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| **Project Name** | Westside Type F Riparian Prescription Effectiveness Project – Exploratory Field Study |
| **Workplan Critical Questions Addressed** | This is one phase of the overall project to address the following critical questions:<br>• How do the RMZ and no-RMZ harvest prescriptions affect riparian stand characteristics and riparian functions?<br>• How do the characteristics of riparian forest stands and associated riparian functions in areas with and without Inner Zone harvest change over time?<br>• Do riparian forest stands in areas with and without Inner Zone harvest remain on trajectory to achieve DFC targets?<br>• How do physical stream characteristics and processes respond to changes in riparian functions in areas with and without Inner Zone harvest?<br>• Do physical stream characteristics and processes meet performance targets? |
| **Project Elements** | Westside riparian conditions, DFC performance targets, riparian functions, forest stand attributes. |
| **Responsible SAG and Project Manager** | RSAG<br>Project Manager – Alexander Prescott |
| **Principal Investigator(s) and Project Team** | CMER scientists: Jenelle Black<br>Project Team*: Doug Martin, Chris Mendoza<br>**The Project Team was formerly organized as a Technical Writing and Implementation Group (TWIG)* |
| **Status** | The Project Team is making revisions to the exploratory report after getting RSAG approval and subsequently receiving multiple rounds of comments from CMER members in FY22 . The report is expected to go to CMER for final approval in November 2022. |
| **Project Timeline** | • The exploratory phase was implemented in FY19-20.<br>• The final exploratory report gained RSAG approval in March 2022 and was presented to CMER for review in April 2022. Since first being presented to CMER, there have been multiple rounds of comments, reviews, and responses. A final version of the exploratory report is anticipated to go to CMER in November 2022.<br>• Discussions have begun on the BACI study elements in RSAG.<br>• The Project Team will develop the BACI study design and expect to have an ISPR/CMER approved study design by FY25.<br>• FY23: Develop BACI study design and RSAG review. |

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| | • FY24: RSAG and CMER review and approval. ISPR review and approval. Additional Project Team members will be needed for BACI study design; may need funding for participation.<br>• FY25: Develop prospective findings report. Develop implementation plan and begin site selection.<br>• Board-approved funds for Westside Type F implementation begin in FY26.<br>  ○ FY26: Complete site selection. Site layout and pre-harvest data collection (May - June).<br>  ○ FY27: Pre-harvest data collection (July - Sept 2025 & May - June 2026).<br>  ○ FY28: Pre-harvest data collection (July - Sept 2026). Apply harvest treatment.<br>  ○ FY29: Complete harvest treatment. Post-harvest data collection (May - June 2028).<br>  ○ FY30: Post-harvest data collection (July - Sept 2028 & May - June 2029).<br>  ○ FY31: Post-harvest data collection (July - Sept 2029). Data QA/QC and analysis. Draft final report and gain RSAG and CMER approval. Initiate ISPR review.<br>  ○ FY32: ISPR approval and findings report. |
| **Expenditures** | FY19-22: $338,573 |
| **Complementary Projects and Project Sequencing** | Sequencing: This project is broken into two phases, an initial exploratory study to gather information on riparian conditions and functions associated with the prescriptions, followed by a BACI study that examines the response of riparian functions, stream habitat and aquatic resources to the prescriptions.<br>Complementary Projects: Bull Trout Overlay Temperature Project, Solar Radiation/Effective Shade Project, Eastside Type F Riparian Effectiveness Monitoring Project (BTO add-on), Wood Recruitment Volume and Source Distances from Riparian Buffers Project, Mass Wasting Buffer Integrity and Windthrow Assessment Project, Windthrow Frequency, Distribution, and Effects Project, Extensive Monitoring Program, and Cumulative Effects Monitoring Program. |

**Project Summary and Purpose**

Riparian prescriptions and rules are very different between Eastern and Western Washington for Type F (fish-bearing) waters. Currently no Westside Type F Effectiveness Studies are being conducted by the Cooperative Monitoring Evaluation and Research (CMER) committee. While CMER has tested the effectiveness of Eastside Type F riparian prescriptions and the Bull Trout Overlay All Available Shade Rule, the current Westside rules remain based to a degree on untested assumptions that riparian prescriptions are functioning as intended. There is therefore a need for a Westside Type F Riparian Prescription Effectiveness project to fill this knowledge gap and complement the Eastside Type F Effectiveness Study results. However, little is known about the distribution of stand conditions along Westside Type F streams under the current suite of prescription variants. Before such a Type F effectiveness study can be implemented, an exploratory study was needed to assess the

distribution of stand conditions and prescription variants. The exploratory study provides information needed to focus and design the Westside Type F Riparian Prescription Effectiveness BACI study.

The goal at the conclusion of the exploratory study was to have information including:

- The level of riparian functions associated with the Type F prescriptions, including data on post-harvest large wood recruitment, shade, and sediment delivery;
- Riparian stand conditions associated with the Type F prescriptions, including stand mortality, density, basal area, and the proportion of sites currently on trajectory to meet the Desired Future Conditions (DFC) target of 325 sq. ft./acre of basal area at 140 years;
- The frequency, magnitude and distribution of windthrow and its effects on stand structure, buffer tree mortality rates and riparian functions; and
- The relative influence of differences in site conditions and geographic location on all of the above.

The results from the exploratory study will be used to design a BACI study to document direction and magnitude of change associated with the prescription variants, and to determine the potential influence of site conditions on riparian stand conditions and functions following treatments. This information will be used to focus the BACI study design to provide fine-scale assessments of treatment effects for a select set of prescription variants and site conditions. The BACI study would improve our understanding and decrease scientific uncertainty about the linkage between riparian prescriptions, changes in riparian stands and riparian functions, and the aquatic resource response (habitat, wood recruitment, temperature, and aquatic organisms). It is anticipated that the overall Westside Type F Riparian Prescription Effectiveness Project would provide the following information:

- An estimate of the effects of specific prescription variants on riparian stand conditions, mortality and trajectory to meeting DFC targets;
- A measure (direction and magnitude of change) of treatment effects on key riparian functions (e.g. shade, large wood recruitment, streambank integrity/bank erosion, sediment attenuation, litter fall);
- Measures of instream habitat, water quality and aquatic biotic responses (e.g., wood loading, habitat composition and complexity, stream temperature, macroinvertebrates, fish) to treatments; and
- An assessment of riparian prescription effectiveness over the short-term (i.e., initially 2-years post-harvest with the potential to extend sampling for metrics of interest).

The exploratory study plan, Best Available Science Scoping Document, project charter and communication plan have been completed. The exploratory report is currently in-progress.

**Project Objectives**

1. To evaluate post-harvest riparian stand conditions and riparian ecological functions across prescription variants with and without inner zone harvest.
2. To evaluate the extent to which post-harvest riparian forest stands are on trajectory to achieve DFC targets at sites with and without inner zone harvest.

The overall goal of the exploratory phase is to produce information needed to focus and design the BACI phase of the project. The exploratory study assessed riparian stand conditions and selected riparian functions across a wide range of prescription variants and site conditions. It also provides a coarse-level assessment of current riparian conditions that focuses on addressing scientific uncertainty surrounding their sensitivity to prescription variants.

**Budget***

| FY23 | FY24 | FY25 | FY26 | FY27 | FY28 | FY29 | FY30 | FY31 | Total Estimated Budget |
|---|---|---|---|---|---|---|---|---|---|
| $30,000 | $30,000 | $167,272 | $375,020 | $245,860 | $134,660 | $375,020 | $297,860 | $21,600 | $1,677,292 |

- *August022333s: Anna Toledo, Lori ClarkRachel RubinISPR-approved Study Design was approved by CMER in March 2022. A field trial was conducted in summer 2022. The PI is currently reporting to CMER and TFW Policy on the field trial, and planning for implementation in summer 2023.Finalized and ISPR approvalB

**Commented [HJR(1]:** Per Status section above this is now past tense, yes?

FY23 RCS field trial completed. (ENREP),, Extensive Riparian Status and Trends Monitoring.. Howevera change in scope *August 10, 2022 Board-approved budget. Funding approved for FY22-FY23. Budget beyond FY23 are estimates only.

**Project Name**Extensive Riparian Status and Trends Monitoring – Riparian Vegetation and Stream Temperature, Type F/N Westside and Eastside Project**Work Plan Critical Questions Addressed**What is the current status of riparian conditions and functions in Type F/N streams on a statewide scale, and how are conditions changing over time?

What is the distribution of maximum summer stream temperature and 7-day mean maximum daily water temperature on FP HCP lands, and how is the distribution changing over time as the forest practices prescriptions are implemented?

What proportion of stream length, at the landscape scale, on FP HCP lands meets specific benchmarks for water temperature, and is this proportion changing over time as the forest practices prescriptions are implemented?

What are current riparian stand characteristicscharacteristic (e.g., density, BA, height, conifer/deciduous) on FP HCP lands, and how are stand conditions changing over time as the forest practices prescriptions are implemented?**Project Elements**Type F and N riparian forest stand conditions, shade, riparian vegetation type, large wood supply potential, channel measurements, stream temperatures**Responsible SAG and Project Manager**RSAG

Project Manager – Alexander Prescott**Principal Investigator(s)**CMER Scientist TBD

Principal Investigator TBD**Status**In April 2022, Policy transmitted a memo to CMER requesting the development of an Extensive Monitoring proposal for stream temperature and riparian stand conditions. In June 2022, the CMER assigned the project to RSAG.

As had been done previously by CMER and RSAG, a memo was drafted to TFW Policy in August 2022 and a joint workshop was convened intending to continue the conversation to refine and seek clarity on the questions posed by Policy, outline some of the extensive monitoring options and to provide critical background documents that are relevant to initiating a meaningful iterative conversation between RSAG/CMER and Policy. TFW Policy is planning to formally respond to the memo and workshop at theirthe November 2022 meeting. The content of said response should indicate whether additional memos/workshops are needed prior to the project team developing scoping documents. **Project timeline**FY23: Revise Charter, Initiate Scoping Document Development

FY24: CMER and Policy Approval of Scoping Documents**Expenditures**Total expenditures to date: $0**Complementary Projects and Project Sequencing**Extensive Riparian Status and Trends – Temperature, Type F/N Westside and Eastside; Riparian Characteristics and Shade Response Study; Mass Wasting Landscape Scale Extensive Monitoring. **Project Summary and Purpose**In 2006 a pilot study evaluated the accuracy of deriving riparian stand metrics from different scales of aerial photos compared to stand data from ground surveys. The contractor concluded that large-scale aerial custom photography could meet riparian assessment needs if combined with other remote sensing (e.g., Lidar) to accurately locate streams. Further study to evaluate the utility

and cost effectiveness of using other remote sensing technology including satellite imagery was recommended, but no new work was planned in 2006.

A project was developed in XXXX to initiate Extensive Riparian Status and Trends Monitoring – Temperature, Type F/N Westside. This project is intended to develop unbiased estimates of the frequency distribution of Type F/N stream temperatures across FP HCP lands in western Washington. Stream temperatures are monitored upstream and downstream from each study reach. Along with stream temperature measurements, air temperature, shade, riparian vegetation type, LWD, and several channel measurements are collected Status: Sampling has been completed. The final report was initially reviewed by RSAG and CMER then revised again based on comments received during ISPR of the Eastside Type F report. The revised report was reviewed by RSAG, CMER, and ISPR. The final report was approved by CMER on April 23, 2019.

In XXXX, a companion study for the eastside was developed: Extensive Riparian Status and Trends Monitoring – Temperature, Type F/N Eastside. This project wasis intended to develop unbiased estimates of the frequency distribution of Type F/N stream temperatures across FP HCP lands in eastern Washington. Stream temperatures are monitored upstream and downstream from each study reach. Along with stream temperature measurements, air temperature, shade, riparian vegetation type, LWD, and several channel measurements are also collected. Approximately 50 sites were sampled in Type F streams over the 2007 and 2008 summer seasons. The revised report was completed and approved by Policy in June 2013. Initial site screening occurred in the summer of 2008 in Type N streams. Only 10% of the sites inspected had flow during the summer monitoring season (site requirement), when peak temperatures occur. The Policy committee decided to deprioritize the Eastside N strata as part of a negotiated settlement of the Master Project Schedule in 2014.

A literature synthesis was completed by the Precision Forestry Cooperative (PFC) at the University of Washington in June of 2015. PFC reviewed articles on the use of remote sensing to evaluate the cost and value of various remote sensing tools to quantify 13 riparian forest metrics. This literature review was specifically requested by Policy in March of 2015 to inform decision-makers on what remote sensing methods they may wantedwant to test in a pilot project.

The purpose of that first pilot project was to determine if remote sensing can be used in conjunction with traditional field work to accomplish the purposes established in the CMER Work Plan and the Monitoring Design Team report (MDT 2002) for extensive status and trend vegetation analysis. This project looked at riparian vegetation on all stream types—S, F, Np and Ns—and all ownerships in the Mashel watershed under the "Extensive Riparian Vegetation Monitoring - Remote Sensing Pilot Study Agreement No. IAA 16-205". CMER and Policy approved this pilot project for riparian extensive vegetation monitoring, which began in November of 2015 and was completed in July of 2017.

Scoping for a second pilot, the Extensive Riparian Vegetation Monitoring Implementation Pilot Study, was completed by PFC in June of 2018. This study was intended to explore the feasibility of applying the methodology and model to other regions of the state and provide a better understanding of remote sensing data availability, cost, and recommendations for how to implement an inventory of riparian vegetation conditions across FP HCP lands in Washington State. The scoping document and prospective findings report were delivered to Policy in 2019.

The key component of this study was to test the transferability of forest inventory models developed in the Mashel watershed to other watersheds. Although the original intent was to implement this pilot in eastern Washington and then the northwest coast, an opportunity arose to test it using existing field data from the Olympic Experimental Study Forest. The transferability of Mashel models to predict DBH, basal area, and stand density were tested using forest inventory plot data that was collected by DNR in the Olympic Experimental State Forest (OESF). The final report was approved by CMER in January of 2020 and was presented to Policy in May of 2020.

Based on this previous work, RSAG and CMER developed and approved a Status and Trends Strategy and presented it to Policy in October of 2019. CMER has requested that Policy provide direction on the priority questions that need to be addressed prior to beginning any additional Extensive Status and Trends projects. Policy requested a joint CMER/Policy workshop on extensive monitoring methods and efforts in use by other entities (state and federal agencies, industry, and academia) to help inform the FP Adaptive Management Program how to move forward with the strategy. This workshop was held on January 29, 2021. A second workshop was held on August 24, 2022 for members of RSAG, CMER and TFW Policy. Further action on implementation depends on the outcome of ongoing CMER and Policy deliberations and funding availability.**Project Objectives**The objective is to build and maintain a status and trends monitoring program that will evaluate how riparian forests and stream temperature change on a landscape scale as a result of forest practices.

**Budget***

**FY22FY23FY24FY25FY26FY27FY28Total**
**Budget**$0$122,349$50,000$50,000$300,000$300,000$250,000$1,022,349*August 10, 2022 Board approved budget. Funding approved for FY22-FY23. Budget beyond FY23 are estimates only.