

# Monitoring Streams and Stormwater Ponds for Early Detection of Oomycete Plant Pathogens in Western Washington, a Citizen Science Project<sup>1</sup>

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## Abstract

Sudden Oak Death (SOD) is the common name for a disease caused by *Phytophthora ramorum* (oomycetes), an invasive plant pathogen of regulatory concern. The nursery, timber, forest specialty product, and Christmas tree industries in Washington are at risk because of the spread of *P. ramorum* within nurseries and from nurseries into waterways and the landscape. This study was initiated in 2010 in order to monitor for early detection of *P. ramorum* in western Washington streams and ponds. Since *P. ramorum*, to date, has been documented to be established in only a few WA streams, this survey provides a baseline description of other oomycete species present in western WA water bodies in urban, rural, and wildland areas.

In 2013, two bait samples positive for *P. ramorum* were collected from the Dungeness River near Sequim, WA. Further sampling of streams in this watershed in 2014 did not yield information about the source of inoculum contaminating the Dungeness. The site where the positive sample was found had no apparent direct water connection with a *P. ramorum*-positive nursery and the source of inoculum is unknown. In spring 2015, Washington State University volunteers did intensive sampling of 11 streams in the watershed. No *P. ramorum* was found at any of the sites sampled. It is possible that *P. ramorum* is no longer present or is at undetectable levels in the Dungeness River watershed. During this study, the first detections in Washington State of *P. bilorbang* and *Halophytophthora fluviatilis* were reported. Additionally, a potential new species of *Phytophthora* related to *P. pseudosyringae* that was recovered is being analyzed by a student volunteer.

Another goal of this project is to identify *Phytophthora* species that may be moving from landscaped areas into stormwater retention ponds. In essence, these ponds may serve as sentinel sites for the detection of exotic *Phytophthoras* that are introduced into landscape sites via the movement of diseased nursery stock. This aspect of the project is also providing research opportunities to local high school and college students. These projects provide the students with hands-on research experience and the opportunity to learn about a group of organisms that is not covered in any detail in their biology classes. As a result, these students gain experience doing scientific research that they can use in future study, as well as adding it to their resume. This has worked out well for everyone involved, including teachers, students, and researchers.

We plan to develop this citizen science program further. In addition to monitoring for oomycete pathogens, other parameters such as nutrient loads, pesticides, water chemistry, and bacterial

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contamination could be studied in stormwater retention ponds. During this project we interacted with volunteer organizations such as Stream Keepers and Master Gardeners, as well as landowners, students, and the general public. As a result, awareness of waterborne plant pathogens and the importance of sanitation to prevent movement of these organisms has been increased with these groups.