Restoring damaged and declining eelgrass in the San Juan Archipelago: a pioneering program using seeds

Yuki Wilmerding
Friday Harbor Labs

Sandy Wyllie-Echeverria
Friday Harbor Labs

Follow this and additional works at: https://cedar.wwu.edu/ssec


This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.
Abstract

The importance of eelgrass (Zostera marina) comes alive through the Coast Salish people’s cultural stories and practices. The presence of these marine flowering plants is important for culturally iconic species such as the Dungeness Crab and Pacific Herring. In the San Juan Archipelago, loss of historical spawning sites for herring appears to coincide with eelgrass decline.

In an effort to offset eelgrass decline, the Puget Sound Eelgrass Recovery Strategy outlines a program that includes a plan to “restore and enhance damaged or declining eelgrass beds”. The uprooting and replanting of adult eelgrass plants is commonly used as a restoration technique. However, throughout the range of eelgrass in the Northern Hemisphere the collection and dispersal of eelgrass seeds has been put forward as a low-cost and effective alternative. This technique is proposed because, after pollination, fertilization, and seed development, eelgrass flowering heads disperse a yearly seed rain, and these seeds populate available habitat either within the bed or a distant location. When seeds settle on the ocean floor in suitable conditions, seedlings sprout, and new patches form.

In spring 2020, we launched a pilot program at the Friday Harbor Laboratories, University of Washington, to restore eelgrass in the nearshore region of Bell Point in Westcott/Garrison Bays using seeds. In this poster presentation we illustrate a step wise description of our program that includes methods to: 1) estimate seed to ovule ratios to guide flowering head collection; 2) harvest flowering heads while limiting damage to the donor population; 3) capture the season of peak seed release; 4) efficiently gather and store seeds before planting; and 5) deliver seeds to a restoration site. We will also provide an estimate of human hours, supplies and construction materials needed to replicate our program at other sites in the Salish Sea.
Restoring damaged and declining eelgrass in the San Juan Archipelago: a pioneering program using seeds

Yuki Wilmerding¹, Sandy Wyllie-Echeverria², Isabella Brown², & Paul Andersson³

¹Western Washington University, ²Friday Harbor Laboratories, University of Washington, ³San Juan Islands Conservation District

1. Estimate number of seeds per flowering head to determine season of peak seed release prior to harvest

2. Harvest flowering heads while limiting damage to donor site
   • Gently walking on the tide flat and limiting the number of volunteers to avoid trampling impact (Travaille et al. 2015)
   • Remove flowering head, leaving rhizome intact in sediment (Zhang et al. 2016)
   • Reduced sediment loading in storage

3. Cultivate flowering heads while seeds develop
   • Culture system catches mature seeds after dispersal
   • Water temperature monitored continuously
   • Salinity monitored weekly

4. Efficiently gather & store seeds before planting
   • Seeds are removed and sieved several times to remove all detritus.

5. Deliver seeds to restoration site after site evaluation
   • Cold stratification (Zhang et al. 2016)
   Seeds are stored at 4°C over winter to increase rate of germination, and are planted the following spring.

~12,500 seeds collected in 2021

Depth of harvest also seems to affect ratio of seeds per flowering head (2021)

12:1 seeds per head at -0.88m
19:1 seeds per head at -1.2m to -1.5m

We are thankful for the support from:

Past methods used at our restoration site:
• Seed buoys • Broadcast seeding

References:

Contact yw13174@my.bristol.ac.uk with questions!