Conservation Moorings to Protect Eelgrass Habitat

A Cooperative Habitat Protection Partnership

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Conservation moorings to protect eelgrass habitat

I. Impacts of moorings on seagrass

II. Traditional vs. Conservation mooring systems

III. Cooperative Habitat Protection Partnerships (CHPPs)

IV. Conservation mooring demonstration project – monitoring design
Impacts of traditional moorings on eelgrass habitat

- **Direct impacts**
  - chain scour
  - concrete anchor blocks or dragged mushroom

- **Indirect impacts**
  - increased turbidity from chain scour
  - reduced light penetration
Mooring impact studies

- **Walker et al. 1989 - Effect of boat moorings on seagrass beds near Perth, Western Australia**
  - Moorings produce circular scours 3-300m²
  - Posidonia or Amphibolis spp.
  - Increase in edge, vulnerable to further erosion and “blow outs”
  - Detritus collected in depressions
  - After removal of moorings pioneer Holophila recolonized in 6-8 months - change in spp composition, meadow forming spp not observed to recolonize

- **Hastings et al. 1995 - Seagrass loss associated with boat moorings at Rottnest Island, Western Australia**
  - Exposed edge of seagrass has doubled from 1941 to 1992 in Thomson Bay
  - Differences in impacts are related to a site’s exposure and sediment characteristics

- **Montefalcone et al. 2008 - BACI design reveals the decline of the seagrass *Posidonia oceanica* induced by anchoring**
  - Population but not individual level effects
  - Anchoring chain resulted in decline in shoot density and increase in large dead areas
  - Called for adoption of “seagrass friendly” moorings
Conservation moorings

Conventional Chain-type Mooring

The Hazelett Marine Elastic Mooring

Source: Hazelett
Conservation moorings

Source: Hazelett Marine
Conservation moorings

- **Current application**
  - Pro-active municipal and private use
  - Permit condition for new projects adjacent to eelgrass or other resource areas to reduce turbidity
  - Permit condition for re-licensing moorings within eelgrass
  - Mitigation alternative for project impacts to eelgrass beds

- But in order to recommend conservation moorings, we need to know quantitatively if they are effective at protecting eelgrass...
Cooperative Habitat Protection Partnerships (CHPPs)

- Emphasize non-regulatory approaches to protect fish habitat
- Establish federal, state, local, & NGO partnerships to protect coastal and marine habitat
- Promote awareness and stewardship of fish habitat
- Provide technical assistance and small grants
Cooperative Habitat Protection Partnerships (CHPPs)

- **Galveston Bay, TX**
  - Living shorelines to protect fish habitat

- **Great South Bay, NY**
  - Promoting community stewardship through shellfish aquaculture

- **Little Campbell Creek, AK**
  - Stream assessment for watershed planning

- **Vineyard Haven, MA**
  - Promoting the use of conservation moorings and assessment of their effectiveness at protecting eelgrass habitat
CHPPs: Massachusetts

- Developed Federal, State and Local partnership (NMFS, EPA, MACZM, MADMF, TNC)
- Funding and development of education/interpretive sign
- Purchased two moorings to be placed in Vineyard Haven Harbor to test recovery (demonstration project)
- Looking for additional sites
- Monitoring plan under development
CHPPs: Vineyard Haven, MA

Photo source: Jeff Lefebvre
CHPPs: Vineyard Haven, MA

Study Questions:

1) Will eelgrass grow back into a mooring scar once the mooring is replaced with a conservation mooring? How long will it take?

2) What will happen to density, % cover and canopy height in and near the scar?

3) What impacts will a conservation mooring have on eelgrass if placed in an unimpacted bed?

Management questions:

1) Can conservation moorings protect eelgrass?

2) Should we continue to recommend conservation moorings as a permit condition?

3) Can conservation moorings be considered as mitigation for eelgrass impacts?
Demonstration Project: Study Design

BEFORE, AFTER, CONTROL, IMPACT
Demonstration Project: Study Design

- BACI or BA
- Annual monitoring at same time of year
  - 3 years
- 50 meter transect with 25 at the center of the scar
- Measure scar diameter

- Collect density, % cover and canopy ht within the scar and at intervals along the transect using a 1m² quadrat with density counted from ¼ meter square area.
Expected results

- Decrease in diameter of scar with Conservation moorings
- Increase in eelgrass density, %cover within and near the original scar
- Canopy height may take longest to recover - reach equivalence with reference site
- Results may depend on characteristics of the mooring field (how dense are moorings, how many are traditional vs. conservation,
- Sediment type, wave and current energy and tidal regime
Stuff to think about

- How can we incorporate other sites?
- Does anyone know of a candidate site?
- Are these methods simple enough to be required as standard monitoring in a permit condition?
- Will basic before and after methods provide the quantitative info needed?
Further information

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Thank you!