

THE CONTRIBUTION OF WORKING FORESTS AND THE FORESTS AND FISH ADAPTIVE MANAGEMENT IN SUSTAINING ECOSYSTEMS FOR AMPHIBIAN ASSEMBLAGES IN THE PACIFIC NORTHWEST



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INTRODUCTION

Washington State has over 14 million acres of forestland and is the second largest lumber producer in the nation. Much of this land (40%) is private- and state-managed forestland covered under the Forests and Fish Habitat Conservation Plan (HCP). This HCP, a collaborative effort between federal, state, tribal and county governments, and forest landowners, was designed to:

- comply with the federal Endangered Species Act for aquatic and selected riparian-dependent species;
- support a harvestable supply of salmon;
- meet Clean Water Act requirements; and
- maintain the viability of the timber industry.

Unique to Forests and Fish Law was the development of a Cooperative Monitoring, Evaluation, and Research (CMER) Committee-advised Adaptive Management Program promoting studies to evaluate and improve forest practices for the protection of public resources. We have been conducting amphibian-related research on managed lands in western Washington as part of this program since 2000.



Figure 1. Seven stream-associated amphibian species are protected under Washington State's Forests and Fish Agreement. Protected species include: Coastal and Rocky Mountain Tailed Frog (*Ascaphus*; a); Olympic, Columbia, and Cascades Torrent Salamanders (*Rhyacotriton*; b), and Dunn's and Van Dyke's Salamanders (*Plethodon*; c). Coastal and Cope's Giant Salamanders are also stream-associated, and common to the study area (*Dicamptodon*; d).

OBJECTIVES

Our overarching objectives are to address the efficacy of current forest practices, and where consistent with other HCP goals, improve forest practices for protection of amphibians in headwater landscapes.

METHODS

Our focal study addresses the efficacy of the riparian management prescription for non-fish-bearing streams. We screened 36,000 headwater basins to obtain 18 useable streams to which one of four harvest treatments (0%, 50%, and 100% buffer, and reference basins) are being applied in a before- and after-treatment control impact design. This design, which will enable distinguishing treatment-specific responses among stream-associated amphibians, is currently in its treatment phase; post-treatment results will be available in 2011. A second study underway examines differences in amphibian response to different levels of riparian shading as a result of harvest (Figure 2). Both studies focus on stream-breeding amphibians (*Ascaphus*, *Rhyacotriton*, and *Dicamptodon*).

We are collecting demographic data using 2 methods: longitudinal light-touch and rubble rousing sampling.

During longitudinal light-touch sampling all moveable objects on the streambed gravel-sized and larger are overturned to increase likelihood of detection. This method will provide life-stage specific presence and absence information for all amphibian species found, and relative abundance for some.

Rubble rousing sampling (Figure 3), used to estimate amphibian density, involves block netting the up- and downstream ends of randomly chosen 1-m reaches. Within these reaches, all substrate gravel-sized and larger is removed from the stream channel, and remaining fines are sifted to locate amphibians.



Figure 2. Surveyor sampling stream enclosure during the shade study.



Figure 3. Surveyors use the rubble rousing sampling method to search for stream-associated amphibians in the Willapa Hills, Washington.



RESULTS

During site selection for our focal study in 2005, 115 basins were sampled for stream-associated amphibians. Of these, 94 (82%) had at least one species present (Figure 3).

Pre-treatment efforts in our focal study from 2006 – 2008 have resulted in over 12,000 amphibian detections representing 17 species of a possible 27 species known in Washington State. The majority of these detections (97%) were of focal stream-associated species (Figure 4).

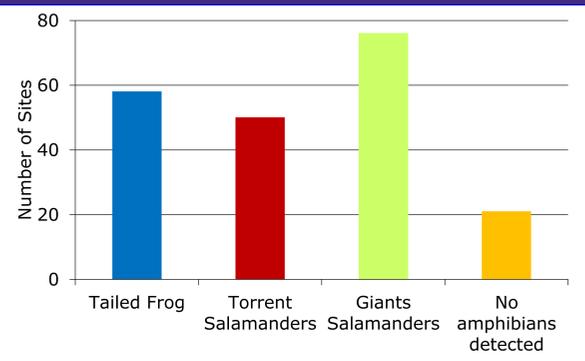


Figure 4. Numbers of basins in which each of three focal taxa were detected during site selection in 2005 (N = 115).

DISCUSSION

These and several other amphibian management studies conducted since 2000 were designed to detect cause-and-effect relationships and will inform approaches for forest practices that will help maintain amphibians in the headwater footprint of drainages to the Salish Sea/Georgia Basin.

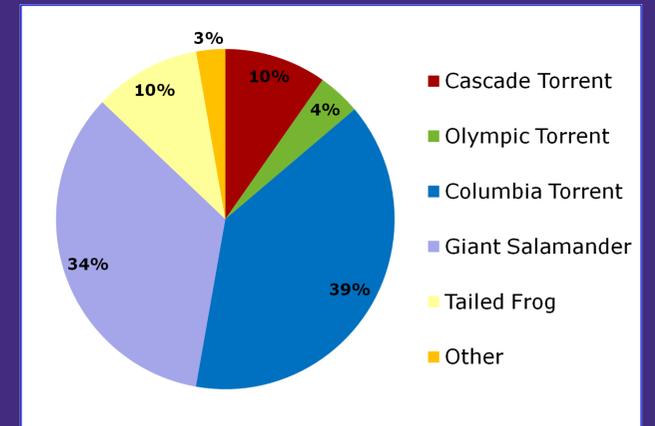


Figure 5. Percent detections by focal species during pre-treatment surveys 2006-2008 (N = 12,087).

We are encouraged by the persistence and relative abundance of amphibians in these forests for two reasons: 1) many of these forests have been managed for over 100 years and have experienced multiple harvest rotations, and 2) forest practices have improved dramatically over the last 20 years to protect public resources.

Studies like these that are supported by the Forests and Fish Adaptive Management Program are critical to understanding how to best meet the immediate needs for wood fiber while protecting the long-term legacy of the Pacific Northwest. Adaptive Management helps keep working forests working by evaluating the impacts of timber management activities on ecosystem function, and allowing policy makers to adjust management regulations to meet resource goals.

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