Case Histories

Restoring modified marine bed habitat
• There was an unprecedented decline of eelgrass in Chesapeake Bay in the 1970’s.
• Numerous restoration techniques were tried.
  – Bundles, cores, turfs, etc.
  – There was varying success.
• This paper reports on the success of a simple method of transplantation.
  – Adult plants shoveled from York River, Virginia. (roots and rhizomes intact)
  – Sediments sieved out.
  – Transported wet in buckets
  – Stored 24-48 hours in tanks with flow-through river water.
• Planting method:
  – Shoots selected had 1-2 cm of rhizome with roots.
  – Placed in bundles of 50-100
  – Diver using SCUBA would then insert rhizome at an angle.
  – Would be 1-2” deep
  – 70 plants placed in 2x2 m² plot.
• Results:
  – 48 plots measured at four sites
    • After 20 months
  – Cover increased from 5% to 30%
  – Shoot density increased from 18 to around 600 per m²
• Zostera marina plays a critical role as a nearshore habitat.
  – It has also suffered extensive losses.
  – Seagrass restoration is an evolving technology.
  – Most common method is the transplanting of adult shoots.
  – Seed dispersal may no longer provide natural colonization because of loss of nearby populations.
- Eelgrass filters nutrients from the water column.
- Supports large and diverse faunal assemblages.
- Stabilizes sediment
- Dissipates wave energy
• Populations have declined.
  – Pollution
  – Periodic wasting disease
• Under clean water act, any impacts to existing populations must be mitigated.
• Site:
  – Impact at New Hampshire Port Authority pier, Portsmouth, New Hampshire
  – Transplanting to take place at several sites in estuary, totally 2.5 ha.
  – Restoration done in estuary of Piscataqua river, which borders Maine and New Hampshire.
• Goals of any seagrass restoration
  – Persistent vegetative cover
  – Equivalent acreage gained for that lost
  – Increase in acreage if possible
  – Replacement of the same seagrass species that was lost
  – Development of a “natural” faunal community
• Collection
  – Done in three 150 x 300 m rectangles in a healthy 6 ha donor site.
  – Vegetative shoots selected
  – Approximately 3 to 5 cm of rhizome taken
  – Stored in large coolers containing some seawater
• Horizontal rhizome method:
  – Two shoots anchored with a bamboo staple.
  – Rhizomes parallel, pointing in opposite direction
  – Spaced on half meter centers.
• Gill netting used to make cages and suppress bioturbation by green crabs.
  – Crab pots were placed inside cages and were emptied twice a week.
• Results:
  – Over winter survival was 25%
  – Majority of intertidal plants were killed by ice damage.
  – Unprotected subtidal plots had severe damage from bioturbation by crabs.
• Harvest and sowing of seeds has been investigated as a restoration method.
  – Large scale application may be limited because of the infrastructure required to collect, store and process seed-bearing reproductive shoots.
• Reproductive biology of Zostera
  – Detached, floating reproductive shoots can transport shoots over 100 km from donor populations.
  – They can drift for 4 weeks while releasing seeds.
  – Ovules mature 4 weeks after being pollinated.
• Seed buoy developed
  – Holds reproductive shoots underwater in the same general location over the period of seed release.
• **Method**
  - Reproductive shoots were collected during the second week of seed release.
  - Shoots placed in mesh bag with 9mm mesh.
  - Bag tied to lobster pot buoy with wire.
  - 6.4 mm floating polypropylene line used to tie buoy to cinder block.
  - Section of garden hose used to protect line where it goes through cinder block.
Typical Seedling Distribution Around a Single Buoy
• Results
  – Seedling recruitment measured to be 7% of available seeds.
  – Buoy location tended to be determined by prevailing winds.