

# A Spatial and Temporal Analysis of New Zealand Mudsnailes Feeding on Aquatic Vegetation in Spirit Lake, Mt St Helens National Volcanic Monument

Archer Boday, Angel Sandoval, Katrina Lester, Robert Jordin, Emma Yeaman, Svea Hallberg, and Jim Gawel

## Abstract:

Spirit Lake in Mt St Helens National Volcanic Monument underwent massive ecological change after the 1980 eruption. This resulted in a lake more sensitive to both natural and anthropogenic disturbances, such as the appearance of the invasive species *Potamopyrgus antipodarum*, New Zealand mudsnails (NZMS). NZMS were found in the lake in 2016 and became a point of concern due to the species' known high reproduction rate and lack of natural predators. NZMS may outcompete aquatic insects and native snail species for food. Unfortunately, fish are unable to digest NZMS which pass through the gut alive. Our project measured changes in NZMS and native snail species abundance over time and space. Vegetation samples were collected from the water, plant species and volume were recorded, and snail density was quantified at various locations around Spirit Lake. We found that NZMS are still absent in the NW Arm of Spirit Lake near the tunnel outlet, even though they have now been detected downstream in Coldwater Creek. The density of native *Gyraulus deflectus* snails increased significantly ( $p < 0.05$ ) from 2021 to 2025 in Duck Bay. Although not significant, mean densities of *G. deflectus* also went up in the NW Arm and *Lymnaea* sp. density went up in all locations. NZMS densities, on the other hand, went down in both Duck Bay and Leech Cove. Our data suggests that NZMS is not currently outcompeting the native species and may be declining in this ecosystem, but more samples are needed to increase certainty.