



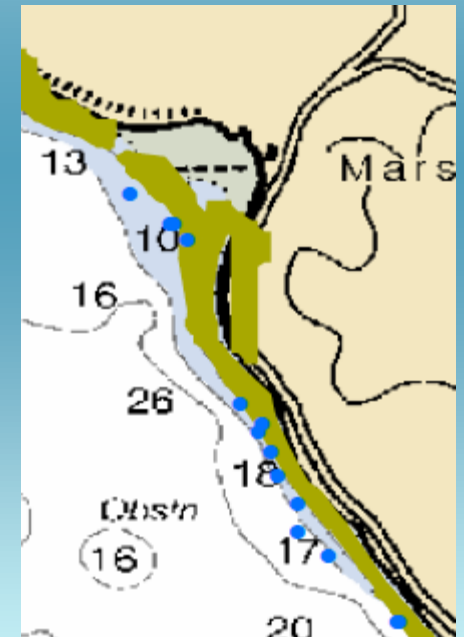
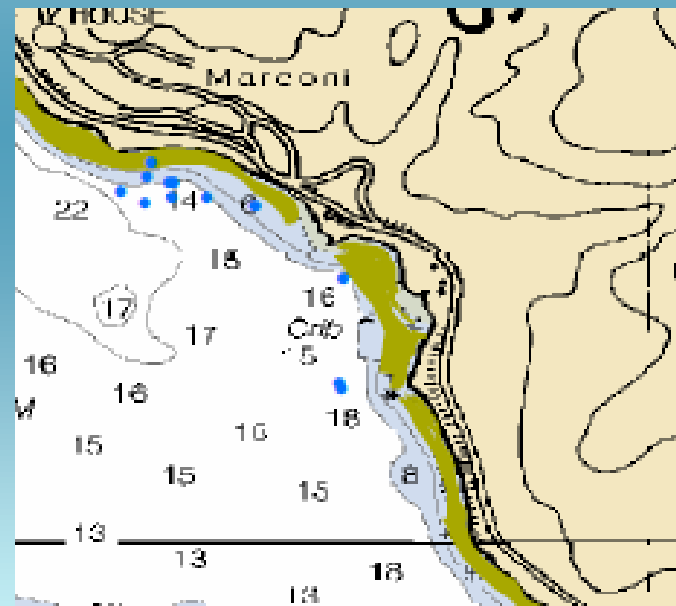
Tomales Bay Eelgrass Habitat Evaluation, Site Monitoring and Restoration Plans

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May 2018 Advisory Council Meeting

Site Monitoring in Areas Affected by Vessel Moorings

- In 2015 we identified 31 mooring locations within or adjacent to eelgrass.



Habitat Evaluation: Questions Asked

- Examine the damage to eelgrass from moorings by conducting an assessment in 2015.
- Make recommendations regarding mooring removal methodologies.
- Document the extent of eelgrass recovery following mooring removals by conducting a follow-up assessment in 2017.



Site Monitoring in Areas Affected by Vessel Moorings

- All sites were investigated in August 2015 and revisited in August 2017 using dive surveys and sidescan sonar.
- The existing moorings investigated in August 2015 were put into a removal or relocation plan, which was executed in 2016 based on recommendation from 2015.



Mooring #: 100 (See Report Figure 2D)

Inspection Dates: August 29-30, 2015

Tag #: G-65 - not present at time of 2015 survey

Description: White and orange fender

GPS Coordinates: 38.16171801, -122.896211

Vessel: No vessel at time of 2015 survey

2015 Eelgrass Status: Not in eelgrass however, some patchy eelgrass may have been impacted by ground chain based on excavation location.

CDFW Eelgrass Zone: Mooring outside but ground chain extends into eelgrass zone

Inspection Notes: Fender was connected to chain, which ran down to the bottom. There was approximately 30 meters of chain coiled up and zig-zagging back and forth. It ultimately ends up connected to a 55-gallon drum. Excavation to south of mooring is ground chain derived.

Recommendations: Shorten ground chain and relocate mooring to the southeast by 20 meters



2016 Removal



1.20 FT10 38.14185, 122.87637
Cut chain on mooring.



1.21 FT9 38.13995, 122.87414
Removed 2 each 55 gallon drums and chain.



1.22 FT7 38.12605, 122.88162
Remove chain and metal anchor.



The 2017 Assessment

- Changes in eelgrass at individual moorings
 - determine how previously identified eelgrass scarring from moorings appeared after the removal approximately a year earlier.
- Evaluating the nature of the changes at each mooring
 - determine if the eelgrass change was likely predominantly driven by large-scale variability in beds, or a recovery of expanded damage associated with the moorings themselves.

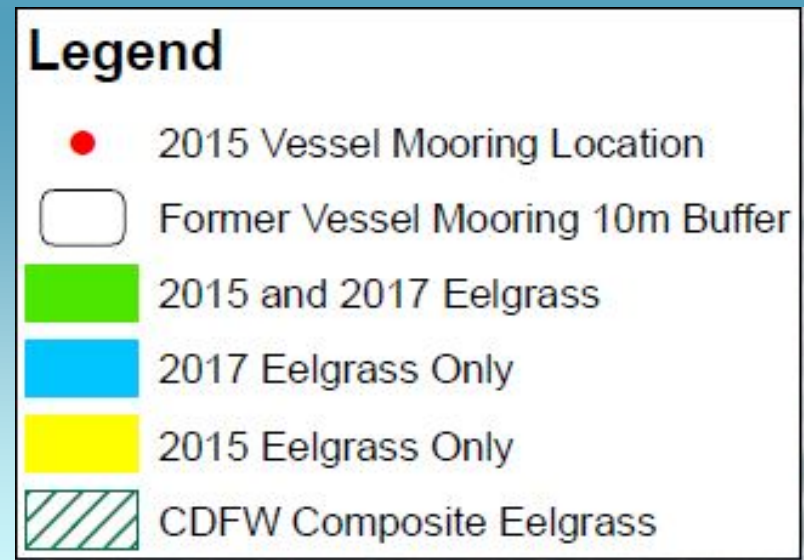
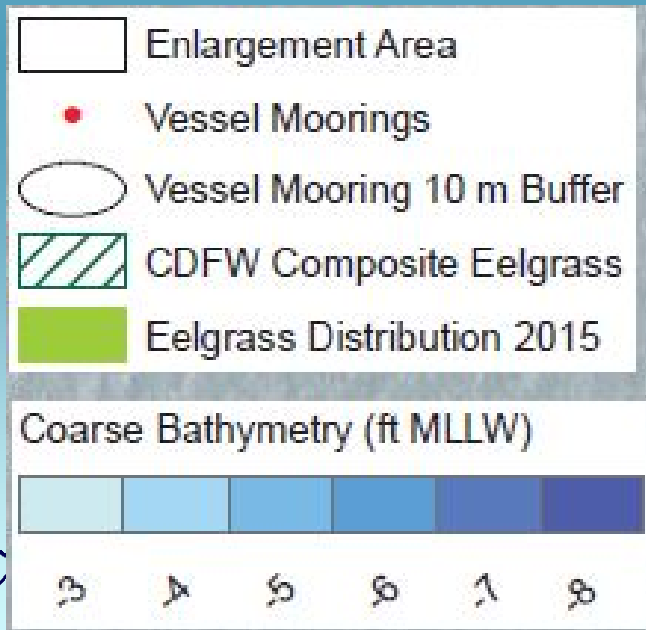


The 2017 Assessment

- Examining the specific mooring scars that were observed in 2015 using the 2017 data to determine how the actual scars have changed.

2015

2017

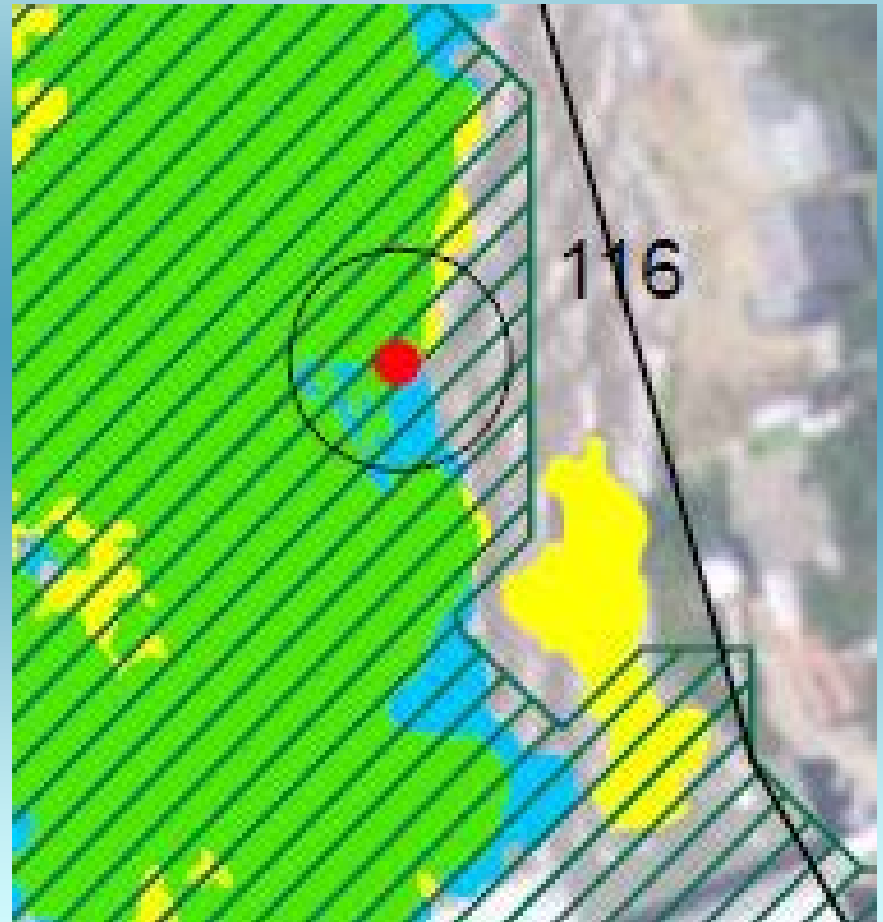


Habitat Evaluation Results: Inn at Tomales Bay

2015

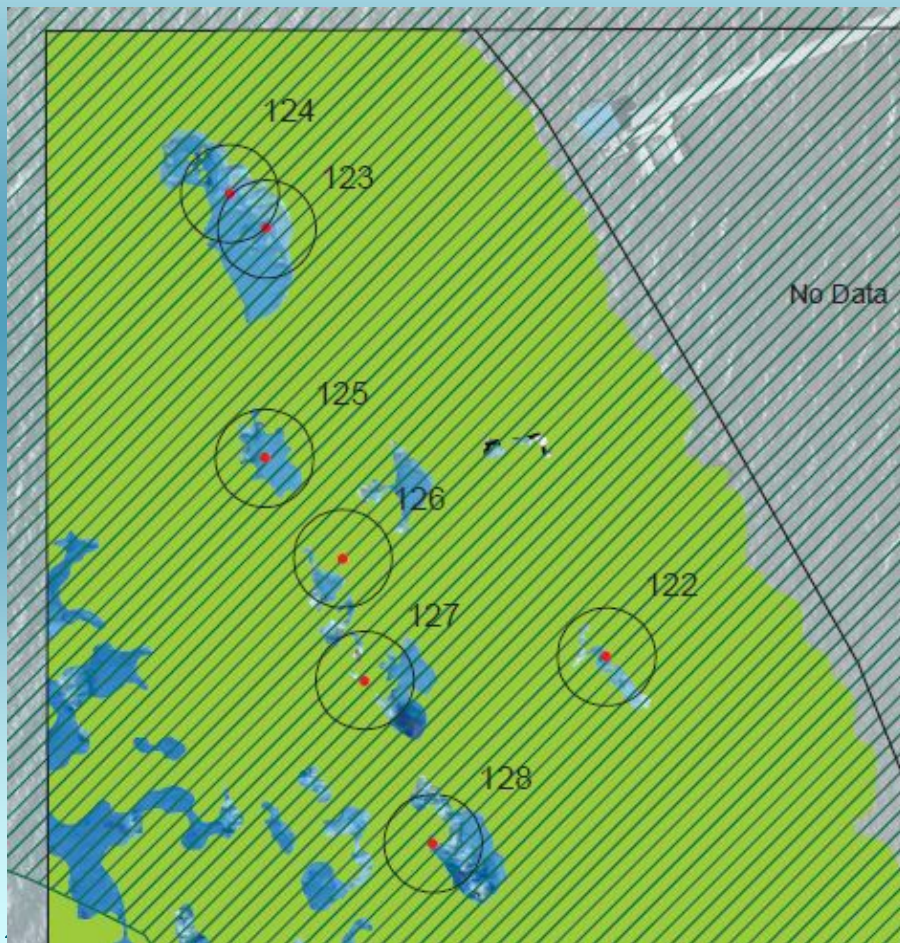


2017

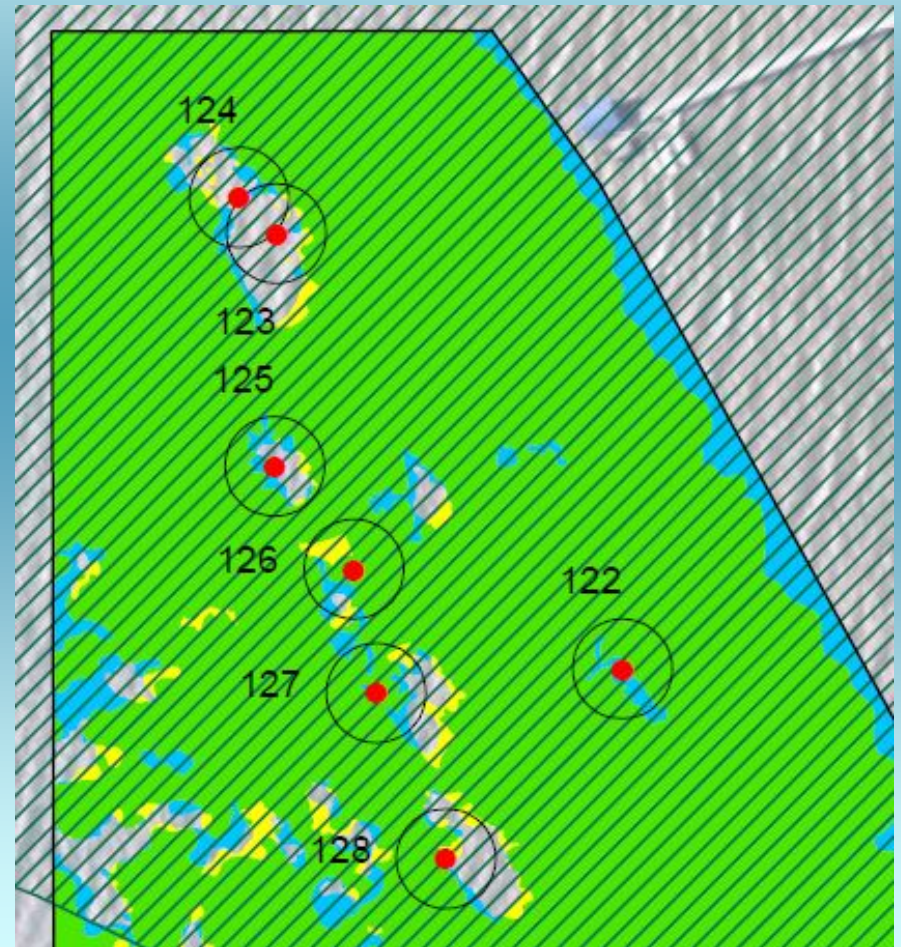


Habitat Evaluation Results: Nick's Cove

2015

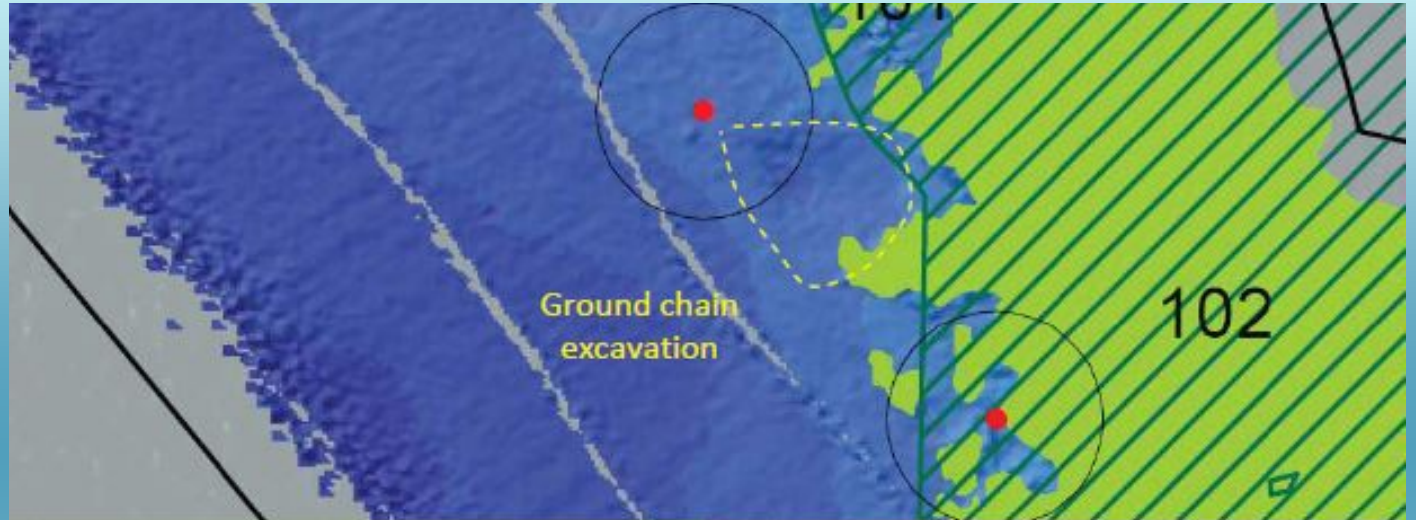


2017



Other Findings

2015 Investigation



What is this telling us?

- 17 of the 31 locations where mooring removal occurred, gains in eelgrass coverage were exhibited that were related to the mooring removals themselves. However, change (gains or losses) couldn't be assessed at several moorings for various reasons.
- While an ideal controlled investigation of mooring effects wasn't possible, the data provides overwhelming evidence of benefits to removal of moorings from within eelgrass beds. This is based on the dominance of sites that exhibited eelgrass increases within mooring influence areas when unassessable change is removed from consideration.



What is this telling us?

- When considering all 31 moorings, 55 percent (17 out of 31) showed gains in eelgrass within mooring damaged areas. However, this goes up to 74 percent (23 of 31) when moorings that could not be evaluated for various reasons are removed from the equation.
- This means that only 26 percent (or only 8 locations) resulted in either no detectible effect or effects that could not be specifically attributed to the removals.



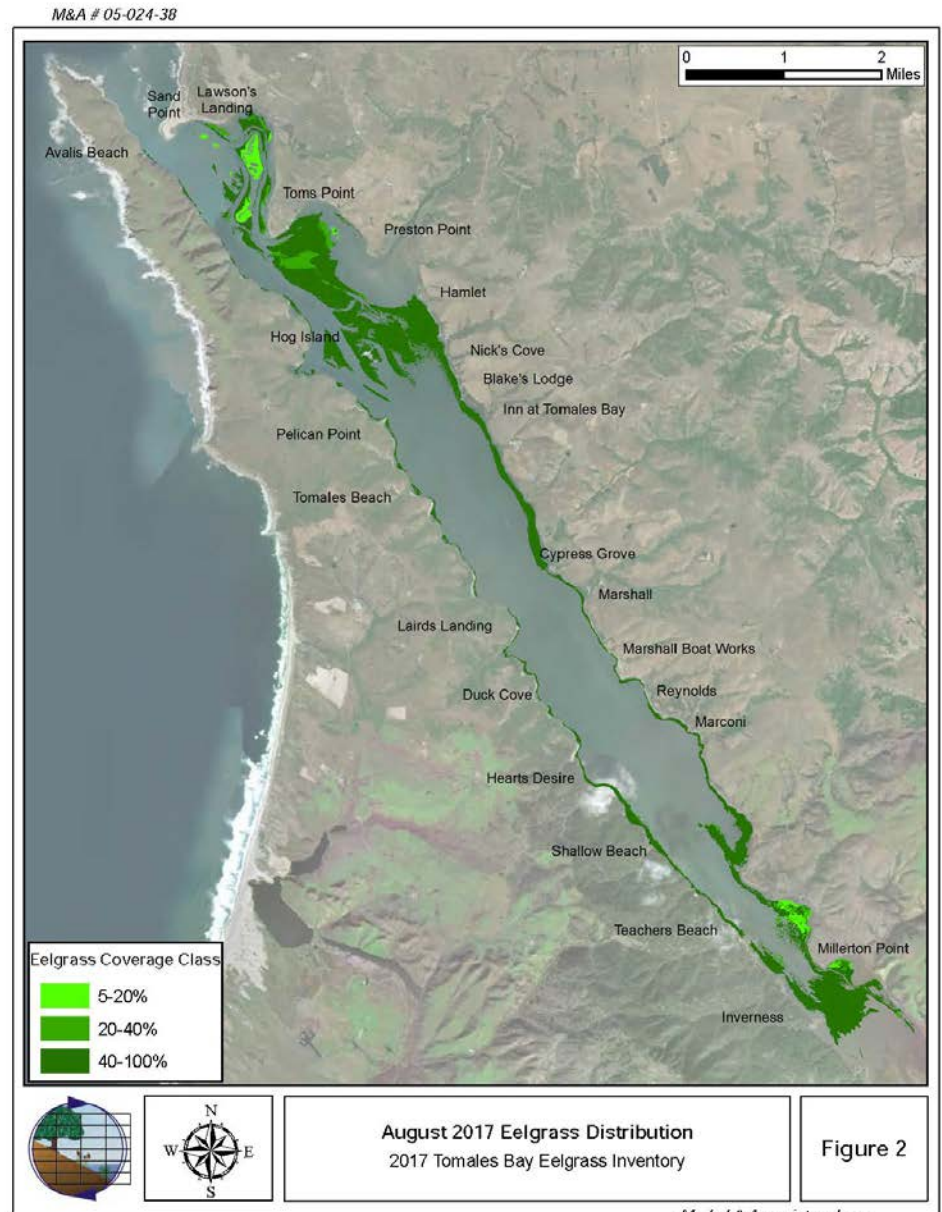
What is this telling us?

- None of the removal sites exhibited detectible damage associated with the removals themselves.
- The removal of 42 moorings and anchors, 2 floating docks and 2 vessels, stopped potential impacts to up to 0.55 acres of seafloor habitat of which 0.23 acres are in eelgrass.
- There is still more recovery to go and more information to be collected if we want to determine locations where “active restoration” needs to occur.



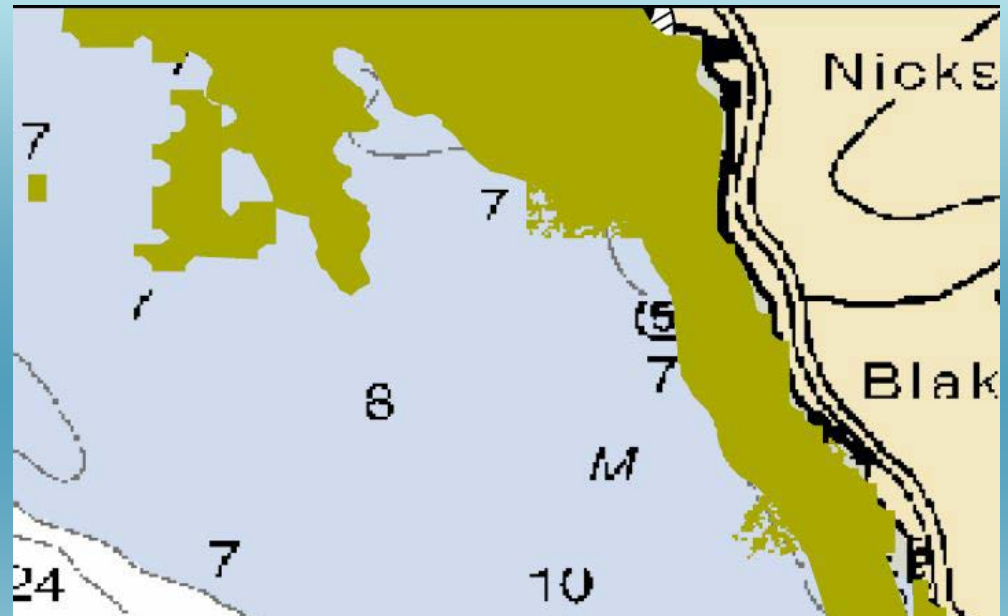
Bay-wide Survey

Our consultants mapped the full extent of eelgrass in order to understand the distribution below the elevations that could be detected using aerial photography.



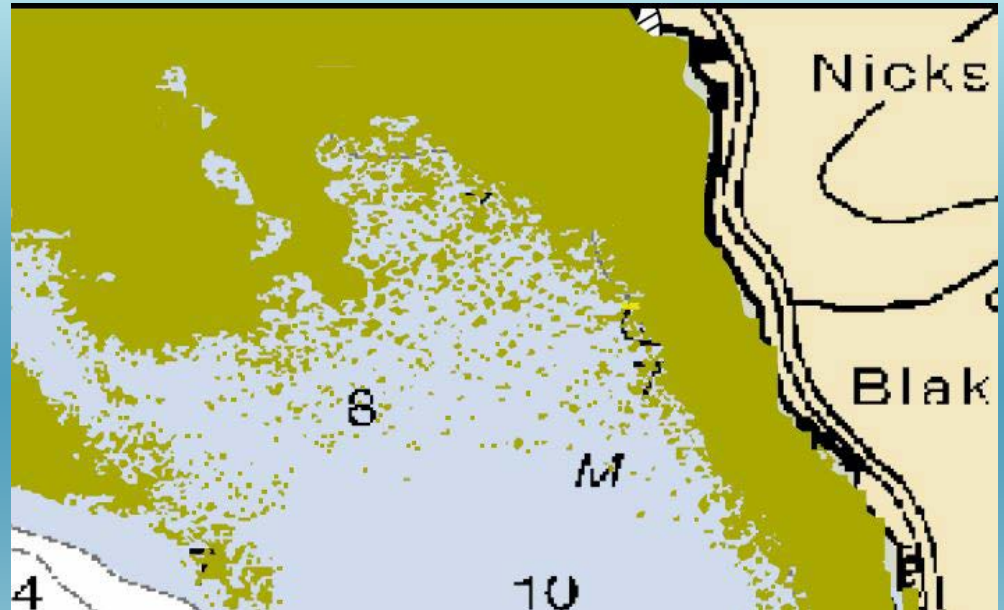
Bay-wide Survey

This gives the baseline for conducting long-term tracking of eelgrass expansion and contraction as a function of various stressors through a potential future much reduced cost monitoring program.



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What we need to know

- Eelgrass recovery rates at mooring sites beyond 2017.
- Annual changes in bed coverage, including percent coverage.
- Hotspots over time.
- Areas of concern: areas that may be affected by other human-caused impacts such as anchoring.
- Changes over time due to climate change and ocean acidification.
- Pros and cons of different survey methods for assessing any of these changes.



What can the Advisory Council do about it?

- Advice?
- Request a State-wide effort?
- Partnerships with institutions?
- Other Ideas?

