

Conservation Moorings to Protect Eelgrass Habitat

*A Cooperative Habitat Protection
Partnership*



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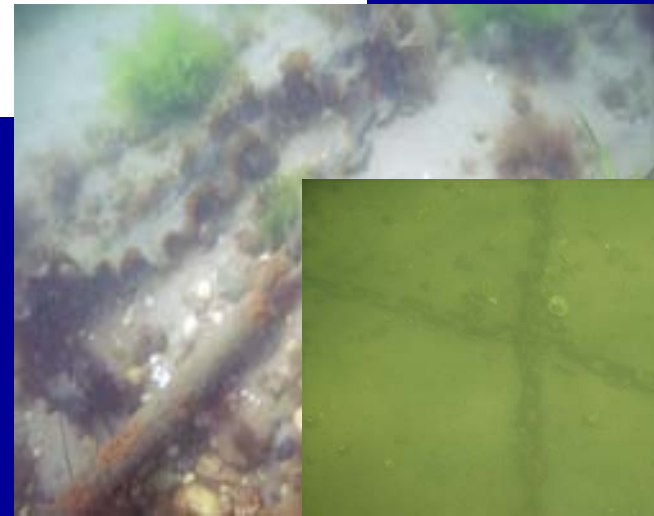
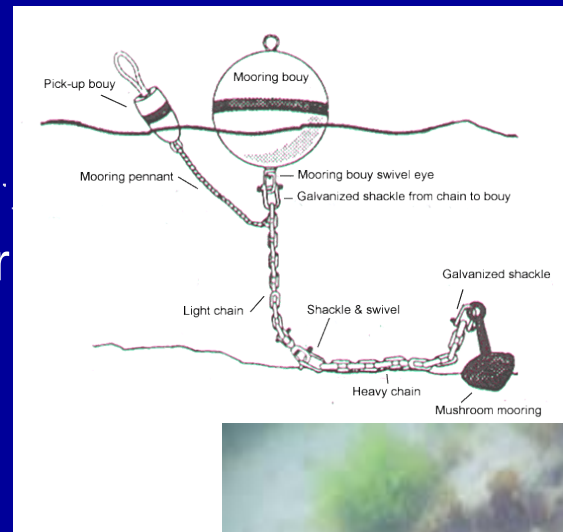
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Conservation moorings to protect eelgrass habitat

- 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





Man-O-War Cay, Abaco Bahamas



Man-O-War Cay, Abaco Bahamas



Manchester, Massachusetts

10-9303 Marblehead, MA Harbor
Aerials Only Gallery (508) 295-5551 (c)

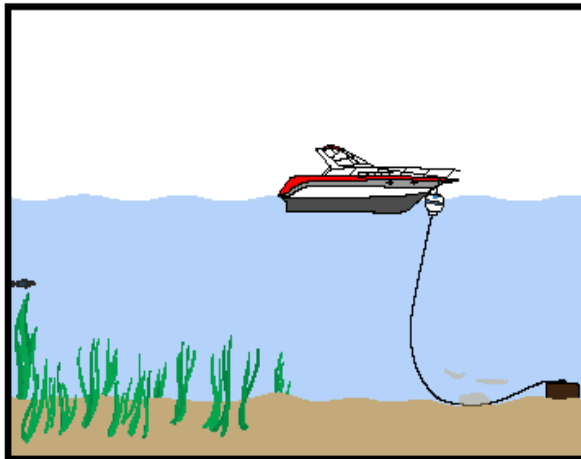
www.skypic.com

Mooring impact studies

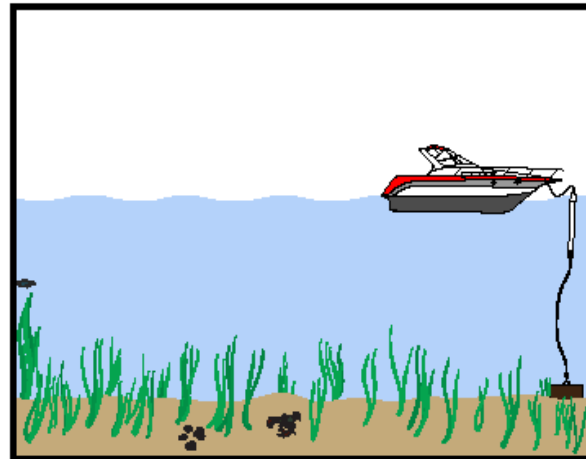
- **Walker et al. 1989 – Effect of boat moorings on seagrass beds near Perth, Western Australia**
 - Moorings produce circular scours 3-300m²
 - *Posidonia* or *Amphibolis* spp.
 - Increase in edge, vulnerable to further erosion and “blow outs”
 - Detritus collected in depressions
 - After removal of 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

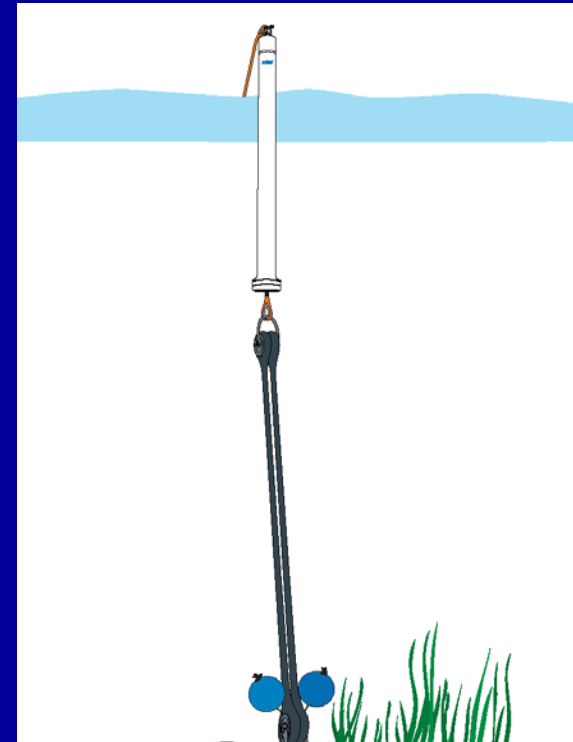
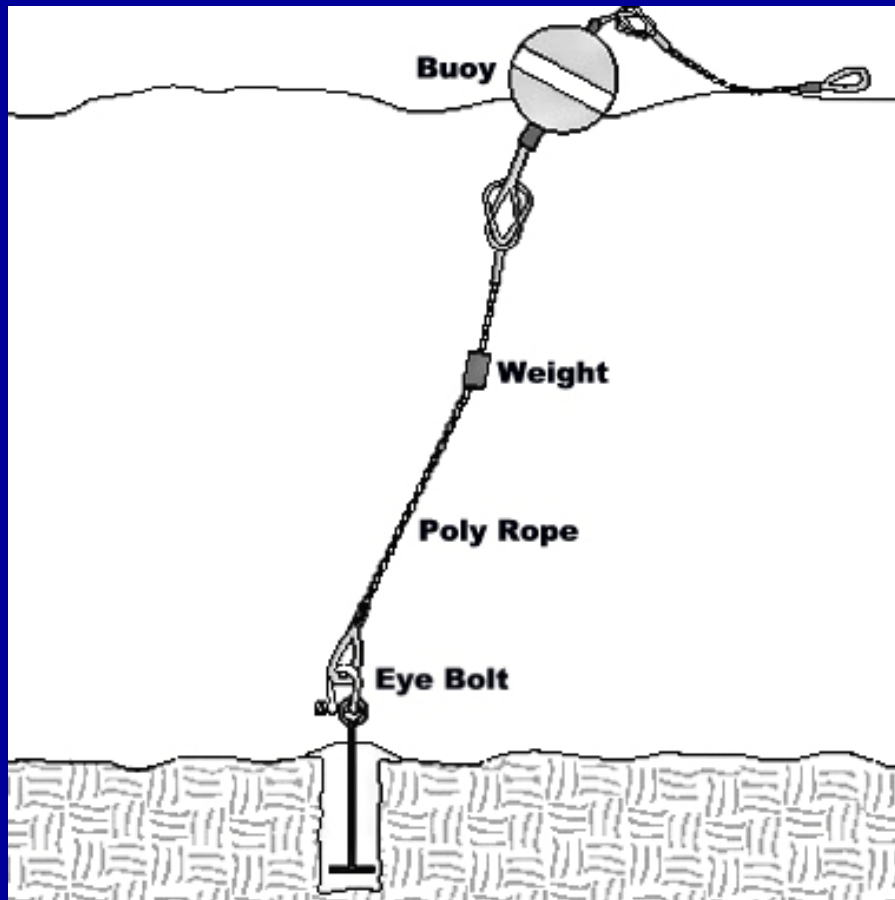


The Hazelett Marine Elastic Mooring



Source: Hazelett

Conservation moorings



Source: Hazelett Marine



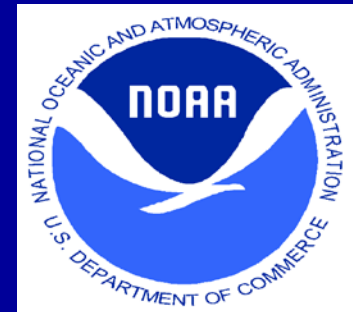
Source: Hazelett Marine

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:

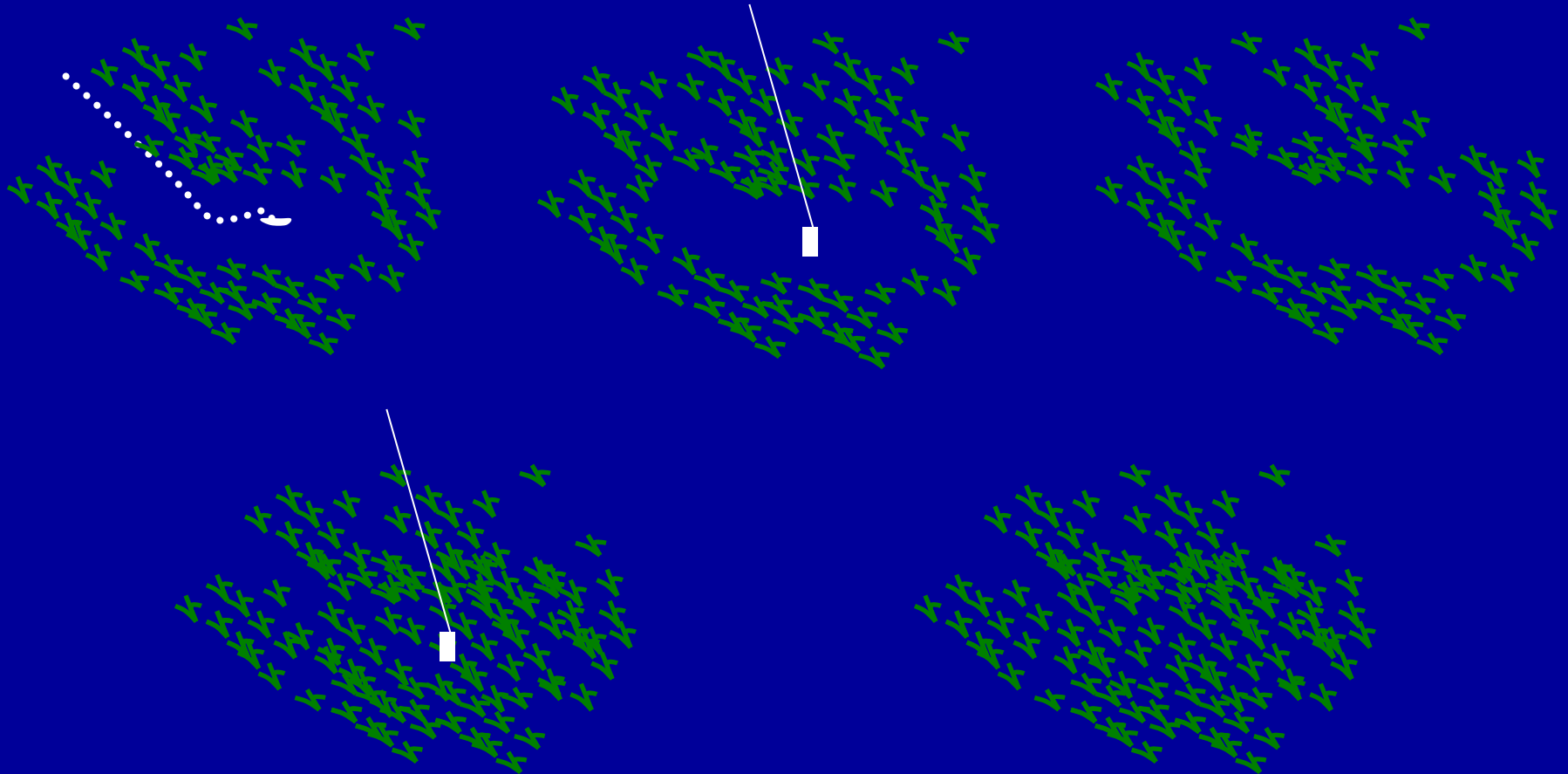
- 1) Will eelgrass grow back into a mooring scar once the mooring is replaced with a conservation mooring? How long will it take?
- 2) What will happen to density, % cover and canopy height in and near the scar?
- 3) What impacts will a conservation mooring have on eelgrass if placed in an unimpacted bed?

Management questions:

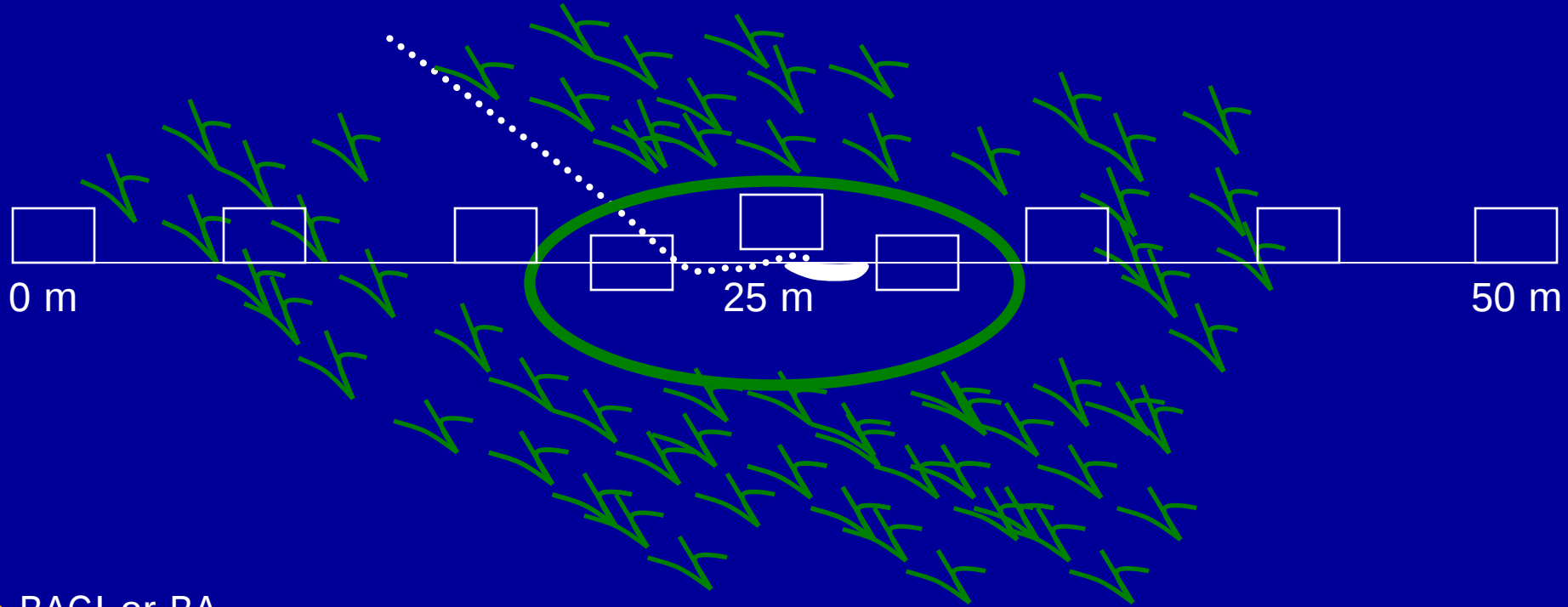
- 1) Can conservation moorings protect eelgrass?
- 2) Should we continue to recommend conservation moorings as a permit condition?
- 3) Can conservation moorings be considered as mitigation for eelgrass impacts?

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

CHPPS

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Conservation Moorings

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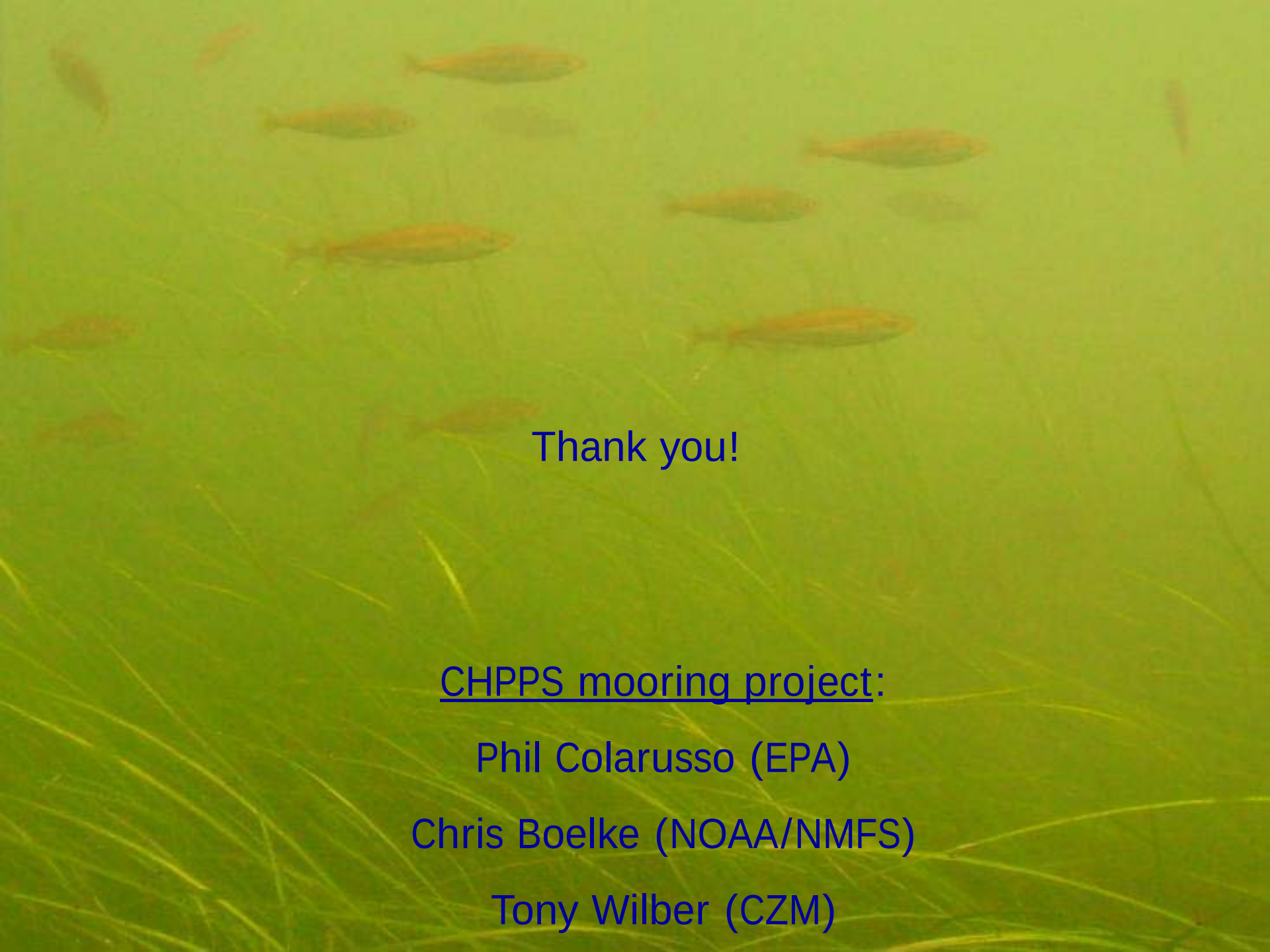
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An underwater photograph showing several small, light-colored fish swimming in a greenish, slightly murky water. In the foreground, there are long, thin blades of seagrass or algae. The background is a soft, out-of-focus green.

Thank you!

CHPPS mooring project:

Phil Colarusso (EPA)

Chris Boelke (NOAA/NMFS)

Tony Wilber (CZM)