**Completed** September 2013
	July 2010: Assess primary issues associated with riparian noncompliance (using the CMP data) and formulate a program of training, guidance, and enforcement believed capable of substantially increasing the compliance rate.	**Completed** August 2012
	July 2010: Ecology in Partnership with DNR and in Consultation with the SFL advisory committee will develop a plan for evaluating the risk posed by SFL roads for the delivery of sediment to waters of the state.	**Off Track** Described below for 2013 report stage.
	July 2010: Develop a strategy to examine the effectiveness of the Type N rules in protecting	**Off Track**

Non-CMER Project Milestones		
	Summarized Description of Milestone	**Status as of July 2016[1]**
	water quality at the soonest possible time that includes: a) Rank and fund Type N studies as highest priorities for research, b) Resolve issue with identifying the uppermost point of perennial flow by July 2012, and c) Complete a comprehensive literature review examining effect of buffering headwater streams by September 2012.	A strategy was developed, and Policy and its' technical subgroups were working to implement the strategy. Conflict over providing default distances for defining the UMPPF stalled implementation, then the Forest Practices Board made Type F and mass wasting Policy priorities. This resulted in Policy setting aside work on completing the Type N milestone. Ecology agreed that due to the limited capacity of Policy, they needed to temporarily suspend work on resolving the Type N milestone in order to succeed in meeting the new Board priorities. But this Type N work remains necessary and overdue.
	October 2010: Conduct an initial assessment of trends in compliance and enforcement actions taken at the individual landowner level.	**Completed** November 2010
	October 2010: Design a sampling plan to gather baseline information sufficient to reasonably assess the success of alternate plan process.	**Completed** December 2014 DNR satisfied this milestone by releasing an Alternate Plan Guidance memo (12-10-14) designed to strengthen the overall process for issuing alternate plans. Success depends on how well the new directives are translated into action. DNR completed training in all Regions regarding rule, alternate plan board manual and memo guidance. DNR has also committed to refresher training as needed for Alternate Plans. DNR will conduct a review of the ICNs associated with AP FPAs over the last year to assess whether the guidance is being effectively used. If not being used effectively, DNR will use outreach and/or training as necessary. DNR has invited Ecology to be part of meetings with DNR forestry staff to explain our focus on this milestone.

Non-CMER Project Milestones		
	Summarized Description of Milestone	**Status as of July 2016[1]**
	December 2010: Initiate process of obtaining an independent review of the Adaptive Management Program.	**Off Track** Policy discussed this issue at their May 2016 meeting as part of reviewing their task list. At that meeting they agreed, with consensus, this outside audit is important but is really a responsibility of DNR to implement. No further conversations on how to accomplish this milestone have occurred.
2011	December 2011: Complete an evaluation of the relative success of the water type change review strategy.	**Completed** March 2013 DNR will recheck current status to make sure the review process has not degraded over time. Additional programmatic improvements may be coming as part of the TFW Policy Committee's work on Type F delineation.
	December 2011: Provide more complete summary information on progress of industrial landowner RMAPs.	**Completed** September 2011
2012	October 2012: Reassess if the procedures being used to track enforcement actions at the individual land owner level provides sufficient information to potentially remove assurances or otherwise take corrective action.	**Completed** June 2012
	Initiate a program to assess compliance with the Unstable Slopes rules.	**Ongoing** The DNR Compliance Monitoring Program is evaluating methods for determining compliance with the unstable slopes rules. A pilot study is underway, with formal implementation targeted for 2017.

Non-CMER Project Milestones		
	Summarized Description of Milestone	**Status as of July 2016[1]**
2013	November 2013: Prepare a summary report that assesses the progress of SFLs in bringing their roads into compliance with road best management practices, and any general risk to water quality posed by relying on the checklist RMAP process for SFLs.	**Off Track** DNR conducted a pilot project in its' NW Region. A draft report was shared with Ecology in October 2014. Approximately 92% of SFLs did not respond or denied access. Eleven percent of roads surveyed were reported as delivering sediment to streams. DNR initiated additional SFL outreach efforts on a statewide basis in 2015 in an effort to conduct a more comprehensive roads assessment. The results of this assessment has not been provided. DNR is expanding their initial survey statewide by having their stewardship and landowner assistance foresters ask for permission to conduct road status surveys. However, without jurisdictional authority to conduct a representative survey, fully satisfying this milestone may not be possible.

CMER Research Milestones		
Description of Milestone		**Status as of July 2016[1]**
2009	Complete: Hardwood Conversion – Temperature Case Study (Completed as data report)	**Completed** June 2010
	Study Design: Wetland Mitigation Effectiveness	**Completed** October 2010
2010	Study Design: Type N Experimental in Incompetent Lithology	**Completed** August 2011
	Complete: Mass Wasting Prescription-Scale Monitoring	**Completed** June 2012
	Scope: Mass Wasting Landscape-Scale Effectiveness	**Off Track** No work has occurred. Policy moved this project to the hold list pending review as part of developing the unstable slopes research strategy. It was also omitted from the MPS list that

CMER Research Milestones		
Description of Milestone		**Status as of July 2016[1]**
		went to the Board. Policy discussed this issue at their July 7, 2016 meeting. They agreed to reaffirm the need to address this question by providing money in 2019 to conduct a project feasibility scoping effort. Funds are also in the MPS for outer years to develop a study if shown feasible.
	Scope: Eastside Type N Effectiveness	**Completed** November 2013
2011	Complete: Solar Radiation/Effective Shade	**Completed** June 2012
	Complete: Bull Trout Overlay Temperature	**Completed** May 2014
	Implement: Type N Experimental in Incompetent Lithology	**On Track**
	Study Design: Mass Wasting Landscape-Scale Effectiveness	**Off Track** Described above for 2010 scoping.
2012	Complete: Buffer Integrity-Shade Effectiveness	**Underway** This study was in dispute over concerns arising from the Spring 2013 ISPR comments. The report was rewritten and is now back from a second ISPR review. A final CMER review draft is expected sometime in the Fall of 2016.
	Literature Synthesis: Forested Wetlands Literature Synthesis	**Completed** January 2015
	Scoping: Examine the effectiveness of the RILs in representing slopes at risk of mass wasting.	**Underway** Policy approved project objectives and critical questions June 2015 to guide scope of study. Work subsequently stopped due to the inability of TWIG members to meet and develop study design alternatives. UPSAG has taken over the work on this project and suggests they can develop a best available science alternatives

CMER Research Milestones		
Description of Milestone		**Status as of July 2016[1]**
		analysis document in the Fall of 2016 for CMER review.
	Study Design: Eastside Type N Effectiveness	**Underway** Completed supplemental field work in 2014 to help in developing a study design in 2015. TWIG submitted two draft study designs for CMER review. Issues of concern were raised in 2015-2016 over what is being measured and the prescriptions proposed for testing. A formal process-based dispute appears to have been resolved at the June 28, 2016 CMER meeting. Disagreements over technical elements may have also been resolved at a special meeting held on July 12. If CMER agrees at their July 26 meeting with the way these issues were resolved, the study design will be sent to ISPR review.
2013	Scoping: Forested Wetlands Effectiveness Study	**Underway** Policy approved revised problem statement, study objectives, and research questions January 2016. The TWIG is working to develop study design alternatives.
	Wetlands Program Research Strategy	**Completed** January 2015
	Scope: Road Prescription-Scale Effectiveness Monitoring	**Completed** March 2016
	Study Design: Examine the effectiveness of the RILs in representing slopes at risk of mass wasting.	**Earlier Stage Underway** Discussed above for 2012 scoping.
	Implement: Eastside Type N Effectiveness	**Earlier Stage Underway** Discussed above for 2012 study design.
2014	Complete: Type N Experimental in Basalt Lithology	**Underway** Expected July 2017.

CMER Research Milestones		
Description of Milestone		**Status as of July 2016[1]**
	Study Design: Road Prescription-Scale Effectiveness Monitoring	**Underway**
	Scope: Type F Experimental Buffer Treatment	**Complete** December 2015 TWIG expects to deliver a draft study design to CMER in September 2016 for the first phase of this two part study.
	Implementation: Examine the effectiveness of the RILs in representing slopes at risk of mass wasting	**Earlier Stage Underway** Discussed above for 2012 scoping.
	Study Design: Forested Wetlands Effectiveness Study	**Earlier Stage Underway** Discussed above for 2013 scoping.
2015	Complete: First Cycle of Extensive Temperature Monitoring	**Underway** One of the four strata is complete and two are now back from ISPR. Problems using the DNR hydro layer to find Type Np study streams on the eastside thwarted efforts to find sites for the final strata. Policy decided not to fund temperature monitoring on the final strata and deprioritized temperature trend monitoring for the others. Final reports on the three tested strata expected to be complete in fall 2016.
	Scope: Watershed Scale Assess. of Cumulative Effects	**Off Track** This project was intended to follow and be built on the lessons learned from other effectiveness monitoring studies which remain behind schedule.
	Scope: Amphibians in Intermittent Streams (Phase III)	**Not Progressing** Project milestone exists only if needed to fill research gaps left from Type N Experimental in Basalt Lithology. The Type N Basalt study is expected to be completed by 2018, so Policy established 2019 as a date to begin this study; if questions were not addressed.

CMER Research Milestones		
Description of Milestone		**Status as of July 2016[1]**
2017	Study design: Watershed Scale Assess. of Cumulative Effects	**Off Track** Discussed above for 2016 Scoping.
	Study Design: Amphibians in Intermittent Streams (Phase III)	**Not Progressing** Discussed above for 2015 scoping.
2018	Complete: Roads Sub-basin Effectiveness	**Earlier Stage Underway** Resample for trend analysis planned for 2022. Ecology agreed to this later timeline since it is prudent to wait until RMAP time extensions have ended before conducting further sampling.
	Implement: Watershed Scale Assess. of Cumulative Effects	**Off Track** Discussed above for 2016 Scoping.
	Complete: Type N Experimental in Incompetent Lithology	**On Track**
2019	Complete: Eastside Type N Effectiveness	**Earlier Stage Underway** Discussed above for 2012 study design.

Status terminology:

"Completed" - milestone has been satisfied (includes those both on schedule and late).

"On Track" - work is occurring that appears likely to satisfy milestone on schedule.

"Underway" - work towards milestone is actively proceeding, but likely off schedule.

"Earlier Stage Underway" – project initiated, but is at an earlier stage (off schedule) then the listed milestone.

"Not Progressing" - no work has begun, or work initiated has effectively stopped.

"Off Track" - 1) No work has begun and inadequate time remains, 2) key stakeholders are not interested in completing the milestone, or 3) attempt at solution was inadequate and no further effort at developing an acceptable solution is planned.

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MEMORANDUM

July 22, 2016

TO: Forest Practices Board

FROM: Donelle Mahan, Assistant Division Manager, Operations

SUBJECT: Pesticide Notification Group Update

At the May 11, 2016 Forest Practices Board meeting the Board chair requested Department of Natural Resources (DNR) staff, Department of Agriculture staff (WSDA), Kalispell Tribe, Washington Forest Protection Association (WFPA), Washington Friends of Farms and Forests (WFFF), and Washington Forest Law Center (WFLC) and their clients come together to discuss what had been presented within each rule petition and seek solutions to concerns where possible.

The Pesticide Notification group met on May 18, June 29, and July 12. The discussion topics at each meeting included notification, a revised Forest Practices Aerial Chemical Application form, reporting, DNR's pesticide webpage, modifications to Forest Practices Application Review System (FPARS), best management practices that could be updated in board manual section 12, and compliance of herbicide applications. I will provide a synopsis of the discussions at the August 10, 2016 board meeting.

Please call if you have questions (360) 902-1405.

DM/

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MEMORANDUM

July 20, 2016

TO: Forest Practices Board

FROM: Hans Berge, Adaptive Management Program Administrator

SUBJECT: Adaptive Management Program Quarterly Staff Report: Water Typing and the 17/19 Biennial Budget

This update provides details on progress made in the Adaptive Management Program since the May 2016 Board Meeting. As expected, the area of emphasis for the Adaptive Management Program during this quarter was on water typing and preparation of the budget for research projects for the 17/19 Biennium. The four areas of emphasis adopted by the Board in August 2015, include best practices in the use of protocol survey electrofishing, review of default physical criteria, an evaluation of the current rule process to identify off-channel habitat, and a pilot project to evaluate the modeling effort using LiDAR derived data.

Type F: Protocol survey electrofishing

The Policy stakeholder Electrofishing Technical Group met twice per month from October 2015 through April 2016 to develop a set of recommendations around areas of contention where protocol survey electrofishing is regularly applied. The participants in the ETG were experienced in applying and/or reviewing protocol survey electrofishing data. The recommendations from the group focus on a range of issues, but they can be summarized into probability of detection of the last fish, adequacy of single site visits, seasonality, and harm to fish or fish populations. The final report was completed on 27 June 2016 and I have included it for your review. A sub-group of the ETG have been asked by Policy to identify any recommended changes in protocol surveys needed for the permanent water typing rule. These recommendations will be presented to you as part of the Type F strategy in November 2016.

Type F: Off-channel habitat

The Off-Channel Habitat Technical Working Group presented their findings at the June 2016 Policy meeting and completed their report for Policy on 19 July 2016. Like the Electrofishing Technical Workgroup, the proposal initiation process included a list of questions intended to better understand how the current rule protects off-channel habitat (OCH) for Type F waters. The task of this group was to collect and review current literature and protocols to define OCH,

determine if OCH is omitted from FPAs under existing definitions, review existing definitions of bankfull width and depth to see if elevation may be a better criteria, review WAC 222-16-031 to see if it adequately covers OCH, and, define the flood return interval that defines 95 percent of OCH and any field methods used to delineate the interval. The authors attempted to address each of these tasks with currently available information. After a thorough review, they recommended some specific areas of study that are needed for more precise answers. Specifically, they recommend a phased study that focuses on understanding whether or not OCH is being fully protected. The first phase would focus on how common OCH is outside of channel migration zones and the second phase would focus on developing methods to identify OCH and determine if and when fish use the off-channel habitat identified above the bankfull elevation. Policy is currently reviewing the report and will be incorporating its findings into recommendations for the Type F strategy in November 2016.

Model Evaluation

The Precision Forestry Cooperative at the University of Washington has been working on the Board directed task to "to scope and initiate a pilot project to re-run the existing hydrologic model using LiDAR data, including at least two watersheds; one westside and one eastside" since November 2015. Although there have been a number of challenges with this project, you will be given a presentation at the 10 August 2016 meeting. The pilot project was applied in the Darland Mountain (eastside) and Mashel (westside) Watershed Analysis Units. While the benefit of using a 3 m vs. a 10 m digital elevation model are obvious in identifying channels, locating them in space, and identifying barriers to fish, it will take a lot of resources to develop water typing models that are highly accurate, minimize error, and balance remaining uncertainty. More robust datasets collected through precise research objectives will be necessary to develop and validate water typing models that will be highly accurate and minimize error.

17/19 Biennial Budget

CMER recommended a biennial budget for Policy approval at the April 2016 CMER meeting. After Policy reviewed the proposed budget, the recommendation was made that the request to the Legislature for General Funds for AMP related research remain unchanged from the current biennium ($5.894 M), and that message was relayed to the Forest Practices Board at your 11 May 2016 meeting. Specific elements of the requested budget for the 17/19 Biennium will be included in a separate memo.

RECOMMENDATIONS OF BEST PRACTICES REGARDING PROTOCOL SURVEY ELECTROFISHING

Results of the Electrofishing Technical Group for TFW Policy Committee

Prepared by: Howard Haemmerle, Pete Bisson, and Hans Berge

JUNE 27, 2016
FOREST PRACTICES ADAPTIVE MANAGEMENT PROGRAM

Technical Workgroup and their affiliations*:

Brandon Austin	Washington Department of Natural Resources
Eric Beach	Green Diamond Resource Company
Patrick Cooney	Smith-Root, Inc.
Doug Couvelier	Upper Skagit Indian Tribe
Jon Drake	NOAA National Marine Fisheries Service
Brian Fransen	Weyerhaeuser Company
Jamie Glasgow	Wild Fish Conservancy
Debbie Kay	Suquamish Indian Tribe
Kris Knutzen	Washington Department of Natural Resource
Ashlie Laydon	Washington Department of Natural Resources
Derek Marks	Tulalip Tribes
Tim McBride	Hancock Forest Management
Chris Mendoza	Mendoza Environmental, LLC
Blake Murden	Port Blakely Companies
Don Nauer	Washington Department of Fish and Wildlife
Kris Northcut	Merrill and Ring
Rod Thysell	Washington Department of Ecology
Jason Walter	Weyerhaeuser Company
Sarah Zaniewski	Squaxin Island Tribe

The participation of the above persons does not imply wholesale endorsement of the document by them or their caucuses for each recommendation contained within this document.

EXECUTIVE SUMMARY

This report summarizes the findings of the Electrofishing Technical Group (ETG) regarding the use and effectiveness of protocol electrofishing surveys in detecting fish. The ETG was asked to consider a number of questions related to the efficacy of backpack protocol survey electrofishing and this report addresses each of those questions with a concluding statement followed by a discussion of the evidence supporting the conclusion. This evidence includes published scientific papers as well as the collective experience of members of the ETG who have strong backgrounds in sampling small streams. Where appropriate, specific recommendations are also given.

It is important to note that this document is the authors' attempt to represent a wide range of experience and perspectives, and it does not claim consensus from all technical group participants on every conclusion and recommendation. An attempt was made during every meeting to reach consensus on each question, but it was not always possible. Individual caucuses are expected to bring any unresolved issues related to protocol survey electrofishing to be considered by the entire TFW Policy Committee for inclusion in the Type F discussions subsequent to the release of this report.

Electrofishing is part of implementing a protocol survey that informs the process of stream typing. While this report presents the group's findings about modern electrofishing techniques and survey protocols, it is important to note that it does not address the question of how electrofishing survey results inform where the F/N boundary (division between fish bearing and non-fish bearing segments of the stream) should be located. Electrofishing is an important tool for informing the process of establishing the F/N boundary but it is not the only tool. Our report is restricted to questions about the protocol electrofishing survey technique itself.

A large number of questions were put to the ETG and there was considerable subject overlap among some of them. Rather than repeat each of the questions in the executive summary, we summarize our findings relative to four general topics: (1) probability of detection, (2) adequacy of single site visits, (3) seasonality of fish occupancy, and (4) harm to individual fish or their populations. More detailed answers to specific questions are found in the body of the report.

1. *Probability of detection*

Electrofishing remains the method of choice for detecting fish in streams. Such sites are typically characterized by channels that do not easily lend themselves to other types of fish sampling. Other survey technologies such as environmental DNA (eDNA) are under development and refinement and show great promise, but electrofishing is still the most widely used, effective and efficient method at this time. Site characteristics including water chemistry and clarity, stream size, and the presence of structures in the water that provide escape cover (e.g., undercut banks and log jams) affect capture efficiency, making it impossible to confirm with absolute certainty that fish are absent from a site. However, in the majority of cases electrofishing is the preferred method of detecting fish presence in headwater streams and is the technique most likely to provide accurate information.

2. *Adequacy of single site visits*

Single site visits are believed to be sufficient to establish fish presence, particularly when surveys extend at least one quarter mile above the location of the last sampled fish. The consensus of the ETG was that multiple site visits are not necessary provided the survey protocols are followed and conditions for electrofishing are favorable. This includes sites above natural and man-made barriers to fish passage.

3. *Seasonality of sampling*

The current protocol electrofishing survey guidelines provide a sufficient time window for electrofishing when flows are typically low or declining, but not at the lowest point in the hydrologic year. The ETG acknowledges that seasonal fish movements occur, but based on current evidence the occupied length of perennial headwater streams does not change much over a year in the absence of significant channel altering events such as debris flows. Therefore, surveys carried out according to the existing timelines have a high likelihood of detecting fish if they are present at a site.

4. *Harm to fish or fish populations*

In most situations, protocol electrofishing surveys are unlikely to result in harmful demographic effects on headwater fish populations as long as appropriate precautions are taken to avoid damage to active redds, damage to instream and riparian habitats, or to cause extensive downstream movement of population members. Special cautions or postponement of electrofishing surveys should be exercised if the population is suspected to contain very few breeding individuals (scientific literature suggests 25 breeding pairs as a lower threshold). The electrofishing technique itself does have the potential to harm individuals and eggs exposed to electrical fields. Spinal injuries are most common. The risk of injury can be minimized by employing modern equipment and using settings that are least harmful to fish. The ETG suggests that training and possible certification of electrofishing crews can also reduce risk, as well as ensuring that protocol surveys are conducted in a consistent manner.

INTRODUCTION

The Type F Permanent Water Typing Rule has been a Forest Practices Board (Board) and Policy priority for the past several years. The issue went through Stages 1 and 2 of the dispute resolution process, ending in the submittal of majority/minority reports to the Board in February 2014. At that time the Board directed Policy to work on two specific issues that are necessary for development of a permanent rule (electrofishing and off-channel habitat). By directing the issue back to Policy with more specific guidance, the Board continued following the adaptive management process for resolving formal dispute according with the adaptive management board manual (Section 22) on those two components.

At its February 2014 meeting, the Board approved a motion associated with development of a permanent water typing rule, and both the Board and Policy work plans were amended to

reflect the motion. The identified steps are essential for the Board to consider when making a final determination of the appropriate approach to take in the development of a permanent water typing rule. Policy was directed to complete recommendations for options on a permanent water typing rule, beginning with two tasks: (1) development of "best practices" recommendations regarding protocol survey electrofishing, including an evaluation of published relevant literature, minimizing potential site-specific impacts to Incidental Take Permits covered species, and options for reducing the overall extent of the surveys' use, and (2) an evaluation of the current rule process to identify off-channel habitat under the interim water typing rule, including recommended clarifications in field implementation guidance, or rule language. The evaluation must be based, in part, on field review of approved Forest Practices Applications and water type modification forms.

The motion adopted by the Board directed Policy to evaluate electrofishing best practices in the context of protocol surveys, not electrofishing as a general practice. The Board motion also asked that Policy convene a technical group to help evaluate these best practices. The AMPA convened a technical group that included practitioners and other caucus representatives to identify best practices regarding electrofishing within the context of protocol surveys, including how to reduce site-specific impacts of practices of protocol survey electrofishing and how to reduce the overall extent of the surveys' use. This document is produced by the technical group to meet the intent of a "best practices recommendation".

Policy reviewed a draft work plan for what the technical group would do to meet the Forest Practices Board motion, which included a list of items that the technical group would review/consider. Policy specifically asked the technical group: "What can the technical group identify to inform Policy's recommendations on how to reduce site-specific impacts of electrofishing and the overall extent of the protocol surveys' use?" To assist the technical work group, Policy generated a list of questions and concerns the technical group should consider (including implementation issues and other relevant documents and questions previously raised by Policy including – memo from UCUT to AMPA (Dec 2013), Tech/Op memo, FFR sections, draft water typing Charter documents (2013), comments to the draft electrofishing literature review (May/June 2015), comments to the electrofishing workshop summary (Feb 2015), etc.). The AMPA convened the technical group (ETG) in October 2015.

The technical group was tasked with identifying technical and scientific issues related to the application and use of electrofishing associated with the protocol surveys to determine how it may be possible to maximize the efficient and effective application of all available information including electrofishing to minimize both site specific impacts to Incidental Take Permit relative to Endangered Species Act-listed fishes and the overall use of electrofishing. Members of the technical group were in complete agreement that the final product of their work must be grounded in science. With this in mind their first action was to draft a purpose statement to guide the development of a final product. The resulting purpose statement of this report is:

"Use science and data to develop "best practices" recommendations regarding protocol survey electrofishing, including an evaluation of relevant literature, to minimize potential

site-specific impacts to all fishes including Incidental Take Permit covered species, and identify options for optimizing the overall extent of the surveys' use."

The technical group was initially tasked with a set of questions regarding the use of protocol surveys in water typing consistent with their purpose statement, identifying which questions/concerns from the items provided by Policy they considered relevant to the electrofishing topic and which issues they would not address as part of the electrofishing review process. The technical group identified those questions and concerns outside their purview so Policy would be able to address them through other venues.

This report summarizes the issues identified, topics addressed, and proposed recommendations that resulted from the technical group's work. The ETG notes that there was overlap among some of the questions we were asked to address; therefore, there is some duplication of content in several of the answers.

RESPONSES TO POLICY'S QUESTIONS

Responses were developed to assist members of Policy in responding to the Board's February 2014 Motion. Questions have been separated into five categories: site specific impacts of electrofishing on fish, optimization of the overall extent of survey use, seasonal distribution of fish and timing of surveys, alternatives to electrofishing, and training and/or certification.

SITE SPECIFIC IMPACTS OF ELECTROFISHING ON FISH

1. Do single visit surveys affect fish populations?

Conclusion:

Under most survey conditions, population-scale damages from a single visit protocol electrofishing survey seem improbable. Exceptions can occur where surveys affect very small breeding populations of fish that are isolated above natural or man-made barriers to fish passage.

Discussion:

It is important to recognize the difference between the effects of electrofishing on individual fish and the effects of electrofishing surveys on fish populations. Potential physiological impacts of electrofishing on individual fish and fish eggs are discussed below. Population-level impacts caused by electrofishing can occur if surveys cause significant alterations of Viable Salmonid Population (VSP) parameters – population abundance, population growth rate, population spatial structure, or population diversity – such that the long-term viability of a fish population is compromised (McElhany et al. 2000). To determine potential electrofishing impacts on VSP parameters it is necessary to know the effective population size (number of breeding individuals) in a local population and the possibility for immigration into or emigration from local breeding populations to occur, both of which can influence the true effective population size. Large populations are less vulnerable to harm from single visit surveys than small populations in cases where a site visit affects a relatively small fraction of

the overall breeding group. Small, closed populations on the other hand are at greater risk of harm if electrofishing results in impairment of the reproductive success, survival, or distribution of a significant fraction of breeding adults. Nielsen (1998) suggested that an effective population size of 25 or fewer breeding pairs of trout could be vulnerable to potential electrofishing damage. In practice it is very difficult to know the number of potentially breeding adults in a population without sampling the population's entire distribution and being aware of the distribution of natural and man-made barriers to migration.

Most fisheries managers seek to obtain data on the total abundance of fish inhabiting a particular stream system. However, for smaller, high-order, streams, such abundance data may not exist. In the absence of data for the total abundance of a population, effective population size may serve as a surrogate for abundance. Since effective population size focuses solely on the relative genetic contributions of adults, the concept does not account for abundance of egg to fry, and fry to smolt, life stages, nor does effective population size necessarily reflect the carrying capacity of a particular habitat. For ESA-listed populations, VSP criteria may matter more than simple estimates of abundance. This becomes critical where sensitive populations that are important to recovery of ESA-listed stocks inhabit headwaters that do not support large numbers of adults.
In most cases, trout will occur higher in a drainage network than non-salmonid species. The following tables give the species identified in last fish surveys conducted in western (Fransen et al. 2006) and eastern (Cole and Lemke, unpublished) Washington CMER investigations.

Table 1. Species present within the stream reaches immediately below the terminal upper limits of occurrence among streams in western Washington State. More than one species was identified at some sites.

	Sites where present	
Species	Percent	Number
Cutthroat Trout *Oncorhynchus clarkii*	88.9	256
Sculpin *Cottus spp.*	10.4	30
Coho salmon *Oncorhynchus kisutch*	5.2	15
Rainbow trout *Oncorhynchus mykiss*	2.8	8
Brook trout *Salvelinus fontinallis*	2.1	6
Threespine stickleback *Gasterosteus aculeatus*	0.3	1

Previously, trout inhabiting small headwater streams were believed to reside in fresh water throughout their life histories and to undertake limited, if any, migrations. Evidence supporting this assumption came largely from marking studies in the UK where the same fish was captured on successive years from the same small stream, often from the same pool (Elliot 1989). If it is assumed that headwater resident fishes do not move, one consequence is that riverine drainage systems contain a mosaic of breeding populations substantially isolated from each other as a result of restricted or absent gene flow. In theory, this can lead to very small effective population sizes in tributaries where trout have access to short segments of the

channel and where interbreeding among adjacent tributary populations is absent or minimized.

Table 2. Fish species observed in each watershed during 2002 last fish resurveys in eastern Washington (Cole and Lemke, unpublished data).

Watershed	Cutthroat Trout	Brook Trout	Bull Trout	Redband/Rainbow Trout	Sculpin spp.
Big Sheep		X			
Cabin	X				
Cooper	X	X			
Deer	X	X			
Le Clerc	X	X			
Naneum	X				X
NF Deep	X				
NF Touchet			X	X	
Rattlesnake	X				
Taneum	X	X			

More recent evidence suggests that movement of adult trout among headwater streams does occur where no natural or unnatural fish passage barriers are present, even though the same fish can occasionally be found at the same place at certain times of the year. Fausch and Young (1995) documented the movement of adult Cutthroat Trout among headwater tributaries in the northern Rocky Mountains and suggested that the ability to move around was an important adaptive mechanism for surviving in seasonally variable and often unpredictable environments. Walter et al. (unpublished CMER study) found that nearly 100% of the fish sampled and tagged immediately below the F/N break in western Washington were absent from the same reach a year later, yet densities often were similar year to year. The development and refinement of PIT-tag (passive integrated transponder) technology has facilitated a better understanding of fish movements in small Pacific Northwest streams, and since PIT-tags have been widely employed most monitoring studies have concluded that movement is widespread and is an important attribute in resident fish life histories. However, large-scale PIT tagging of juvenile fish creates its own set of risks, primarily due to tag burden, sub-lethal tag effects, and delayed mortality.

It is possible that single site visit surveys could directly affect small headwater fish populations, but damaging effects would only occur under specific circumstances. The population inhabiting the stream segment of interest would have to be truly isolated by an impassable barrier from the recruitment of new adults moving up into the stream. That is, fish could leave the segment by moving downstream but new recruits would not be able to enter the population by moving upstream. The location of such specific circumstances in Washington's watersheds has not been fully mapped, but isolated Cutthroat Trout populations upstream from natural and/or anthropogenic barriers are common in the Pacific Northwest (Guy et al. 2008). In these watersheds, a single debris flow or other large disturbance can

cause an immediate decrease in intra-population genetic diversity that persists in locations where no subsequent immigration to the population occurs (Guy et al. 2008). Based on available evidence, headwater fish populations upstream from natural and man-made migration barriers are vulnerable to genetic and demographic harm if surveys cause a loss of adult fish that reduce the breeding population size to a level that impairs one or more VSP parameters. In102 protocol site visits in 2015, Weyerhaeuser scientists usually encountered fewer than 4 fish in a population survey, but in approximately 45 percent of surveys more than one fish was encountered (graph below, unpublished data of B. Fransen). Therefore, the breeding population would have to be very small and the site visit would have to result in displacement, reproductive impairment, or mortality of adults in order to cause population level impacts.

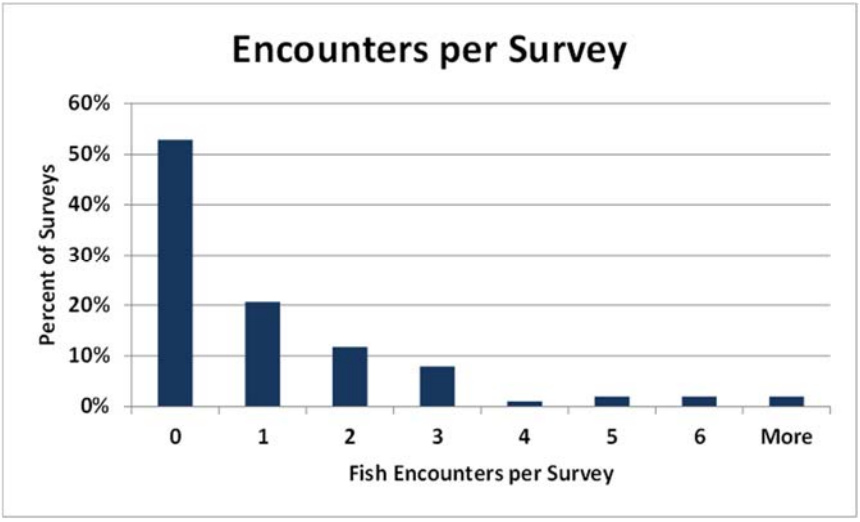


Figure 1. Number of fish encountered per survey at 102 protocol survey sites (B. Fransen, unpublished data).

Based on DNR's RMAP (Road Maintenance and Abandonment Plans) reports, the vast majority of impassible culverts that have been removed and/or replaced are located in the lower portions of watersheds as a result of RMAP's prioritization of anadromous fish passage (DNR annual RMAP reports, DNR / WDFW fish passage database). Impassible culverts historically installed in steep headwater areas are often located underneath deep road fills making them very costly to replace with fish passable culverts. Impassable headwater culverts yet to be replaced can isolate fish populations and form boundaries for areas within watersheds where negative impacts from electrofishing could occur if isolated breeding populations upstream of the barriers are very small.

The barrier effect could be exacerbated if there was significant downstream movement of fish from the sampled reach as a result of volitional avoidance of the electrical field or disturbances related to wading in the stream, or alternatively, if there was drift of stunned fish downstream during the electrofishing procedure itself. To have a significant effect on the population, fish moving downstream out of the sampled reach would need to pass over the barrier that would prevent them from moving back into the site. Finally, a fish population

could be negatively impacted if single visit electrofishing led to immediate or delayed mortality of enough shocked individuals or eggs to cause a significant reduction in one or more VSP parameters.

As outlined above, the potential to reduce the number of breeding adults depends on the geomorphic setting of the stream segment in question and the ability of new colonists to move into the site, thus expanding the effective population size. It is important to note that even in intensively monitored watershed studies where headwater populations (not isolated) have been repeatedly electrofished for a decade or more (Hall et al. 1987; Hartman et al. 1987) there is no direct evidence that long-term harm to salmon and trout populations related to electrofishing has occurred. Given the importance of understanding the effects of protocol single site visits on headwater fishes, additional studies focusing on the demographic and genetic impacts of electrofishing on small populations would be helpful.

Recommendations:

Careful attention to electrofishing technique minimizes risks to individual fish, prevents both adults and juveniles from being driven downstream out of the site, and blocks egress from shocked areas by stunned fish, thus reducing the likelihood of long-term demographic impacts. Environmental conditions that may compromise the effectiveness of an electrofishing survey include extremes in flow (low or high), turbidity, extremes in conductivity and water temperature (low or high, see NOAA and e-fishing equipment manufacturers guidelines), and dense or impenetrable riparian vegetation. Carrying out effective surveys using techniques that result in low risk to fish populations will require careful adherence to protocols and board manual guidance, particularly NOAA electrofishing guidelines for ESA-listed fish and WDFW Scientific Collection Permit conditions, and training that provides both proper instruction to electrofisher operation as well as hands-on field experience. It may be helpful to conduct repeat surveys in a small subset of sites for quality control purposes.

Specific recommendations include:

- Use electrofisher settings appropriate for a stream's conductivity.
- Ensure environmental conditions at time of survey are appropriate and within limits of protocols.
- Follow manufacturer recommendation on when and how to use equipment.
- Avoid electrofishing over active redds.
- Minimize walking in the stream.
- Use procedures to minimize egress of fish.
- Ensure adequate training of survey leads and crews.

2. Is there evidence of direct harm from electrofishing on incubating eggs and gravid females (especially in headwaters where cutthroat spawn)?

Conclusion:

With proper training, experience, and equipment, direct harm from electrofishing can be minimized. However, the procedure itself has the potential to harm all fish life history stages through lethal and sub-lethal injury and stress.

Discussion:

Electrofishing has been used as a survey tool for more than a half century. Over that time there have been many advances in sampling technology as well as a number of studies on the specific effects of electrofishing on physiological performance. Nielson (1998) provides a useful synthesis of electrofishing impacts on trout populations in the Sierra Nevada Mountains of California. Relative to Question 12, potential harm from protocol surveys goes beyond harm associated directly with electricity effects. A two-person survey team walking carelessly through wadeable channels during a spring survey window can impact eggs and alevins in active redds. Cutthroat Trout typically spawn from late winter to early summer, depending largely on a stream's thermal and discharge regimes, with eggs potentially incubating at spawning locations from March to July. Steelhead or resident Rainbow Trout typically spawn between December and June, with eggs incubating at spawning locations throughout that period or longer. Physical damage to incubating eggs can take place if redds are disrupted by wading when eggs and alevins are crushed or washed from the egg pocket. Owing to their small size, resident Cutthroat or Rainbow Trout inhabiting headwater streams do not excavate deep redds and the substrates selected for spawning are composed of smaller gravel than those selected by larger, anadromous salmonids. Eggs may be deposited only a few centimeters below the substrate surface where they may be vulnerable to wading; therefore, it is important for surveyors where possible to avoid wading in stream habitats likely to be used for spawning such as pool tail-outs and low gradient riffles with small to medium diameter gravels. In most cases spawning, gravel incubation, and fry emergence have been completed by early August, and surveys after that time have reduced likelihood of impacting reproductive success.

Evaluating the direct physiological harm from electrofishing to eggs and gravid females is more difficult because electrofishing equipment has been increasingly refined over the years and the published literature on the effects of electrofishing on developmental physiology, based on older technology that is no longer be used, can be outdated. Nevertheless, what literature does exist points to the possibility of some electrofishing-related injury (Sharbor and Carothers 1988; Thompson et al. 1997), although the injury rates have been found by some investigators to be low if proper techniques are followed (Ainslie et al. 1998; McMichael et al. 1998). Spinal injuries, by far, are the most commonly cited injury type and such injuries occur when rapid contraction of muscles during electric shock causes vertebrae to deform or fracture. This can happen at any life history stage.

Visible evidence of electrofishing-related injury does not always reveal the extent of spinal damage. In one study, 40% of fish held in aquaria for a year after exposure to electrofishing showed X-ray evidence of some spinal injury, whereas only 2% exhibited external signs of injury immediately after being shocked (Dalbey et al. 1996). Voltage, wave form, and pulse

rate can affect egg development, although some authors believe that the potentially harmful effects of increased voltage are more important than either wave form or pulse rate (Dwyer and Erdahl 1995; Roach 1999). Sharbor and Carothers (1988) found that exponential and square wave pulse patterns were less harmful than quarter-sine waves, and virtually all investigators recommend that surveyors utilize the lowest possible voltage with a wave form that causes the least injury to eggs, juveniles, or adults. However, the ability of electrical currents to effectively stun fish is size-dependent; voltages and wave forms optimized for capturing adult trout are not the most effective for fry, and vice-versa.

The best equipment settings will likely involve a compromise between shocking effectiveness and the potential for injury, a compromise best gained through experience and by adherence to NOAA electrofishing guidelines (http://www.westcoast.fisheries.noaa.gov/publications/reference_documents/esa_refs/section4d/electro2000.pdf), as well as any state permit requirements. The NOAA guidelines state "Electrofishing in the vicinity of adult salmonids in spawning condition and electrofishing near redds are not discussed as there is no justifiable basis for permitting these activities except in very limited situations (e.g., collecting brood stock, fish rescue, etc.)". In addition, because of temperature-related physiological stress associated with warm summer conditions, the greatest risk to ESA-listed fish during surveys may consist of failing to follow stream temperature restrictions on electrofishing during warm survey periods.

Recommendations:

Minimizing harm to individual fish and eggs will require that:

- Surveyors be properly trained and experienced.
- The proportion of the stream exposed to electrofishing be limited.
- Modern equipment and machine settings that cause the least amount of damage while still effectively detecting fish.
- Available knowledge of potential fish use in and/or upstream of reaches being surveyed (species, size, spawn-timing, etc.) be utilized.
- The amount of physical disruption to the channel be minimized.

3. What is currently being done to reduce site-specific impacts *of protocol electrofishing surveys*?

Conclusions:

Landowners currently have several options to reduce site-specific impacts of single visit surveys. While some of these options are described in Board manual guidance, they are not rules and therefore the extent to which these options are used is currently unknown.

Discussion:

Several options exist to minimize site-specific impacts of single visit surveys, including:

(a) Follow protocol electrofishing survey guidelines using the best available equipment and careful survey procedures. Careful attention to the setting of the stream reach in question (appropriateness of an electrofishing survey, flow regime, presence of passage barriers, suitable fish habitat upstream and downstream), employing fish shocker settings that result in the least injury while providing for effective capture, avoiding excessive wading in the channel (especially in potential spawning habitats), and taking care to prevent the downstream displacement of fish when performing the survey all contribute to reducing site-specific impacts.

Ambient conductivity is used to measure the concentration of dissolved solids ionized in water and is an important consideration in reducing site specific impacts. The unit of measurement commonly used is one millionth of a Siemen per centimeter (micro-Siemens per centimeter or µS/cm). Charges (electrons) transfer along these ions between the two electrodes of the electrofisher and are delivered to the fish. Higher conductivity allows for easier transfer of electrons and lower conductivity causes reduced transfer of electrons. The key to successful electrofishing is to minimize the difference between the internal conductivity of a fish and the ambient conductivity of the surrounding water. Fish are generally accepted to have a conductivity of 115 microSiemens/cm (Miranda 2009).

(b) Use visual observation prior to electrofishing. Visually spotting fish from the stream bank does not injure fish or eggs, and in most cases it is possible to identify fish to the species level based on known distributions of species in the drainage. However, relying solely on visual observations to determine fish presence is more prone to false negative errors than electrofishing, i.e., concluding that fish are not present when in fact they are. Visually observing fish in very small streams can be especially difficult when the channel is small, the fish species present are cryptic, the fish populations are small, water is turbulent, and cover is abundant. For bottom-dwelling species that are occasionally the uppermost stream residents such as sculpins or lampreys, visual observations are virtually impossible. While visual observation is an acceptable method to document fish presence, it is not an acceptable tool for documenting fish absence.

(c) When appropriate, use an alternative technique for determining presence such as environmental DNA (eDNA). This technique is very benign compared to electrofishing because it simply involves filtering several liters of stream water and assaying it for DNA from species of interest. While this technique is currently gaining traction many investigators still feel that it risks false negative errors when target species are rare and thus contribute a very small fraction of detectable DNA in the sample. The difficulty is compounded when the library of reference DNA sequences for species of interest is incomplete. Nevertheless, a recent study demonstrated that improvements in the technique have the potential to make it a more reliable tool for headwater fish detection (Wilcox et al. 2015), and continued technique refinement and development of reference genetic libraries may make eDNA a viable alternative to electrofishing in the future.

(d) Survey coordination. Contact WDFW, local Tribes, private landowners, DNR, and/or NGOs to determine what surveys have already been performed in the watershed of interest.

Recommendation:

- Training and/or demonstration of requisite experience is needed for all field crew leaders. Electrofishing can have direct impacts on fish and under specific circumstances can have population-level impacts. Electrofishing protocol surveys are performed by individuals and organizations representing a wide range of backgrounds and experience. To ensure the proper level of consistency, effectiveness, optimization, and accountability, survey leader proficiency should be demonstrated periodically and survey crew members should be instructed in correct techniques, such as: Training as it relates to issue of impacts.
- Type of equipment – proper use including equipment settings.
- Prior investigation of fish presence (pre-mission planning).
- Create a widely available database of known fish distributions. If changes to stream location or water types are proposed and accepted for a FPA those changes should be reflected in a centralized GIS database to prevent unnecessary surveys.
- Reduce impact by limiting length of stream surveyed.
- Assess use alternative methods for documenting fish presence.
- Personnel guidelines (number of staff).
- Avoid multiple site visits during appropriate season once fish presence determined.
- Environmental conditions at time of survey – ensure that conditions are appropriate and within limits of protocols.
- Be aware of isolated habitats and existing stressors.

4. What is the availability of state and/or federal agencies to provide electrofishing and protocol survey assistance to landowners?

State and federal agencies do not currently provide this service. Private consulting firms, NGOs, and tribes have offered electrofishing assistance to landowners.

OPTIMIZATION OF THE OVERALL EXTENT OF SURVEY USE

1. Are surveys ineffective at low flow?

Conclusion:

Based on practitioner experience protocol electrofishing surveys are generally effective at detecting fish during low flow conditions when those flows fall within the normal long-term

range for a given stream and time of year. Whether or not fish occupy a specific site during low-flow conditions is a question of distribution, rather than protocol survey effectiveness.

Discussion:

The ETG interpreted 'low flow' to represent average flows that fall within the normal long-term range for a given stream and time of year. There was general agreement that:

- Protocol electrofishing surveys are generally effective at low flow.
- Periods of low flow may, in fact, represent the most effective time to survey due to there being more fish per unit channel area, clear water conditions, etc.
- In cases of extreme low flow conditions, electrofishing effectiveness may be compromised when stream depth is too shallow for electrode submersion. The most acute example is when a stream reach dries up completely. In these cases, the loss or lack of flow can reduce or eliminate the opportunity to detect fish and thereby impair survey effectiveness.

With regard to isolated habitats and existing stressors, there are no published environmental thresholds for determining when habitats are too physically isolated (presumably, this means situations where flows are intermittent and fish are concentrated in a few pools) or water quality conditions are such that stress on fish associated with electrofishing would be likely to cause injury or death. However, when surveying ESA-listed fish, NOAA electrofishing guidelines contain specific temperature thresholds above which electrofishing is not permitted. Fish that remained stunned for extended periods of time may become easy prey for predators. Protocol experience and training sessions should discourage surveyors from electrofishing in residual pools where inhabitants are likely to be temperature- or food-stressed, and/or exceedingly susceptible to predation. Experience and professional judgment on the part of the surveyors will be needed when deciding whether or not electrofishing is appropriate.

2. Are surveys ineffective at high flow?

Conclusion:

Based on practitioner experience, protocol electrofishing surveys can be effective at detecting fish during high flow conditions when those flows fall within the normal long-term range for a given stream and time of year. Whether or not fish occupy a specific site during high-flow conditions is a question of distribution, rather than protocol survey effectiveness.

Discussion:

The ETG interpreted 'high flow' to represent average flows that fall within the normal long-term range for a given stream and time of year. There was general agreement that:

- Protocol electrofishing surveys are not "ineffective" at high flow, but may be "less effective" than at normal or low flow.

- High flow conditions may not represent the optimal time to conduct protocol electrofishing surveys. Furthermore, there is a high flow threshold where surveys should not be conducted due to potentially difficult (and unsafe) sampling conditions resulting from increased water volume and depth, higher stream velocity, higher stream turbidity and/or reduced fish response to the electrical field. These conditions may result in reduced likelihood of detecting fish which could result in "false negatives".
- Surveyors tend to avoid sampling in high flow conditions so this may be a non-issue in practice.

3. Are protocol surveys ineffective in streams over 5 feet wide?

Conclusion:

Based on practitioner experience, protocol electrofishing surveys are generally effective at detecting fish in streams greater than 5 feet bankfull width.

Discussion:

For the purposes of this discussion the ETG interprets the "5 feet wide" criteria to mean channel bankfull width (BFW) because that is the stream metric referenced in Board Manual 13. Some research investigating the relationship between stream channel size and overall electrofisher effectiveness/efficiency has been done, however, results are highly variable. Kruse et al (1998) found that stream width was the most important measured stream variable that influenced capture probability and catch efficiency. Weyerhaeuser Company (unpublished data for CMER) shows a catch efficiency of 84% (16% probability of not capturing fish) for streams that are 1 meter wide, 82% (18% probability of not capturing fish) for streams that are 2 meters wide, and 79% (21% probability of not capturing fish) for streams that are 3 meters wide. This report states: "Stream width appears to be a poor predictor of likely catch efficiency within the ranges of stream widths typically encountered during (protocol) electrofishing surveys."

Protocol electrofishing surveys are not generally ineffective in streams over 5 feet wide, but electrofishing effectiveness can be negatively correlated with stream size. Larger streams may have a higher expectation or presumption of fish use. These larger streams also have a wider cross-sectional area and deeper water column that may require more electrofishing effort (e.g. multiple electrofishers, multiple surveys) in order to increase the probability of detection.

Recommendation:

The metric of "5 feet wide" (BFW) should be revisited, as this does not necessarily represent what practitioners would consider a "larger stream" in the context of protocol electrofishing surveys.

4. Is ¼ mile sufficient to demonstrate fish absence?

Conclusion:

Protocol electrofishing surveys conducted over a distance of ¼ mile upstream from the last detected fish are generally sufficient to indicate fish absence with a high probability.

Discussion:

For the purposes of this discussion the "¼ mile" criterion is in reference to the surveyed stream length upstream of the last detected fish. Published data supports the assertion that the ¼ mile survey criteria is generally sufficient to indicate fish absence. Bliesner and Robison (2007) report that: "In streams with low gradient a minimum of 300 m should be surveyed… In streams where a gradient break of a minimum of 8-12% exists this study has indicated that 60 m is sufficient to indicate the Class I (fish bearing), Class II (aquatic life) break." There was general agreement among the ETG that if fish have not been detected within ¼ mile survey and there is no potential habitat upstream (including above permanent, temporary or gradient barriers), then absence is implied. However, the need to survey additional distance upstream from the last detected fish may depend on habitat type, stream size, water level, and other stream properties.

5. Are multiple surveys necessary to demonstrate absence?

Conclusion:

Multiple protocol electrofishing surveys conducted on a single stream segment are not generally needed to indicate fish absence. However, there may be exceptions where stream size, atypical flows, seasonal or annual fish distribution patterns, recent restoration of fish passage, or recent channel disturbances suggest that multiple surveys would be worthwhile. It is important to note that absence cannot be demonstrated, but they probability associated with presence can be evaluated to see when it is improbable that fish are present (e.g., >95% probability that fish do not occur).

Discussion:

The single survey criterion is usually sufficient depending on habitat type, stream size, water level, etc. For the purposes of this discussion the term "multiple surveys" means surveys conducted at a single site over multiple days, seasons, and/or years, not multiple survey passes conducted on a single day. Some published data (Cole et al. 2006) supports the assertion that a single protocol electrofishing survey is generally sufficient to indicate fish absence. The authors, however, do acknowledge the fact that: "Longer term studies that include sampling over a wider range of stream flows and that occur after catastrophic environmental events may further characterize variability in the upper limits of fish distribution". There was general agreement within the ETG that in specific instances where seasonality in fish distribution may be expected, where flow conditions at the time of an initial survey are not "normal", or when a survey is conducted in very wide streams channels, additional survey effort may be

necessary. In addition, stream segments that have been subject to recent channel disturbance events such as debris flows may require additional survey effort (even in subsequent years), particularly if stream conditions have been significantly altered.

6. Are surveys effective above man-made barriers where fish occur above the barrier?

Conclusion:

Based on practitioner experience, protocol electrofishing surveys are generally effective in stream reaches above man-made barriers where viable fish populations exist, and where the abundance and/or species composition of fish within that reach does not appear to be influenced by the presence of the man-made barrier and appropriate environmental factors exist (e.g., conductivity, temperature, turbitity, etc.).

Discussion:

There is no evidence to suggest that electrofishing would be less effective above man-made barriers than below them for the purpose of determining fish presence, particularly when habitat conditions and fish composition and abundance are similar between reaches. The appropriateness of using protocol electrofishing surveys for determining fish presence above man-made barriers may be influenced by the characteristics of the fish population in the reach upstream from the barrier relative to the population downstream. In situations where the presence of a man-made barrier influences the abundance and/or species composition of fish above the barrier and that this influence could impact the upstream distribution of fish, protocol electrofishing surveys may not be appropriate. Board Manual 13 addresses this situation and recommends using physical criteria unless otherwise approved by DNR through consultation with WDFW, Department of Ecology, and affected Tribes in these cases.

7. Is detection poor in small headwater streams?

Conclusion:

The probability of detecting fish in headwater streams using protocol electrofishing surveys can be influenced by population density and numerous other factors previously mentioned above, but is generally not poor.

Discussion:

Headwater streams may support low densities of fish, which can result in reduced electrofishing efficiency and detection probability. The probability of detecting fish is directly related to the population size (Weyerhaeuser Company, unpublished CMER data). The draft CMER Preliminary Assessment of Variable Catch Efficiency states, “Likelihood of detection was lower in sites where fish abundance was low and estimated reduced catch efficiency in response to smaller population size”. Some research has shown that electrofishing efficiency is negatively correlated with increasing stream size (Kruse et al. 1998, Rosenberger and Dunham 2005), while others have found no significant difference

when testing this population abundance and capture efficiency (Foley et al. 2015). However, the ETG felt that in the majority of cases electrofishing is the preferred method of detecting fish presence in headwater streams and is the technique most likely to provide accurate information.

8. Are two shockers [electrofishers] required in larger streams?

Conclusion:

Based on practitioner experience, multiple electrofishers are not generally required when conducting protocol electrofishing surveys in streams larger than 5 foot bankfull width.

Discussion:

The ETG found no specific documentation or data to support the need for two electrofishers in headwater streams wider than 5 ft. BFW. The use of multiple electrofishers should be approached with caution as two shockers may increase the potential risk of site-specific survey impacts on fish. There likely is an upper channel width threshold above which two (or more) electrofishers would result in greater probabilities of detection, but these conditions are generally not encountered during protocol electrofishing stream surveys.

9. Use of protocol surveys during drought years (2015 and future years). Should we be making permanent calls during these years?

Conclusion:

At this time there is a lack of consensus among the ETG on this question. There is agreement, however, that the question may not necessarily be appropriate for this group. This question relates more to if/how drought conditions may impact where to establish the F/N boundary in relation to the last observed fish, and therefore when and where water type maps should be updated.

10. Effectiveness of "single-pass" electrofishing surveys to account for seasonal and long term distribution variability of fish populations within a stream system (snapshot in time).

Conclusion:

By definition a "single pass" or "snapshot in time" sample cannot address distribution variability. Multiple surveys would be needed at a given site to assess actual variability in fish use between seasons and/or years. The ETG concluded this is less a question about the effectiveness of the protocol electrofishing survey itself and more about how and where to establish the F/N break point in relation to the location of the last observed upstream fish, in order to account for potential seasonal and/or long term variability in fish distribution.

Discussion:

Studies investigating longitudinal variability in fish distribution have evolved over time. Early research by Shuck (1945) and Miller (1954 and 1957) indicated that resident trout are sedentary, while more recent research has indicated otherwise. Cole et al. (2006) and Cole and Lempke (2003) report that changes in the location of the "last upstream fish" were limited in eastern Washington streams during a two-year comparison where surveys were conducted under similar flow conditions and at the same time of year, and the changes that did take place were not believed to be biologically significant according to the authors. Changes in the location of the last upstream fish were more common, and distance of change was greater, however, when the same sites were resurveyed four years later (Cole and Lempke: Final ABR Report 2006). Cole and Lempke (2006) suggested that this increased variability in last fish locations was attributable to both inter- and intra-annual variability, and that surveys captured different flow conditions and sampling seasons. In the same report, however, Cole and Lempke (2006) also reported that: "… these data suggest that the upper limits of fish distribution are not highly variable among seasons, at least when seasonal flow conditions are similar…".

Walter et al. (in review) reported that PIT tagging and recapture data for cutthroat trout sampled at the upstream extent of fish distribution within 6 headwater catchments in western Washington suggests a high rate of mortality within and/or emigration from these small stream reaches from year to year. This, coupled with the fact that fish density in these reaches was relatively consistent through time, suggests that while individual fish in these habitats may be highly mobile, the habitat that the fish population as a whole occupied did not change significantly.

Another study to assess seasonal movement of cutthroat trout in a coastal Oregon stream using both mark-recapture and radio transmitters (Gresswell and Hendricks 2007) reported most fish moved very short distances, while a few individuals moved significant distances over the course of the 14-month study. Other research on cutthroat trout movement report similar results (Heggenes et al. 1991; Hilderbrand and Kershner 2000; Schrank and Rahel 2004).

11. What is the risk of not finding fish that are actually present (detectability) when conducting a protocol electrofishing survey?

Conclusion:

The ETG agreed that there is chance of not finding fish that are actually present. The detectability of fish is influenced by site-specific attributes.

Discussion:

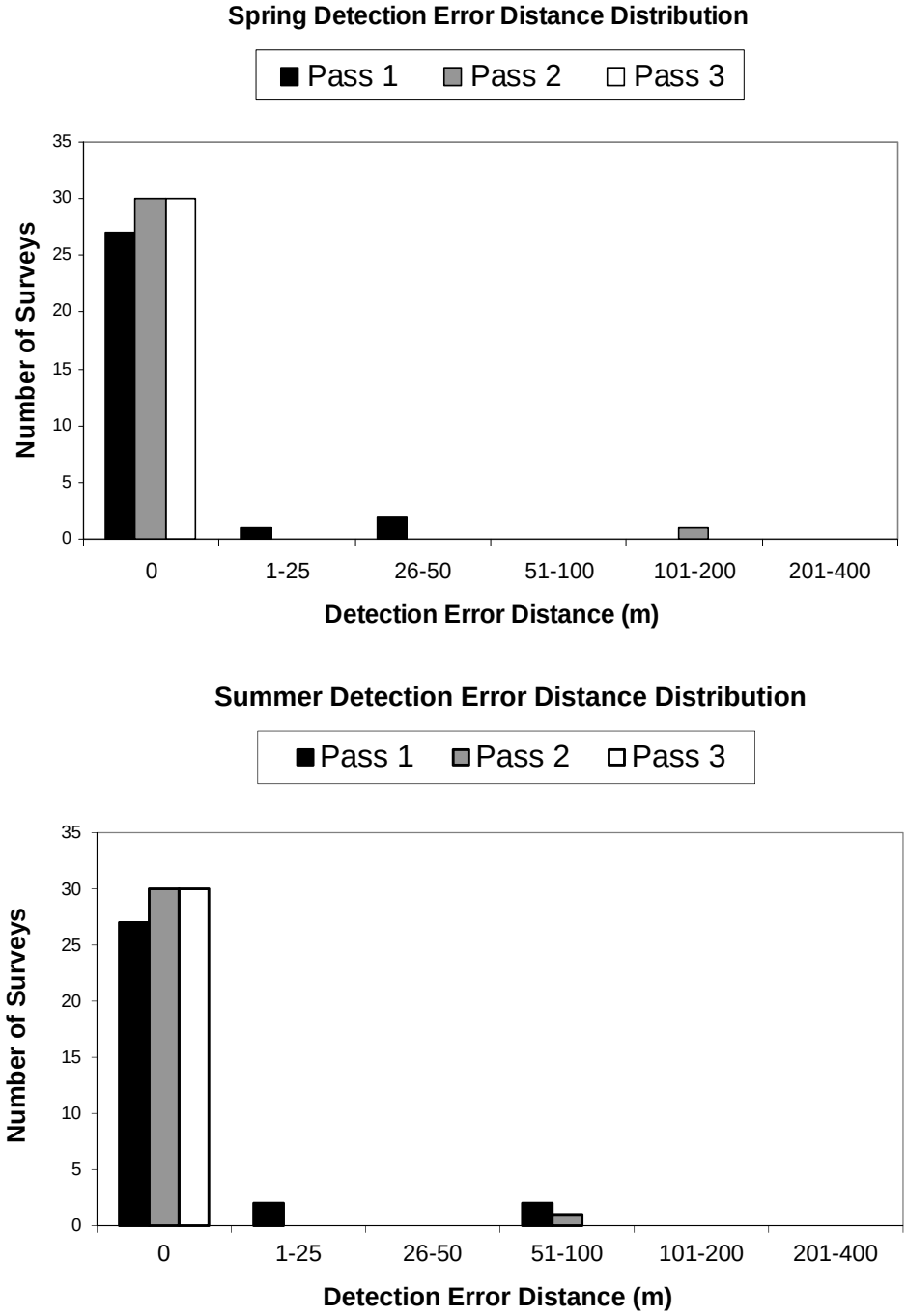
Some investigations have addressed electrofishing efficiency and/or the probability of detecting fish using a backpack electrofisher, while many more examined catch efficiency. For the purposes of this discussion the term catch efficiency is used when fish had to be netted

and/or brought to hand in order to be counted, where detection probability applies to situations where fish only had to be observed while electrofishing. When conducting protocol electrofishing surveys, detecting a fish is sufficient to classify a stream segment as Type-F. Fish do not necessarily have to be captured.

CMER sponsored research (Cole et al. 2002) evaluated the reliability of a single pass electrofishing survey to detect the uppermost fish. Detection error surveys were conducted in 28 streams with terminal Type-F/N break points where no permanent natural barrier to upstream fish movement was present at or within 400 meters (m) of the break. After locating the uppermost fish by protocol electrofishing survey, additional electrofishing surveys were conducted in the reach upstream of the uppermost fish. If fish were found upstream from this point, the distance from the new uppermost fish to the original last fish location was recorded. Surveys were repeated until no fish were detected above the original location of the uppermost fish in a minimum of 4 consecutive surveys. No fish were found above the uppermost fish location identified during the initial protocol electrofishing in 27 of the 28 sites evaluated. At one site, one fish was found 0.5 m upstream on the second pass and another fish 14 m upstream in the third pass. Average error distance across all sites was 0.5 m. As part of another CMER-sponsored study (Cole and Lempke 2006), detection error was evaluated in both spring and summer. A random sample of 30 streams with fish distribution data collected during previously conducted protocol electrofishing surveys, again with terminal F/N break points where no permanent natural barrier to the upstream movement of fish was present at the break point, was selected for each season. The same resurvey protocol was followed as in the Cole et al. (2002) study mentioned above. Cole and Lempke (2006) report that fish were encountered upstream of the original uppermost fish location in only 3 of

the 30 sites resurveyed in each season. Average error distance was higher than observed in the 2002 samples, and averaged 47 and 44 meters in spring and summer samples, respectively

Figure 2. Frequency distribution of spring (upper graph) and summer (lower graph) detection



error distances of last fish surveys performed in seven eastern Washington watersheds in 2005.

It is important to note that these data likely over-state survey detection error across all sites because sample sites were selected to include only those where not detecting fish that were present was more likely (e.g. terminal streams, and streams with no upstream barrier). "These data are therefore a conservative estimate of survey error across the study area" (Cole and Lemke 2003).

The reported range of catch efficiencies in the literature is somewhat variable, and can be influenced by channel characteristics such as stream width. Catch efficiencies may be lower than detection probabilities in similar habitats as it is possible to detect (observe) a fish without actually capturing it. Kruse et al. (1998) estimated a first pass survey catch efficiency of 82% (18% probability of not capturing fish that are present) in small mountain streams. Similar catch efficiencies of 84% (16% probability of not capturing fish) were reported in forested streams in Washington that are 1m wide, 82% (18% probability of not capturing fish) for streams that are 2m wide, and 79% (21% probability of not capturing fish) for streams that are 3m wide (Weyerhaeuser Company, unpublished CMER data).

SEASONAL DISTRIBUTION OF FISH AND TIMING OF SURVEYS

1. What is the appropriate period to conduct an electrofishing survey?

Conclusion:

Based on practitioner experience, no "perfect window" exists and the current window as defined by Board Manual 13 (March 1-July 15) is appropriate in most cases for western Washington.

Discussion:

The ETG is aware of no specific documentation or data to answer this question, and more research is needed on the subject. Results of research reported by Cole and Lempke (2006), however, do address the issue of changes in the upper distribution of fish between seasons and are included in the responses to other questions.

Board Manual 13 reads: "Survey information collected to determine fish use or the maximum upstream extent of habitat utilization must be collected during the time window when the fish species in question are likely to be present... In most cases, this period extends from March 1st to July 15th…". For the purposes of this discussion the term "appropriate period" would refer to the time window during which fish species are most likely to be present. The key is knowledge of target species' life histories. It is important to maintain flexibility in potential survey timing on behalf of both surveyors and reviewers. The need for this potential flexibility is supported by Board Manual 13 language (above) in stating "In most cases…". Surveys conducted outside of the Board Manual 13 window to capture potential seasonal fish use can be resolved through consultation with WDFW and affected tribes.

Additional discussion is necessary for appropriate protocol survey windows for eastern Washington.

2. **Do differences exist between headwater streams and streams lower in the watershed in relation to fish presence (seasonal use), adult spawner presence, eggs in gravel, juvenile presence, etc.?**

Conclusion:

The ETG concluded that differences do exist between headwater streams and streams lower in the watershed in relation to fish presence (seasonal use), fish abundance, adult spawner presence, eggs in gravel, and juvenile presence.

Discussion:

Fish populations in headwater streams typically occur at lower densities, have fewer spawners and eggs in the gravel, and offer less juvenile rearing habitat than downstream reaches. The impact of these differences on protocol electrofishing survey effectiveness have been addressed in a number of other responses in this document.

3. **Are there reasons to vary approach when dealing with anadromous vs resident vs all fish use – especially where resident fish are not yet spawning when e-fishing window opens?**

Conclusion:

There are reasons to vary survey approaches when encountering different species and/or life stages. Most important are consideration of timing and abundance of different life stages in the targeted survey reach. The key is knowledge of target species. If unfamiliar with the life history traits of target species, consultation with WDFW and affected tribes prior to conducting surveys is recommended.

Discussion:

For ESA-listed species, adherence to NOAA electrofishing guidelines (http://www.westcoast.fisheries.noaa.gov/publications/reference_documents/esa_refs/section4d/electro2000.pdf), as well as any state permit requirements, should be followed. The NOAA guidelines state "Electrofishing in the vicinity of adult salmonids in spawning condition and electrofishing near redds are not discussed as there is no justifiable basis for permitting these activities except in very limited situations (e.g., collecting brood stock, fish rescue, etc.)". In addition, because of temperature-related physiological stress associated with warm summer conditions, the greatest risk to ESA-listed fish during surveys may consist of failing to follow stream temperature restrictions on electrofishing during warm survey periods.

4. **Any proposed change in the timing of e-fishing window may not fit with and may actually be in opposition to NOAA and WDFW guidelines.**

Conclusion:

This will be an important consideration when reviewing the appropriate protocol survey window for a particular site.

Discussion:

This issue should be acknowledged when considering the question, "What is the appropriate period to conduct an electrofishing survey?"

5. When should a protocol survey be used in situations such as:

a. Streams with disturbance/habitat degradation (e.g. debris flows, fires)?

Conclusion:

Consultation with DNR, Ecology, WDFW and affected tribes is the best way to ensure survey results are accepted.

Discussion:

This is very much a "site specific" question. There is a wide spectrum of disturbance influence on habitat and channel conditions that can influence both fish distribution and the ability to survey effectively. Board Manual 13 requires documentation of how disturbance or habitat degradation may have affected fish distribution. The ETG concludes that (1) natural events such as debris flows and fires are part of the natural and historic disturbance regime in headwater stream systems, (2) stream segments which have been subject to recent channel disturbance events may require additional survey effort (even in subsequent years), particularly if stream conditions have been significantly altered, (3) the need for survey flexibility is supported by data presented by Cole et al. (2006), and (4) in locations of obvious and recent disturbance events the protocol survey may document presence but is a less reliable indicator of absence.

b. Above man-made barriers (MMBs)?

Conclusion:

Board Manual 13 addresses this situation and recommends using physical criteria unless otherwise approved by DNR in consultation with WDFW, Department of Ecology, and affected Tribes in these cases.

Discussion:

This topic has been addressed under question 6 "Are surveys effective above man-made barriers where fish occur above the barrier?" in the section on optimization of the overall extent of survey use.

c. Ponds, wetlands, and off-channel habitats?

Conclusion:

Electrofishing surveys are not the preferred tool for establishing fish presence in ponds and wetlands, especially those that are not wadeable. Protocol electrofishing surveys are not applicable to defining off-channel habitats under current rules.

Discussion:

There are two distinct questions that must be considered here. First, the appropriateness of using protocol electrofishing surveys in ponds and wetlands, and second the appropriateness of using the survey method to define off-channel habitat. Electrofishing surveys can under certain circumstances (small, shallow ponds and wetlands with good water clarity) be appropriate for documenting fish presence in ponds and wetlands, but not usually for documenting absence. The definition of off-channel habitat is currently being reviewed by a TFW Policy technical committee.

Recommendation:

Other methods (minnow trapping, seining, hook and line sampling, etc., or a combination of multiple sampling techniques) are likely to be more appropriate in ponds and wetlands.

d. How soon to shock after removal of man-made barrier or disturbance?

Conclusion:

There is no specific documentation or published data to answer this question, and more research is needed on the subject. Data (unpublished) are currently being collected by Weyerhaeuser and the Tulalip Tribe to help answer the question.

Discussion:

The ETG believes that timing will largely depend on a number of physical and biological variables including the characteristics of the fish population downstream from the blockage and the characteristics of the stream segment upstream from the blockage. We assumed that the question addresses the issue of time it takes for fish to recolonize stream habitat upstream from natural disturbance or removal of blocking anthropogenic structures.

e. No or insufficient pools meeting protocol "size" are present?

Conclusion:

Many surveys in headwater and small tributary streams simply cannot meet the qualifying pool criteria, as sufficient numbers of qualifying pools are not present in the surveyed reach. Surveyors should sample and document the pool habitat that is available.

Discussion:

This issue is not a major concern in terms of the effectiveness of protocol electrofishing surveys. For the purposes of this discussion we assume that this pool count includes the surveyed stream segment upstream of the last detected fish.

Recommendation:

Revise the survey protocols related to the number of pools of sufficient size to more accurately reflect conditions in small headwater streams.

f. Larger streams (streams that should naturally be fish habitat); is there a stream size that should automatically be considered fish habitat?

Conclusion:

There is no scientific evidence to support a single default stream size that should automatically be considered fish habitat.

Discussion:

ETG members concluded that there are some larger streams that do not contain fish, particularly those reaches upstream from permanent natural barriers.

ALTERNATIVES TO ELECTROFISHING

1. Are there alternatives that can achieve FFR/HCP precision and accuracy targets while reducing e-fishing?

Conclusion:

There are a number of alternatives to electrofishing and each has its advantages in terms of cost savings or reduction of harm to fish. However, not all have been evaluated relative to achieving FFR/HCP precision and accuracy targets.

Discussion:

a. eDNA

Environmental Deoxyribonucleic acid (eDNA) sampling is quickly becoming a useful tool in the detection of organismal DNA in water. The emerging information from eDNA researchers on fish detection indicates that legacy DNA can create false positives that still necessitates the need to validate eDNA results with tools like electrofishing. eDNA could be used to identify streams that lack fish, but the technique may be prone to false negative results

when fish are rare. Whereas, streams with positive eDNA detections could be further explored with electrofishing surveys for occupancy and distribution in the drainage network.

b. Continued use of default physical criteria

TFW Policy is currently discussing the appropriateness of default physical criteria to see if they accurately reflect fish presence.

c. Model

This includes examining models, remote sensing (e.g., LiDAR), and other screening tools that could potentially target field validation efforts resulting in a reduction in the use of electrofishing.

d. Lentic sampling techniques

For areas (ponds, wetlands, other slow-flowing waters) where electrofishing is not the appropriate approach there are other alternative methods such as minnow traps, seining, and hydroacoustic surveys that can be used. If the water body is large enough and boat access is possible, a boat shocker can be used.

e. Visual Observation

Snorkeling can be used in pools to visually observe fish and can be effective where streams are too deep to be wadeable. Some fish species, because of their habitat preferences, small size, or cryptic coloration, are difficult to observe by snorkeling. Another technique utilizing visual sighting is simply to walk the banks of the stream and watch for fish, but in small channels with considerable instream and riparian cover fish are hard to observe.

f. Trapping

Trapping using wire minnow traps is a tool used to sometimes supplement electrofishing in deeper habitats/pools or where electrofishing is not appropriate for specific species. The efficacy of trapping is highly dependent on fish species. Traps in streams may be more useful for capturing invertebrates such as crayfish. Other methods, like snorkeling, are more often used for observing fish. Standardization of trapping currently has not been developed.

<u>Recommendation:</u>

There may be a need to re-examine listed alternatives to determine if they meet FFR/HCP precision and accuracy targets, and understanding advantages and disadvantages of implementing each method.

TRAINING AND/OR CERTIFICATION

Conclusion:

Protocol electrofishing surveys rely on both accuracy in establishing fish presence at a site and consistency of technique when multiple sites are surveyed over a field season. Experience can help ensure that surveys cause a minimum of harm to fish and eggs that might be present at a site, but keeping up with modern equipment and technique is important too. Additionally, leaders of survey crews need to maintain data quality control among crew members and assure that field protocols and other rules are followed. For these reasons, the ETG concluded that there would be value in having a training and/or certification program available to organizations engaging in protocol electrofishing surveys. We note that protocol electrofishing training would involve receiving instruction in both electrofishing theory and field techniques, while protocol certification would add an element of testing and (possibly) prior experience in electrofishing and stream classification. We anticipate that field crew leaders would be protocol electrofishing certified.

Discussion of alternatives:

1. Certification Process

a. Would training and/or certification be creating an issue rather than solving one?

Training needs not only to focus on electrofishing, but also on the process of water typing as a whole. This will ensure that current practices are well understood and new individuals entering the field continue with this established process. Certification can be incorporated into the training process by providing a test so that attendees can demonstrate aptitude in the material. Short term, a mandatory training and certification program would put a burden on training all practitioners. Additionally, it would create the need to identify organizations who can develop a training course and subsequently train and certify people. Further, it would require specifying how often this training/certification needs to be renewed and what costs are associated with potential training and certification. Many current practitioners are resistant to needing certification, but do understand the need for future practitioners to be properly trained and certified.

Other potential questions included:

- Would the experience of an operator be considered when establishing requirements for training/certification?
- Would the information needed to secure a Scientific Collection Permits already capture much of the requirements related to experience?
- Would training and/or certification be designed for both surveyors and water type modification (WTM) application reviewers?

The ETG discussed the idea of requiring certification for both electrofishing practitioners and WTM reviewers. If certification simply focuses on the use and operation of electrofishing

equipment, then reviewers may not need to be trained and certified. But, if certification and training includes water typing methodology, then reviewers and users would both find value in training and certification. At a minimum, practitioner certification would like result in appropriate operation of electrofishing equipment and likely reduce site-specific impacts and optimize the use of electrofishing surveys as a whole. If during review it is discovered that a survey did not follow the protocol, then it should be documented that alternative methods were approved. Certification and training will only resolve this issue if the training includes instruction on how to follow the protocol and prepare a WTM that satisfies reviewers.

Certification programs are currently being offered by USFWS, Smith-Root, and NWETC that cover electrofishing safety, equipment use, and fish handling while electrofishing. There is no formal certification program for the methodology of assessing stream type modification. Therefore, it will be important to determine what information training and certification would encompass, at what point the entire training and certification process could be integrated into one course. To be clear, training involves instruction, whereas certification involves a demonstration of proficiency on the training material, often evaluated by passing a test.

Currently, training is left to practitioners training one another. This can create inconsistencies and sometimes spread misinformation. Formalized training minimizes inconsistencies and mitigates against the spread of misinformation. However, certification and maintaining certification records does create an oversight issue of who would be in charge of maintaining the database and informing those who need updated training.

Some members of the ETG expressed concern that the safety aspects of training would cover primarily safety for electrofishing crew members and that there is also a need to include proper training in fish handling, minimizing the risk of spreading invasive species, and other issues relative to protecting aquatic ecosystems. There was the suggestion that practitioners could opt out of certification and/or training if they could establish a history of professional experience, while another suggestion was that prior experience with protocol surveys and WTM forms should not necessarily be required for certification.

Typical information relative to fish presence or absence submitted with WTM forms is often not standardized. Some ETG members felt water type modifications or proposed changes to the current water type at any given site should follow one standard process. Small landowners seem to be reluctant to use the WTM form. ETG members were not sure why, but felt that incorporation of WTM instructions could be included in a training/certification program, resulting in increased use of the form.

b. Scientific Collection Permit

A Scientific Collection Permit is useful to further demonstrate electrofishing competence. The ETG felt a Collecting Permit should not be used as a surrogate for training and certification, but rather as a supplement. The suggestion was made that the WTM form could include a box where the Collection Permit number could be included. If some other survey method was used (e.g., visual observation) the form should indicate that as well.

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MEMORANDUM

July 12, 2016

TO: Forest Practices Board

FROM: Marc Ratcliff
Forest Practices Policy Section Manager

SUBJECT: Board Manual Development Update

The following provides information on anticipates development for amending sections of the Forest Practices Board Manual.

- Section 12, *Guidelines for Application of Forest Chemicals.* In recognition of anticipated recommendations to the Board resulting from discussions regarding aerial application of forest chemicals and to incorporate advances in trade practices and terminology, Board staff recommends amending this Section of the manual. Completion of this Section is anticipated in mid calendar year 2017.

- Section 23, *Guidelines for Field Protocol to Locate Mapped Division Between Stream Types and Perennial Stream Identification.* Development of this Section will occur concurrently with the development of the permanent water typing rule after the Board accepts the recommendations brought forward by the TFW Policy Committee for establishing the regulatory Type F/N water break. The completion and approval of this Section will coincide with the Board's timeline for the adoption of the permanent water typing rule.

  The current work being done by the TFW Policy Committee also contains recommendations for refining guidance for conducting protocol surveys to establish fish use. Information for protocol surveys will no longer reside in Section 13 (*Guidelines for Determining Fish Use for the Purposes of Typing Waters),* but will be incorporated into Section 23. As a result, Section 13 will be a placeholder for future development of Board Manual guidance.

Please feel free to contact me with any questions at 360.902.1414, or marc.ratcliff@dnr.wa.gov.

MR

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MEMORANDUM

TO: Forest Practices Board

FROM: Garren Andrews, Compliance Monitoring Program Manager

SUBJECT: Current status of the Compliance Monitoring Program

2016 Compliance Monitoring Spring field reviews completed June 2016.

Forest Practices Hydraulic Projects and Unstable Slopes pilot study methodology, and field protocol development underway. Field work for the two pilot studies is expected to commence fall 2016.

2015-2016 Compliance Monitoring Biennium report work is ongoing. Target completion date is summer 2016.

The Compliance Monitoring Program will submit the 2014-2015 biennial report for Independent Study Peer Review. Review questions are currently being developed.

If you have any questions please contact me at (360) 902-1366 or garren.andrews@dnr.wa.gov

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MEMORANDUM

July 18, 2016

TO: Forest Practices Board

FROM: Marc Engel, Assistant Division Manager, Policy and Services
Forest Practices

SUBJECT: 2016 Rule Making Activity

In anticipation of TFW Policy Committee recommendations to the Board regarding a permanent water typing rule staff is not requested Board approval to initiate any active rule making at this time.

With the TFW Policy Committee recommendations for a permanent water typing rule, staff anticipates requesting your approval to file a CR 101 *Preproposal Statement of Inquiry* at your November meeting.

Staff has identified a suite of needed minor rule changes to correct typographical errors and to add minor clarifications to the rules. Staff is tentatively planning to also request Board approval to file a CR-101 *Preproposal Statement of Inquiry* for these changes at the November meeting.

I look forward to answering any questions you may have on August 10.

ME

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MEMORANDUM

July 21, 2016

TO: Forest Practices Board

FROM: Tami Miketa, Manager, Forest Practices Small Forest Landowner Office

SUBJECT: Small Forest Landowner Office and Advisory Committee

Small Forest Landowner Advisory Committee (SFLAC)

Since my last staff report, the Small Forest Landowner Advisory Committee met on May 26th and July 20th, 2016. These meetings specifically focused on addressing and outlining the short and long term goals for the Small Forest Landowner Advisory Committee. The committee outlined a number of short term goals which are:

1. The creation of a SFLAC Member Handbook.
2. Work with DNR staff to create an SFLO Alternate Plan Guidance document to supplement Section 21 of the Boards manual.
3. Work with DNR staff to create an advice document to assist small forest landowners understand the Forest Practices Interdisciplinary Team process.
4. Work with DNR staff to design sample alternate plans for small forest landowners to use as a guide when completing alternate plans. These will be incorporated into the Boards guidance in Section 21 of the board manual.

The committee also began to identify long term goals which are to work with DNR staff to:

1. Identify future funding sources for the Small Forest Landowner Office.
2. Identify options for fully funding the Forestry Riparian Easement Program.

Additional short and long term goals will be developed at future Small Forest Landowner Advisory Committee meetings.

Forestry Riparian Easement Program (FREP)

For the FY 15-17 biennium, the Forestry Riparian Easement Program received $3.5 million from the State Capital Budget. There are now 136 forestry riparian easement applications on the list waiting for compensation, with 50 of them already cruised and valued. It is estimated that the remaining applications will be valued by the end of this biennium. Funding in the 2015-2017 biennium is available to purchase approximately 55 of these 136 applications. New applications are expected to be received at a rate of 30 new applications per year.

Rivers and Habitat Open Space Program (R&HOSP)
The State Capital budget appropriated the R&HOSP $1 million for the FY15-17 biennium. Generally, when the funding level exceeds $1 million, DNR expects to allocate approximately 70 percent of the funds for critical habitat and 30 percent for channel migration zones (CMZs). If the demand is limited in either funding category, DNR may shift moneys between the funding categories. Applications will be funded in order of ranked priority until all funds are expended. All remaining eligible applications will be offered the opportunity to be considered for future funding.

DNR currently has 25 applications for the R&HOSP: 5 for CMZ and 20 for critical habitat for state listed threatened or endangered species. R&HOSP staff are currently prioritizing these applications. Prioritization is based on, but not limited to, the following elements:

- The habitat quality of the property
- Risk of future habitat loss
- Documented occupancy
- Species' landscape continuity
- Species diversity

It is anticipated this prioritization process will be completed by August 2016.

Family Forest Fish Passage Program (FFFPP)
The State Capital budget appropriated $5 million to the Family Forest Fish Passage Program for the FY15-17 biennium. In the 2016 field season, the FFFPP will be correcting 19 fish passage barriers opening up approximately 50 miles of habitat for fish.

Long Term Applications (LTA's)
There are now a total of 218 approved long term applications; which is an increase of 7 approved applications since the end of the last reporting period (4/11/2016).

LTA Applications	LTA Phase 1	LTA Phase 2	TOTAL
Under Review	5	3	**8**
Validated	21	0	**21**
Approved	2	218	**220**
TOTAL	**28**	**221**	**249**

Upcoming Landowner Events
The WSU Forestry Extension program, in coordination with DNR, provides education and information about forest management to private forest landowners as well as the general public. They offer classes, workshops, and field days as well as publications, videos, and online resources to help landowners achieve their various land management objectives. Below is a list of upcoming events designed to aid small forest landowners.

2016 Family Forest Owner's Field Days - On Saturday June 25, 2016, WSU Extension and DNR hosted the eastern WA Family Forest and Range Owner's Field Day in Colville, WA. The event was attended by over 250 forest and range owners with property primarily located in northeast Washington.

The western WA Family Forest Owner's Field Days are scheduled for:

- August 20 in Sequim
- August 27 in Snoqualmie
- September 17 on Lopez Island

Forest Stewardship Coached Planning - WSU's flagship class teaches landowners how to assess their trees, avoid insect and disease problems, attract wildlife, and take practical steps to keep their forest on track to provide enjoyment and even income for years to come. In this class landowners will develop their own Forest Stewardship Plan, which brings state recognition as a Stewardship Forest and eligibility for cost-share assistance, and may also qualify them for significant property tax reductions. The following are scheduled Forest Stewardship Coached Planning classes:

- Deming, September 15 – November 3, 2016
  Class session 6:00 – 9:00 PM Thursday evenings
  Location TBD

- Preston, September 27 – November 15, 2016
  Class session 6:00 – 9:00 PM Tuesday evenings
  Preston Community Center

WSU Extension Twilight Tours- Long summer evenings are perfect for enjoying "twilight tours" of local forests. These free out-in-the-woods events are a chance to share ideas, see what others are doing, and look at real examples of challenges and solutions.

- August 2 – Marysville
- August 24 – Shaw Island

For more information regarding these classes and events go to http://forestry.wsu.edu/

<u>New Staff for the Small Forest Landowner Office</u>
The Small Forest Landowner Office revised the duties of the current vacant Outreach Specialist/Grant Writer position. The position now serves as the designated Natural Resource Small Forest Landowner Technical Assistance Forester in western Washington, who will provide independent professional on-site technical consultative services to small forest landowners in understanding the Forest Practices Rules, timber harvest systems, small forest landowner alternate plan templates, 20-acre exempt harvest activities, long-term applications, low impact harvest activities, and road construction techniques. This position will also maintain the duties of

the Outreach Coordinator by overseeing the development of educational curriculum and outreach activities administered by the Small Forest Landowner Office.

The SFLO recently hired Josh Meek into this position. Josh comes to us with a B.S. degree in Education and a M.S. degree in Forestry from the University of Montana, and has several years of forestry experience working with both State and Federal governments. For the past two and a half years Josh has been in the DNR South Puget Sound region, where he worked in both State Lands and Forest Practices. We welcome Josh into the Small Forest Landowner Office and look forward to providing this valuable service to landowners across western Washington.

Additionally, the Family Forest Fish Passage Program will be hiring an additional staff person to assist primarily in coordinating outreach for the Program and to assist with fish barrier evaluations. It is anticipated this position will be filled by August 2016.

Please contact me at (360) 902-1415 or tamara.miketa@dnr.wa.gov if you have questions.
TM/

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

August 19, 2016

MEMORANDUM

To: **Forest Practices Board**

From: **Terry Jackson, Forest Habitats Section Manager**

Subject: **Upland Wildlife Update**

The following provides a brief status update for ongoing or pending actions pertaining to priority wildlife species in forested habitats.

Marbled Murrelet
1992: Federally listed as threatened
1993: State listed as threatened
1996: Federal critical habitat designated by USFWS
1997: FPB enacted permanent State Forest Practices Rules for the species.

WDFW is currently completing a 5-year periodic status review for the Marbled Murrelet. It provides a summary of the best available science to date on the current status of the species and makes a recommendation as to what the conservation status or listing should be based on the information. These reviews are not intended to be a comprehensive species account highlighting or describing the entirety of the state of knowledge of the species. On July 12, 2016, the public comment period began for the Marbled Murrelet periodic status review. The results of the review will be presented to the Fish and Wildlife Commission on November 4, 2016, along with recommendations for its listing status.

Primary threats to the Marbled Murrelet include loss of old forest nesting habitat from commercial timber harvest and mortality associated with net fisheries and oil spills. In Washington, nesting habitat losses since initial listing in 1993 have been substantial, with an estimated 30% loss on nonfederal lands. At-sea population monitoring from 2001 to 2015 indicated a 4.4% decline annually, which represents a 44% reduction of the population since 2001. The magnitude of the population decline indicates that the status of the Marbled Murrelet in Washington has become more imperiled since state listing in 1993. Without solutions that can effectively address these concerns in the short-term, it is likely the Marbled Murrelet could become functionally extirpated in Washington within the next several decades. Therefore, WDFW's recommendation to the Fish and Wildlife Commission is to uplist the Marbled Murrelet to a state endangered species in Washington. Depending upon final listing status, WDFW will be having discussions with WDNR regarding recommendations to the Board for potential future forest practices protection strategies.

Canada Lynx
2000: Federally listed as threatened
1993: State listed as threatened

WDFW is currently completing a 5-year periodic status review for the Canada Lynx. On July 12, 2016, the public comment period began for the lynx periodic status review. The results of the review will be presented to the Fish and Wildlife Commission on November 4, 2016.

Available information indicates that the distribution of lynx in Washington has contracted significantly from its historic extent and that the boreal forests in western Okanogan County provide the only habitat in Washington that supports a resident lynx population. Estimates of population size, while rudimentary, suggest that this population may include approximately 54 individuals. Threats to this population include loss and fragmentation of habitat, small population size, demographic stochasticity, and the unpredictable effects of climate change. Habitat may be lost as a result of timber harvest, but the bulk of habitat loss is due to large wildfires. There has been no indication that the conservation status of Washington's lynx population has improved since it was state and federally listed. Given the reduced distribution, small population size, and an increase in the number and severity of threats to lynx in Washington, WDFW's recommendation to the Fish and Wildlife Commission is to uplist the lynx to a state endangered species in Washington. Depending upon final listing status, WDFW will be having discussions with WDNR regarding recommendations to the Board for potential future forest practices protection strategies.

Northern Spotted Owl
1988: State listed as endangered
1990: Federally listed as threatened
2012: Designation of revised critical habitat for the USFWS recovery plan

- The results of WDFW's periodic status review for the northern spotted owl was presented to the Board at their February meeting.
- Summary of draft periodic status review: Because of the species' continued population decline, primarily from ongoing habitat loss from timber harvest and wildfires, as well as competitive interactions with Barred Owls, the Washington Fish and Wildlife Commission, at its February meeting, voted to retain the Northern Spotted Owl as endangered in the state of Washington.
- The NSOIT is currently working towards developing a Safe Harbor Agreement for forest landowners to help with federal assurances while protecting existing habitat and recruiting new habitat. The group will also consider other opportunities for landowner incentives.

Fisher
1998: State listed as endangered
2016: Federal listing status: In April 2016, final decision that listing is not warranted.

Current Status:
The fisher, a member of the weasel family, is returning to the state after disappearing from Washington's forestlands during the last century. Since 2008, the Washington Department of

Fish and Wildlife (WDFW) and its partners have successfully relocated more than 100 fishers from British Columbia to Olympic National Park and other federal lands within the Cascade Mountain Range.

These recovery efforts were one reason why the U.S. Fish and Wildlife Service (USFWS) determined in April of 2016 that the state's fisher population did not require protection under the federal Endangered Species Act (ESA) as initially proposed.

Another factor in that federal decision was Washington State's leadership in working together with forest industry, landowners and other conservation entities to develop a voluntary program that offers forest landowners an incentive to work as partners in the recovery effort. This voluntary program is called a Candidate Conservation Agreement with Assurances (CCAA). Landowners who choose to enroll in this CCAA receive federal assurances in the event that the fisher ever becomes listed in the future. By signing on to the CCAA, landowners agree to follow certain conservation measures that protect an actively denning female fisher and her young when and if the fisher moves onto private land. At the most recent count, WDFW has enrolled 43 landowners and 1.7 million acres of forest land into the CCAA. Landowner enrollment continues to occur.

Future Updates to the Board

The forest practices rules require that when a species is listed by the Washington Fish and Wildlife Commission and/or the U.S. Secretary of the Interior or Commerce, DNR consults with WDFW and makes a recommendation to the Forest Practices Board as to whether protection is needed under the Critical Habitat (State) rule (WAC 222-16-080). WDFW and DNR continue to coordinate in order to anticipate federal actions and/or state action in response to changes in the status of a species.

cc: Hannah Anderson
Penny Becker
Gary Bell
Marc Engel
Sherri Felix
Joe Shramek
Amy Windrope

FOREST PRACTICES BOARD
2016 WORK PLAN

TASK	COMPLETION DATE/STATUS
Adaptive Management Program	
• CMER Master Project Schedule Progress*	August
• Report to Leg (10/1/16) on CWA, AMP and Master Project Schedule	August
• Buffer/Shade Effectiveness Study (amphibian response)	*2017*
• LiDAR Pilot Report	August
• Proposal initiation to review unstable slopes rules and guidance	February
• Type F* Recommendations	November
• Alternate Plan Template Timeline*****	November
• Policy Recommendations & Timelines on PI for Unstable Slopes*	August
Annual Reports	
• Clean Water Act Assurances	August
• Compliance Monitoring Annual Report (w/ISPR Review)	November
• Northern Spotted Owl Conservation Advisory Group	August
• Taylor's Checkerspot Butterfly Report	May
• TFW Cultural Resources Roundtable including WAC 222-20-120	August
• TFW Policy Committee Priorities*	August
• Western Gray Squirrel	May
Board Manual Development	
• Section 16, Guidelines for Unstable Slopes	May
• Section 21, Alternate Plan	*2017*
CMER Membership	As needed
Field Tour	October
Forest Chemicals	August
Rule Making	
• Board's Practices and Procedures (WAC 222-08-040)	November
• Rule Clarification	February 2017
TFW Cultural Resources Roundtable Recommendations on Cultural Resources Protection	*2017*
Cultural Resources	November
Upland Wildlife - Northern Spotted Owl	On-going
Quarterly Reports	
• Adaptive Management Program & Strategic Plan Implementation*	Each regular meeting
• Board Manual Development	Each regular meeting
• Compliance Monitoring	Each regular meeting
• Clean Water Act Assurances	February
• Legislative Update	February & May
• NSO Implementation Team	Each regular meeting
• Rule Making Activities	Each regular meeting
• Small Forest Landowner Advisory Committee & Office	Each regular meeting
• TFW Cultural Resources Roundtable	Each regular meeting
• TFW Policy Committee Work Plan Accomplishments & Priorities*	Each regular meeting
• Upland Wildlife Working Group	Each regular meeting
Work Planning for 2017	November

Italics = proposed changes *May 2016*
**= TFW Policy Committee*

FOREST PRACTICES BOARD
2016 WORK PLAN