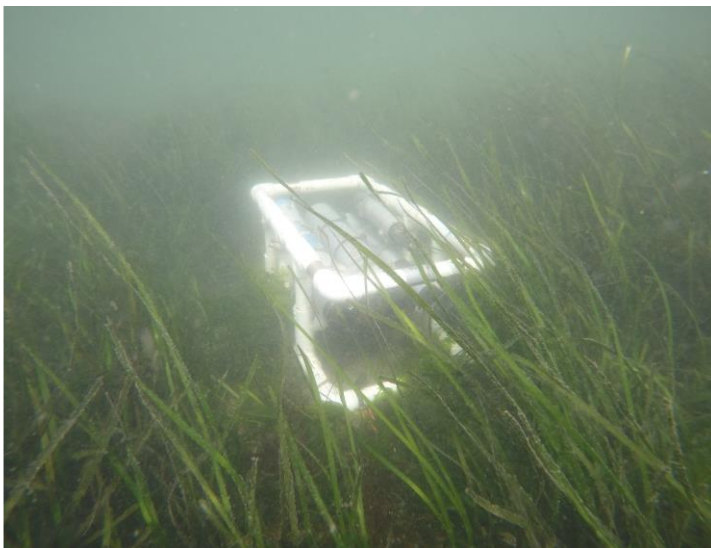




Can eelgrass restoration improve water quality?

Eelgrass in Puget Sound is relatively healthy: DNR monitoring shows that total coverage has been stable between 2000 and 2018. At the same time, localized declines have been documented, including losses at Westcott Bay and Quartermaster Harbor. To reverse losses and advance Puget Sound Partnership goals of increasing total coverage, DNR has tested a variety of eelgrass restoration methods. Restoration has been most successful at Joemma Beach State Park in South Puget Sound, where separate patches were restored in 2015, 2016, and 2017.

Over 18 months in 2018 and 2019, DNR deployed scientific instruments at Joemma Beach State Park inside and outside of three restored eelgrass patches of varying maturity. Instruments measured pH, temperature, oxygen, salinity, and chlorophyll. By comparing conditions across this habitat mosaic, DNR set out to assess the effects of eelgrass restoration and patch maturity on water quality.



Scientific instruments inside of a restored eelgrass patch.



2015 Joemma Beach State Park eelgrass restoration is boxed in blue, 2016 in red, and 2017 in orange.

Why does this matter to DNR?

DNR frequently directs or undertakes restoration projects. To make informed decisions in the allocation of restoration dollars, DNR must understand the full range of costs and benefits for proposed activities. If eelgrass restoration improves water quality in addition to other benefits, restoring eelgrass could be prioritized, especially where ocean acidification impacts are expected to be acute.

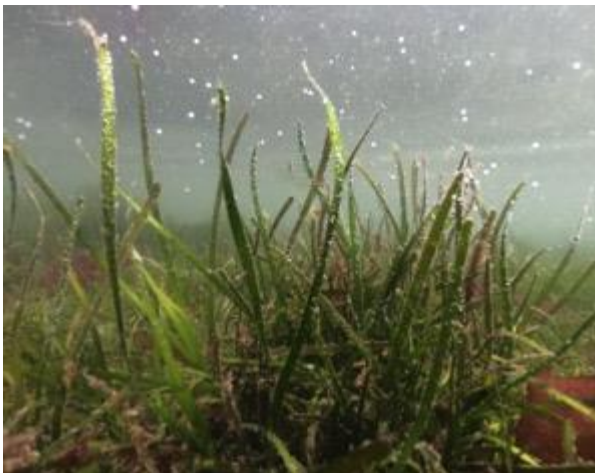
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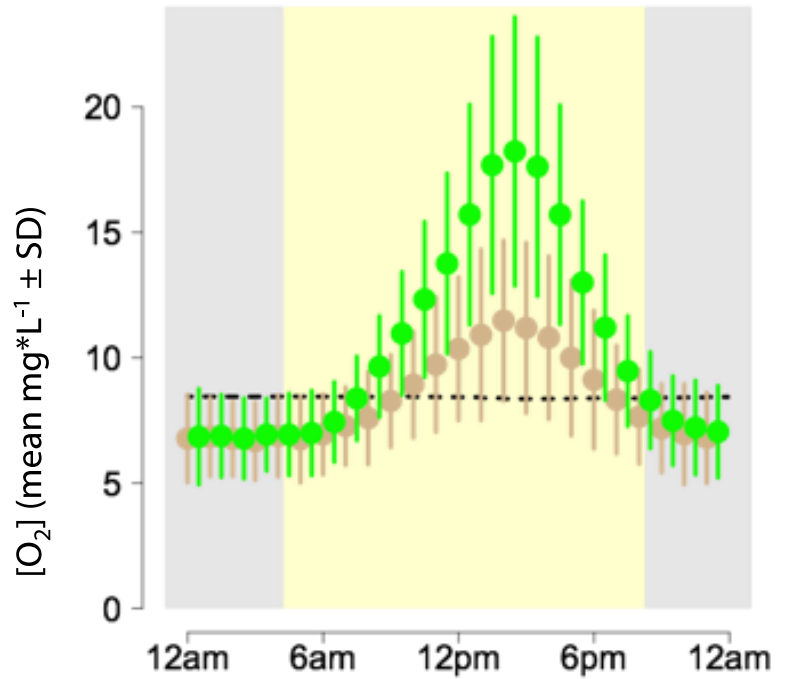
Project Outcomes

The dataset for this project is incomplete, as scientific instruments are deployed at Joemma Beach State Park into the fall of 2019. Preliminary results suggest that eelgrass restoration can have effects on local water quality in summer, consistent with increased photosynthesis in eelgrass. Oxygen concentrations in restored eelgrass patches were higher than in adjacent unvegetated areas at midday. The results for pH were similar, but more variable.

Mature patches of restored eelgrass appear to have more pronounced effects than newer patches. Differences in water quality were largest between the 2015 restoration and its adjacent unvegetated area, and smallest between the 2017 restoration and its adjacent unvegetated area. These results may indicate that water quality benefits from eelgrass restoration are fully realized only after several years.



Restored eelgrass at Joemma Beach State Park producing oxygen bubbles through photosynthesis.



Dissolved oxygen levels across an average day/night cycle in summer 2018 in the 3-year old restored eelgrass patch (green) and adjacent unvegetated area (brown).

Project Outputs

Preliminary results have been presented at:

- South Sound Science Symposium, Shelton, WA 2018
- Department of Ecology Environmental Assessment Program, Lacey, WA 2018
- Society for American Military Engineers Sustainability Training Forum, Seattle, WA 2019
- Washington Ocean Acidification Center Symposium, Seattle, WA 2019
- Snohomish County Beach Watchers, Marysville, WA 2019

Future Opportunities

Upon the retrieval of scientific instruments from Joemma Beach State Park, DNR will analyze the complete dataset to evaluate the effects of eelgrass restoration on water quality, with attention paid to seasonal dynamics, shoot density, and patch maturity. DNR intends to submit the results and analysis for publication through peer review.

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