

Memorandum

To: Timber, Fish & Wildlife Policy Committee

From: The Forested Wetlands Effectiveness Program TWIG:

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Date: December 21, 2015

Re: Policy approval of problem statement, study objectives, and critical questions for the Forested Wetlands Effectiveness Project

The Forested Wetlands Effectiveness Program Technical Writing and Implementation Group (TWIG) is requesting Policy approval of the initial problem statement, objectives, and critical research questions.

Background

The Washington State Legislature and the Washington Forest Practices Board (WFPB) have adopted rules designed to maintain and restore salmonid populations and meet the requirements of the Federal Clean Water Act. A formal science-based Adaptive Management Program (AMP) was established to provide science-based recommendations and technical information to assist the WFPB in determining when it is necessary or advisable to adjust the rules and guidance to achieve resource objectives (WAC 222-12-045). The resource objectives are intended to ensure that forest practices, either individually or cumulatively, will not significantly impair the capacity of aquatic habitat to: a) support harvestable levels of salmonids; b) support the long-term viability of other covered species; c) meet or exceed water quality standards, protection of beneficial uses, narrative and numeric criteria, and anti-degradation (WAC 222-12-045(2)(a)).

The WFPB has empowered the Cooperative Monitoring Evaluation and Research committee (CMER) and the TFW policy committee (Policy) to participate in the AMP (WAC 222-12-045(2)(b)). CMER has been tasked with completing a programmatic series of work tasks in support of the AMP; these tasks are laid out in an annual work plan that is approved by Policy. The Forested Wetlands Effectiveness Program has been given a high research priority because of the many gaps in the scientific understanding of wetland ecosystem functions, as well as the limited protection for forested wetlands under current Forest Practices Rules.

This document provides an opportunity for Policy to review and approve the problem statement, objectives and critical questions for the Forested Wetlands Effectiveness Project. The purpose is to ensure the study is informed by the research needs and priorities of Policy. Following approval

of this document, the TWIG will evaluate and use the best available science to prepare a document with study design alternatives for CMER and Policy approval. CMER will review and approve the document if it defensibly portrays and uses the best available science in developing study design alternatives. Policy will rely on the document to select alternative(s) that will be used as the basis for developing a complete study design.

Introduction to the Forested Wetlands Effectiveness Study

Wetlands are critical habitats at the interface of aquatic and terrestrial ecosystems that contain unique vegetation and soils, and perform important functions driven by the prolonged presence of water. Wetlands often influence hydrologic regimes, water temperature, nutrient cycles, and physical habitat characteristics in watersheds. Forested wetlands (i.e., wetlands with mature timber, or potential timber stands with a crown closure of 30 percent or more; WAC 222-16-035 (2)) occur frequently across Washington. In some regions, two or more forested wetlands may exist per headwater stream channel (Janisch et al. 2011) and, in many regions, frequently occur in depressions and flat areas. Despite their frequent and extensive occurrence, and potential influence on downstream ecosystems, limited information exists describing forested wetland ecology.

Moreover, as illustrated in the Wetlands and Forest Practices Literature Synthesis (Adamus 2014), impacts of forest practices within and upslope of forested wetlands in the Pacific Northwest have not been examined. The Forested Wetlands Effectiveness Study will examine influences of forested wetlands on hydrologic processes, temperature regimes, nutrient cycles, and the quantity and quality of plant and animal habitats in watersheds managed under the Forest Practices Habitat Conservation Plan (FPHCP) in Washington State. It also will evaluate the impacts of timber harvest on the ecological and hydrologic functions of forested wetlands and on connected watershed functions, potentially including, but not limited to, the regulation of surface and subsurface hydrologic exchange, plant and animal habitat quantity and quality, and ecosystem dynamics of temperature, sediment, carbon, and nutrients.

Problem Statement

Effects of timber harvest and other forest practices on forested wetland structure and function remain poorly understood. Forested wetlands receive the least amount of protection among wetland types defined in the current Forest Practices Rules. Low-impact timber harvest is permitted in these wetlands where there is, or would be if trees were mature, a live-crown canopy closure of at least 30% of merchantable species.

Primary Issues:

1. Forested wetlands are not well understood—it is not adequately known what ecological and hydrologic functions they support, what ecosystem services they provide, or how they are altered by timber harvest and other forest practices.
2. It is stated in the Washington forest practices rules that functional levels of forested wetlands and downstream aquatic resources should be restored by half a timber rotation; however, this objective has not been tested. Moreover, “functions”, under forest practices rules, have not been defined and, therefore, baseline (pre-harvest or application, or “ambient”) levels are not known.
3. It is unknown whether there are forested wetland types or locations that are particularly sensitive to forest practices (i.e., that experience greater shifts in functional levels post-harvest or other treatment and/or have longer residual changes in functions post-treatment compared to other types or locations).

Study Objectives

The TWIG proposes the following primary research objectives for this project:

1. To examine how well current forest practices rules meet the performance target of no-net-loss of wetland functions by half of a timber rotation cycle
2. To develop study design(s) that, when implemented, will yield information on the changes in wetland functions and associated watershed resources due to implementation of forest practices rules

The TWIG’s next task will be to conduct a Best Available Science (BAS) synthesis, and to subsequently use the information to develop study design alternatives for a Forested Wetlands Effectiveness Project that will address both these objectives and the following Critical Questions. The Best Available Science document will incorporate knowledge gained from the 2014 literature synthesis conducted by WetSAG on the effects of roads and tree removal on wetlands (Adamus 2014); however the BAS document will also incorporate sources from other regions and will be tailored to the Critical Questions below.

Critical Questions

The project will address two high-level critical questions (1 and 2 below). Critical question 1 is broken out into more specific questions taken from Project A1 of the Wetlands Monitoring and Research Strategy (Adamus 2014).

1. How do the magnitude and duration of forest practices affect water regimes, water quality, plant and animal habitats, and watershed resources in forested wetlands and linked (via surface or subsurface flow) downstream waters?

- i. How does timber harvest in forested wetlands alter processes that influence hydrologic regimes in those wetlands, in downgradient waters, and the connectivity between them?
 - ii. How does timber harvest in forested wetlands alter processes that influence water quality in those wetlands and in downgradient waters?
 - iii. How does timber harvest in forested wetlands alter processes that influence plant and animal habitat functions in wetlands, in connected waters, and in surrounding uplands?
2. How well do current forest practices rules in forested wetlands meet the Forest and Fish aquatic resource objectives and performance targets, and the goal of no-net-loss of functions of those wetlands by half of a timber rotation cycle?

The critical questions (i, ii, and iii) and proposed alternatives will focus on timber harvest effects on wetland functions important to Clean Water Act Assurances (e.g., temperature, nutrient retention, connectivity, salmonid habitat). Within that theme, "likelihood of effects" is one consideration when prioritizing what to study. The Literature Synthesis (Adamus 2014) suggested a level of certainty with which various effects might occur, based only on the author's experience and inferences from the studies he reviewed. The table below lists effects that the author inferred are most certain to result from timber harvest in wetlands, organized by critical questions i-iii. Additional schemes for prioritizing the research based on likelihood of effects could consider differences in wetland type, size, and connectivity, as well as in watershed geology, climate, and the extent of current and expected harvesting of timber from wetlands.

Critical Question	Most Certain Effects
Water Regime	<ul style="list-style-type: none"> • Near-term rise in local water tables • Near-term increase in water yield
Water Quality	<ul style="list-style-type: none"> • Near-term increase in soil erosion and export of suspended sediment from logged areas • Initial warming of runoff in summertime • Changes in the amount, form, and timing of nutrients, large wood, and organic matter received and exported by wetlands
Plant and Animal Habitat	<ul style="list-style-type: none"> • Increased frequency of invasion by non-native plants

	<ul style="list-style-type: none"> • Heightened risk of wind-thrown trees • Colonization by wildlife species not present in same forested wetland prior to harvest
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Request

The TWIG requests that Policy approve the critical questions above so that the TWIG can develop study design alternatives that will address the critical questions in an operational context. The TWIG anticipates that during the Best Available Science review and the drafting of study design alternatives and rationale, the scope of the study will be refined and focused further. The alternatives which are developed and prioritized will be within the scope of the budget and timeline provided.

References

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