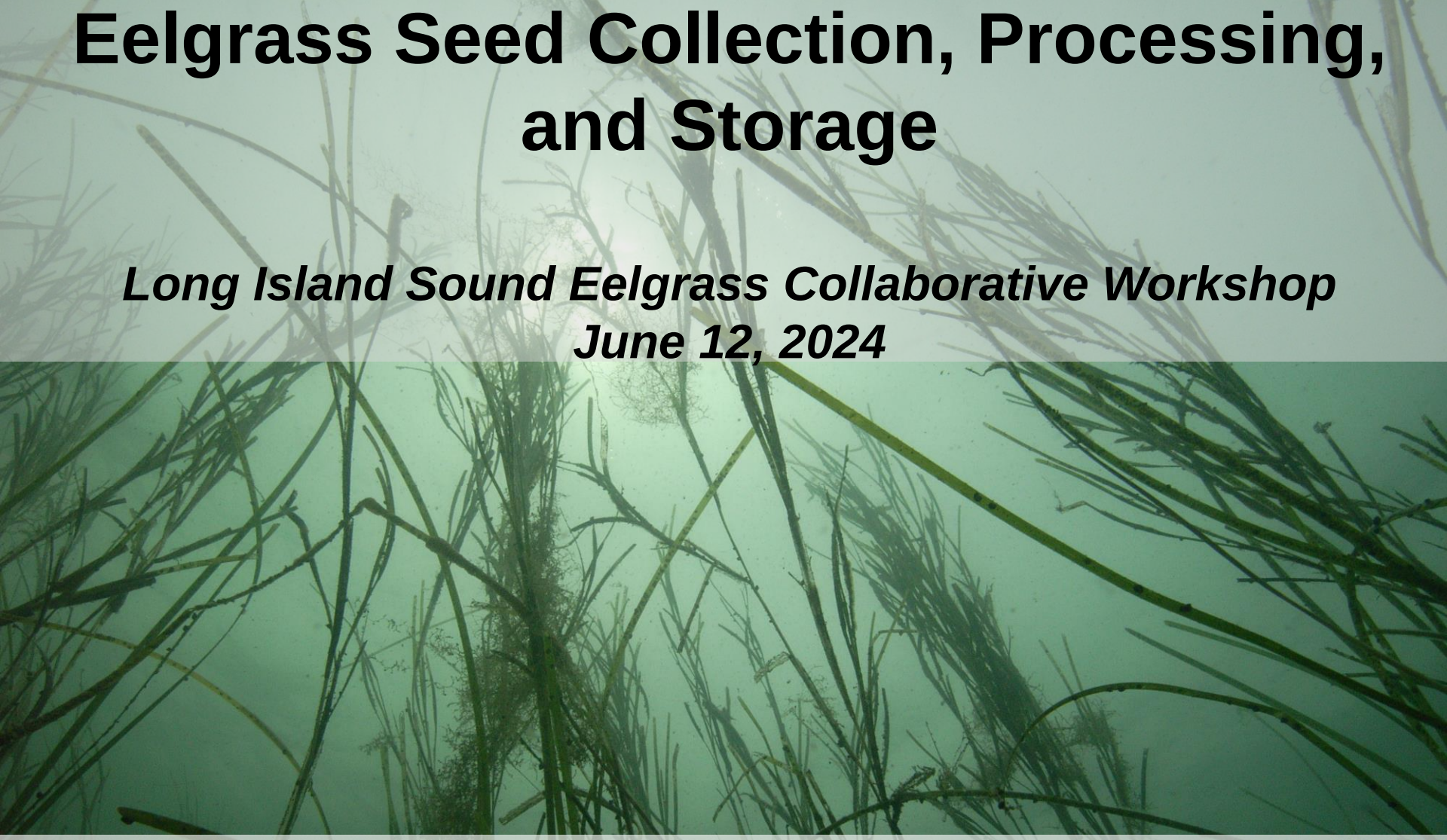
Eelgrass Seed Collection, Processing, and Storage



Long Island Sound Eelgrass Collaborative Workshop
June 12, 2024

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Cornell Cooperative Extension
Marine Program

Marine Meadows
An initiative of Cornell Cooperative Extension | Marine Program

OVERVIEW

1) Flower Shoot Monitoring and Collection Timing
2) Flower Shoot Collection
3) Processing of Collected Material and Seeds
4) Storage of Seeds

MONITORING AND COLLECTION TIMING

- Monitoring should start at least 1 month prior to expected seed release.
  - Follow the “Assessing Eelgrass Flowering Density and Seed Maturity “ SOP developed by Carr and Colarusso
  - Frequency of monitoring should increase as seed development progresses toward Stage 4.
  - Flower shoots should be collected when seeds development reaches late-Stage 4 and Stage 5.

FLOWER SHOOT COLLECTION

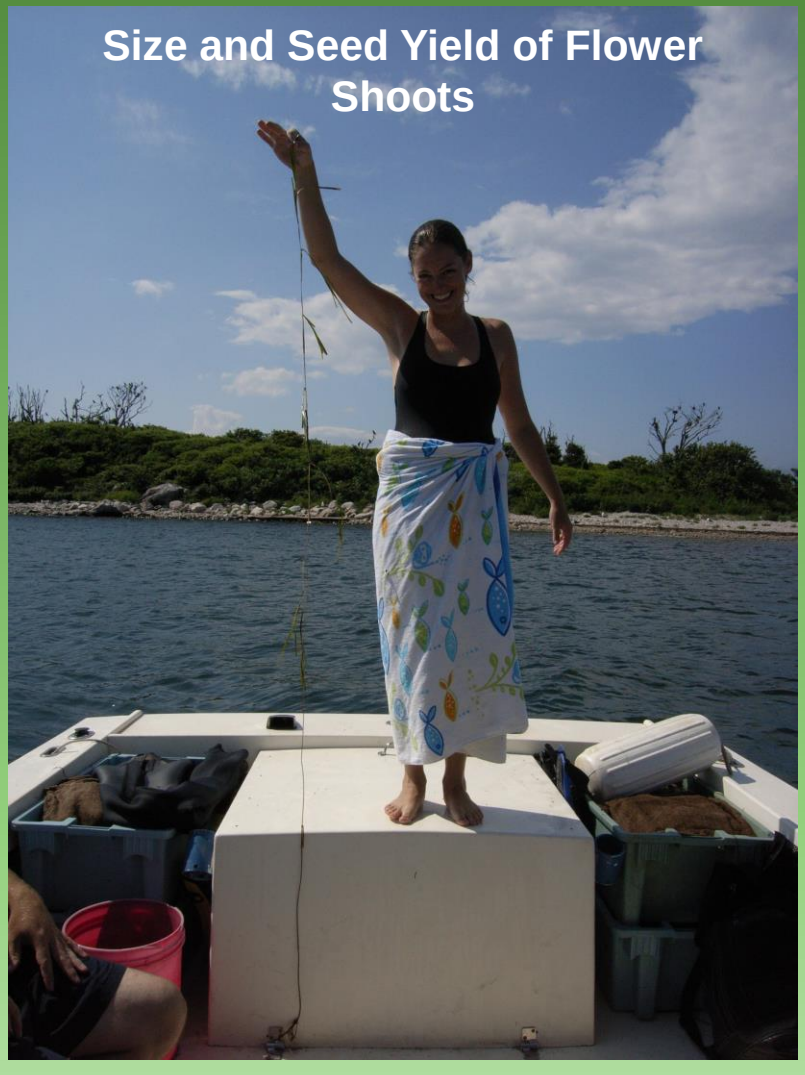
Collection methods will vary depending on the depth of the meadow.

Snorkeling for Shallow Meadows

SCUBA for Deeper Meadows

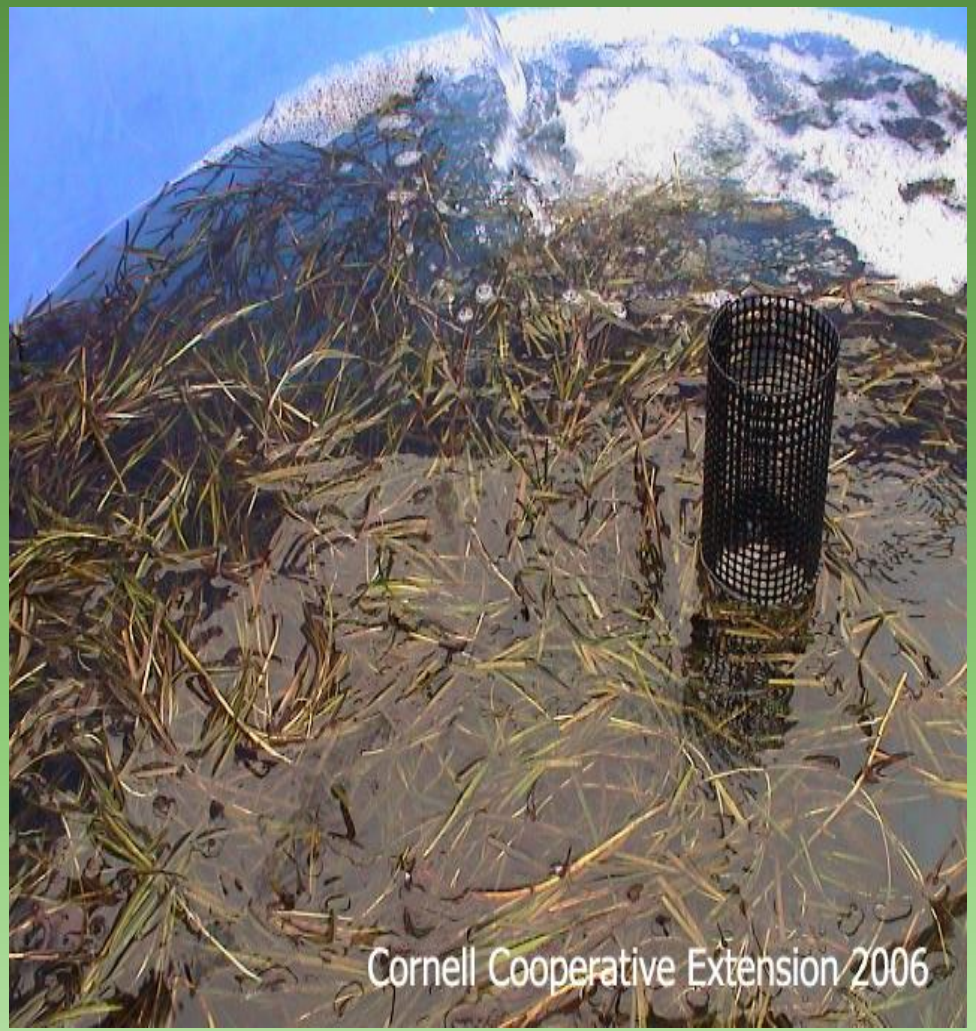
FLOWER SHOOT COLLECTION

Collection efficiency will vary based on several factors



FLOWER SHOOT AND SEED PROCESSING

- Flower shoots collected are placed in flowing seawater tanks.
- Tanks can be packed relatively dense to make efficient use of available space.
- Flower shoots should be agitated several times a week to promote seed release from spathes.
- Material may require 4-6 weeks for complete release.



FLOWER SHOOT AND SEED PROCESSING

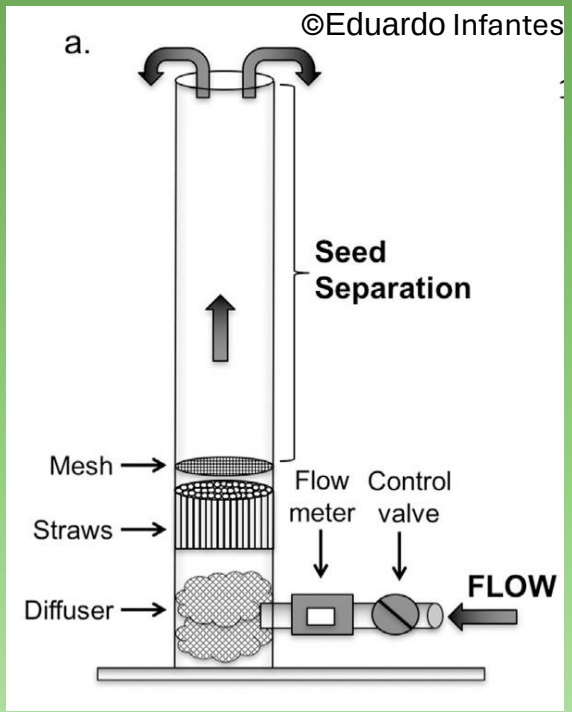
- When seeds have released, the non-seed organic materials should be shaken out to release any trapped seeds and discarded.
- Seeds and organic debris are washed with ***SEAWATER*** through a series of sieves.
  - A 2-2.5mm sieve will separate large material from seeds and fine organics.
  - A 750-1000 micron sieve will retain seeds while rinsing fine organics.

FLOWER SHOOT AND SEED PROCESSING

After repeated washing and sieving, the final product is relatively clean eelgrass seeds.

FLOWER SHOOT AND SEED PROCESSING-ALTERNATIVES

A vertical flume system can be built to "automate" the process of separating seeds from debris by relative density.



The "Churchill Method": Dr. Jerry Churchill used small plastic kiddie pools covered with tarps to breakdown the flower shoots in stagnant seawater for seed release.

EELGRASS SEED STORAGE

Flowing, seawater upwelling system

Aquaculture upwelling silos placed in raceways with ambient, flowing seawater has proven viable for long-term seed storage.

- Pros –
  - Water temperature more closely reflects seasonal changes experienced by seeds in meadows (“stratification”?)
  - Minimal equipment cost.
  - Can be located outdoors.
- Cons –
  - No control of temperature which could lead to germination in fall.
  - Introduction of fouling organisms and seed predators.

EELGRASS SEED STORAGE

Closed, temperature-controlled system

Closed system seed storage includes water temperature control and filtration with a variety of configurations .

- Pros –
  - Manipulate temperature and other parameters as needed
  - Minimization of fouling and predation.
- Cons –
  - Equipment intensive and expensive
  - Equipment failure can lead to extreme fluctuations in temperature
  - Requires indoor space

EELGRASS SEED STORAGE

Cold Storage of eelgrass seeds

Cold storage of eelgrass seeds may be the most available method of storing seed, simply requiring a refrigerator. Seed are stored in filtered seawater in sealed containers at 4-7ºC.

- Pros –
  - Inexpensive and readily available
  - Seeds can be held for several months with minimal germination.
- Cons –
  - Flask go anoxic and can create odor
  - Untreated seeds can grow bacteria and fungus that can impact seed quality
  - Long-term storage may result in reduced germination rates


Thank You
JUL 23 2008