

Benthic Video Monitoring in the Providence River Estuary – What do we see?

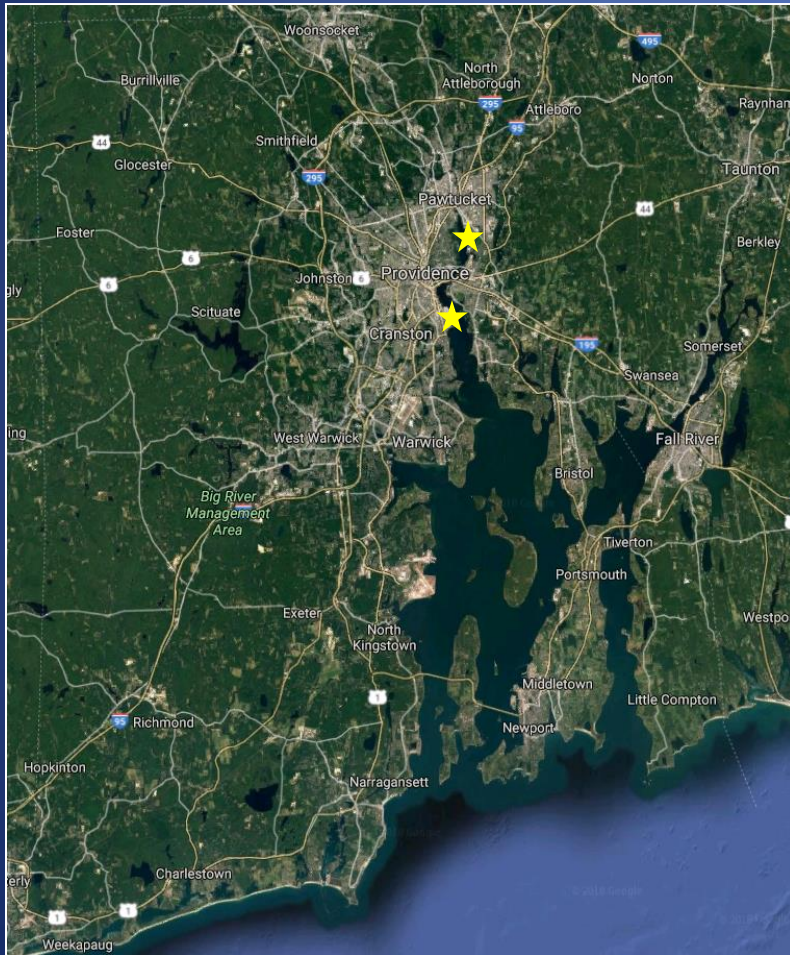
Eliza C. Moore, M.S.
Narragansett Bay Commission

NEERS – April 27, 2018
Portsmouth, NH





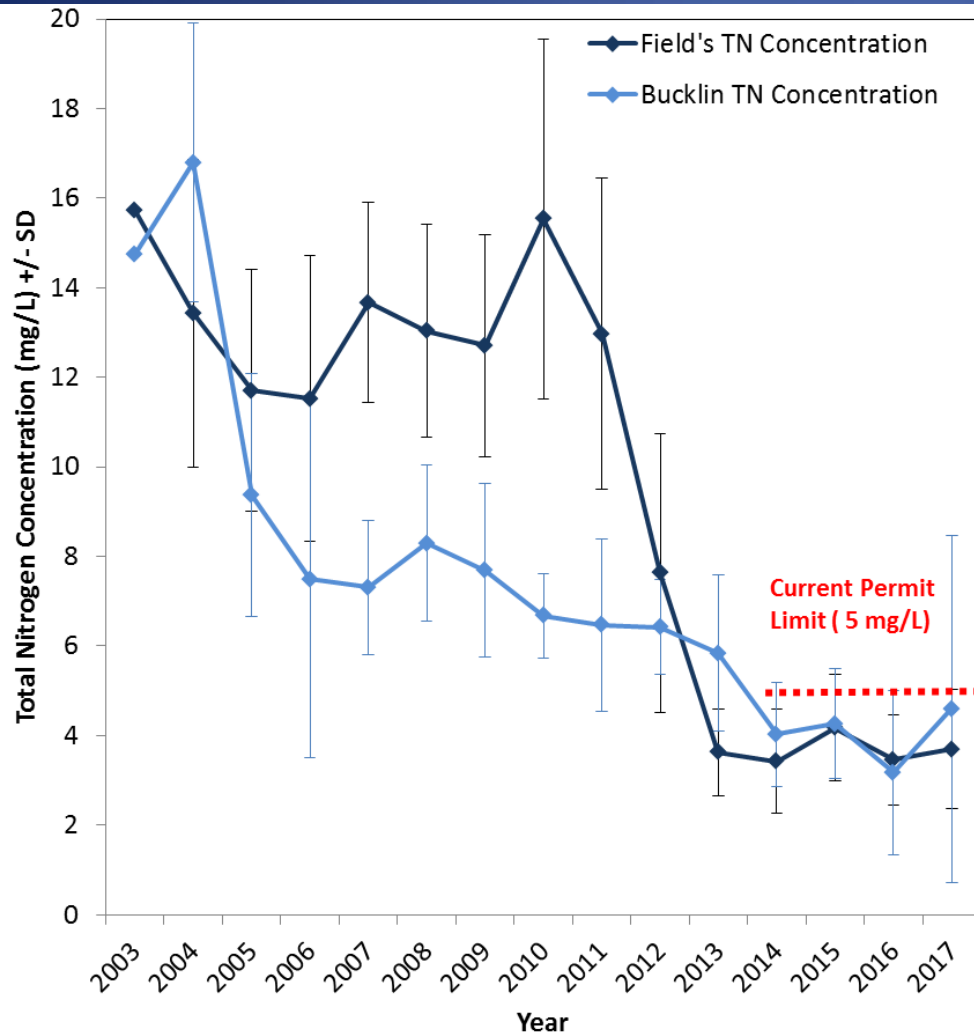
Narragansett Bay Commission



- Own and operate two largest WWTFS in Rhode Island
- Serve 360,000+ residents and 8,000+ businesses in ten RI communities.
- Extensive receiving waters monitoring program



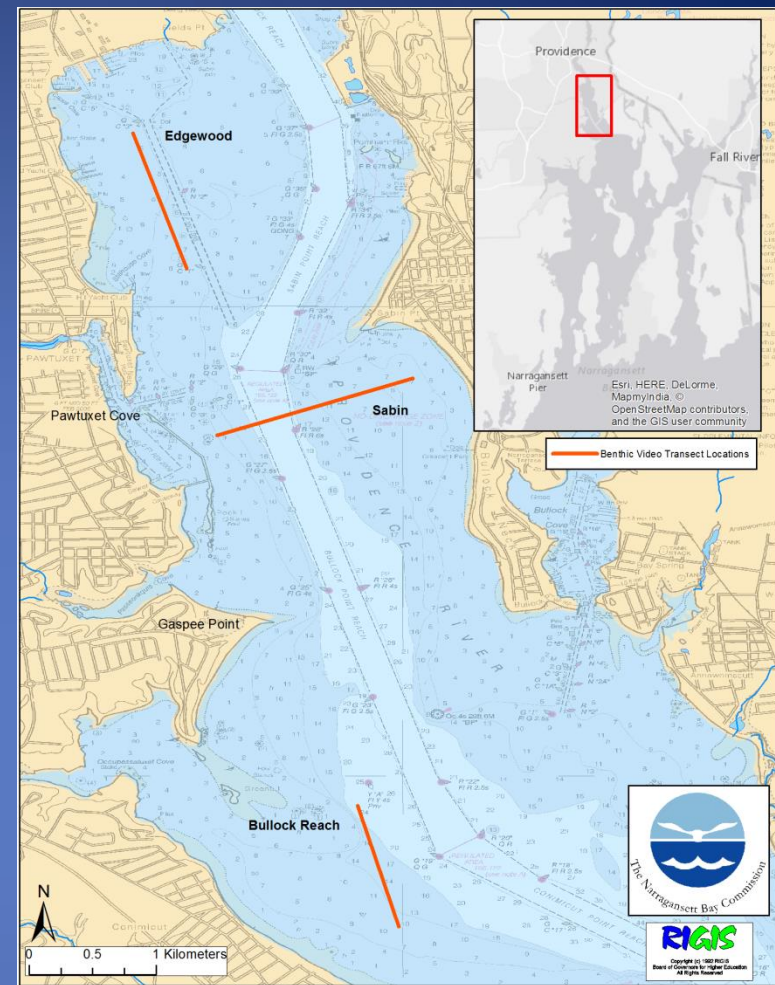
Narragansett Bay Commission



- Monitor receiving waters to track water quality improvements following infrastructure investment
 - Nitrogen reduction upgrades
- snapshot.narrabay.com for all data

NBC Benthic Video Monitoring

- Began in October 2014
- Focus on three transect areas
 - 1-5 m depth



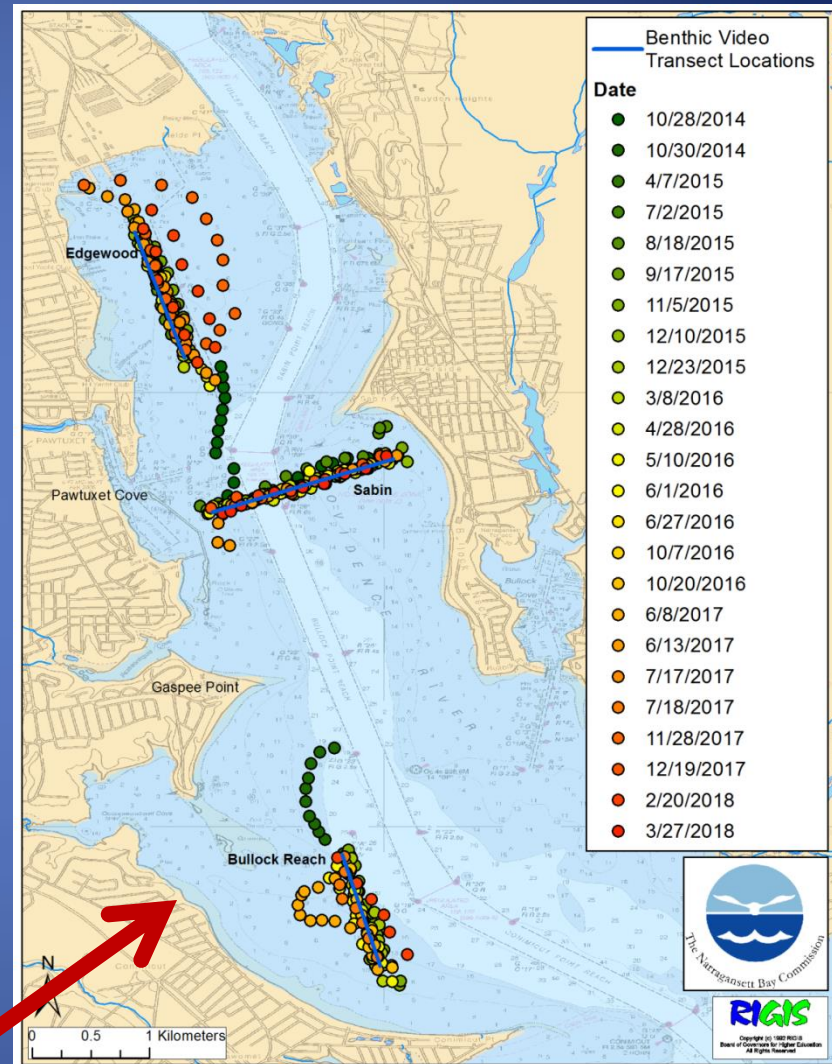
NBC Benthic Video Monitoring

- Began in October 2014
- Focus on three transect areas
 - 1-5 m depth
- SeaView camera
 - Scale lasers added 2017



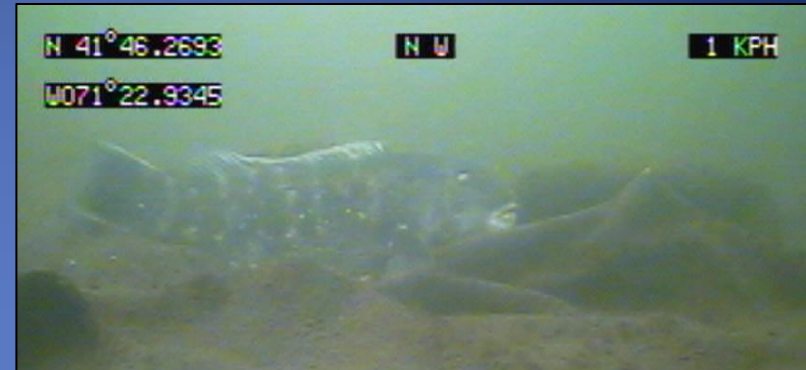
NBC Benthic Video Monitoring

- Began in October 2014
- Focus on three transect areas
 - 1-5 m depth
- SeaView camera
 - Scale lasers added 2017
- Surveys attempted monthly
 - 3 - 6 good videos per transect per year
 - Dots every 5 minutes (MAP)



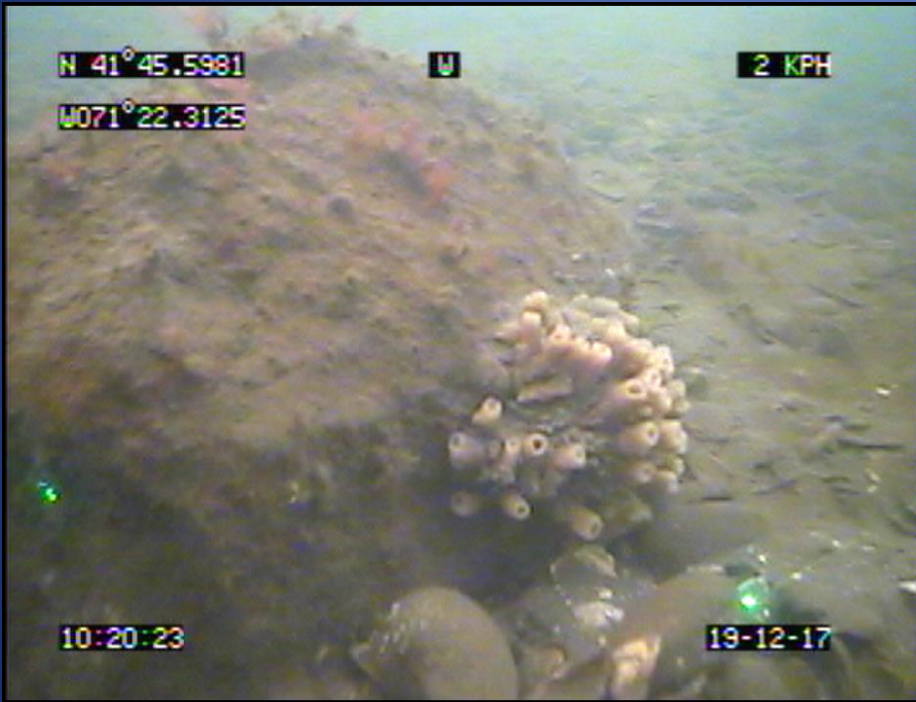
NBC Benthic Video Analysis

- Video subsampled every 5 minutes
 - CMECS (substrate and dominant biota)
 - Single frame
 - Counts
 - 60 sec.
- Rare observations (whole video)



What do we see?

- Three full years of observation (2015-2017)
- High variability
- Patterns emerging
 - Seasonal
 - Spatial
- Indicators of water quality
- Cool stuff



Seasonal Patterns

- Bushy brown alga or colonial diatoms
 - Late winter (March)
 - Mostly at Sabin



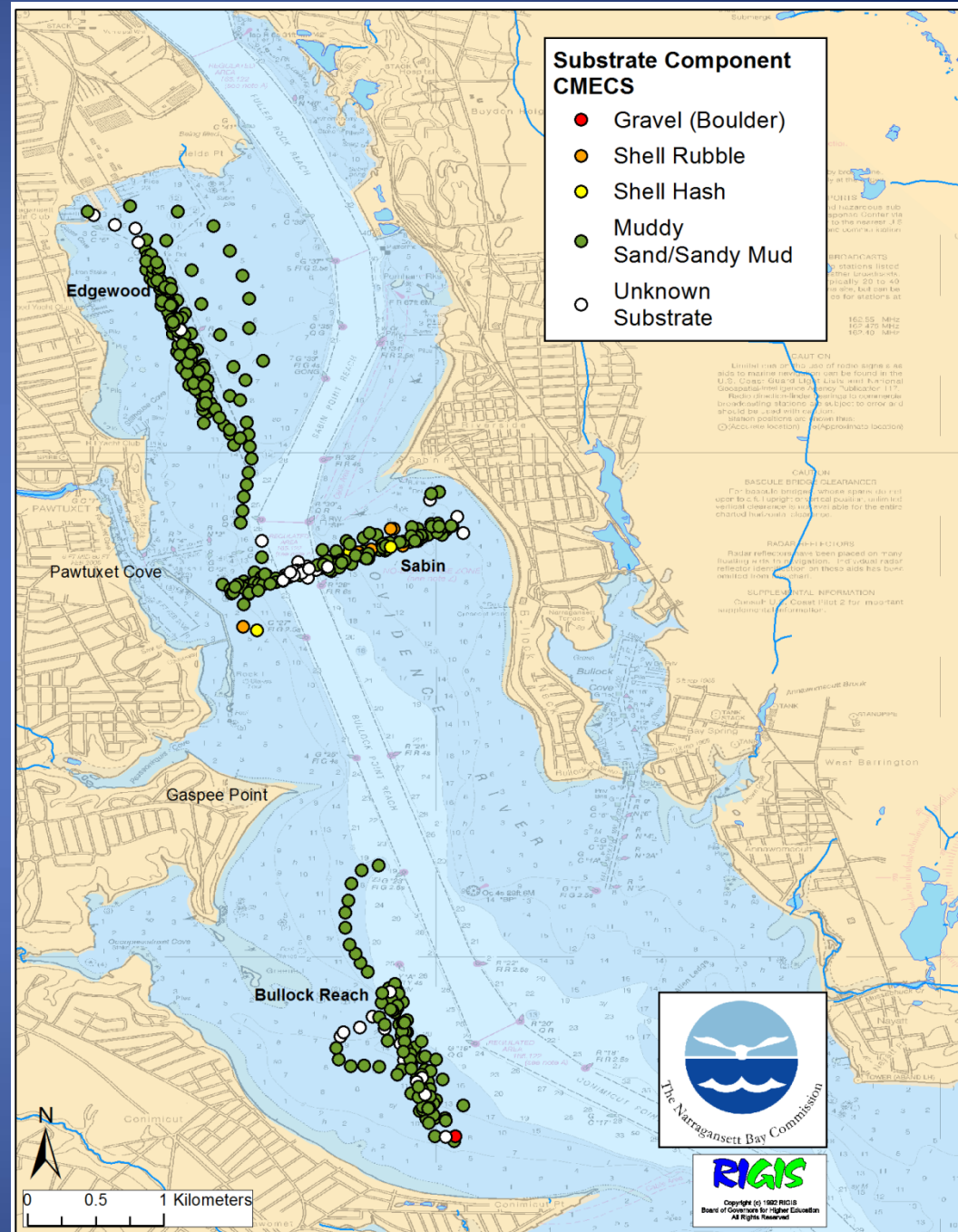
Seasonal Patterns

- Lugworm (*Arenicola cristata*) egg sacs
 - May-July
 - Most abundant at Edgewood, but seen elsewhere.



Spatial Differences

- Dominant Substrate Type
 - Fine (muddy sand, sandy mud)
 - Shell Hash/Rubble mainly off Sabin Point
 - Sporadic areas of boulders/large cobble



Spatial Differences

- Dominant Substrate Type
 - Fine (muddy sand, sandy mud)
 - Shell Hash/Rubble mainly off Sabin Point
 - Sporadic areas of boulders/large cobble
 - *Crepidula* reef

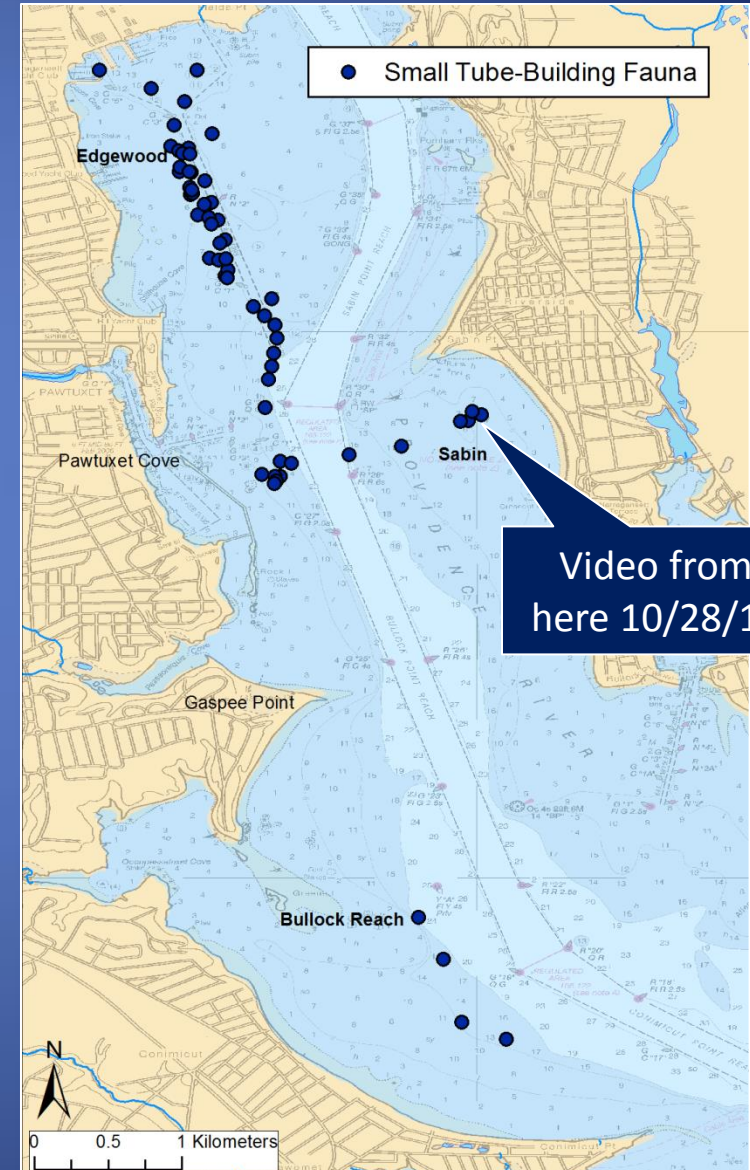


Indicators of Water Quality

- Amphipod tube mats



- High organic matter
- Expect a decline with nutrient reduction?



Indicators of Water Quality

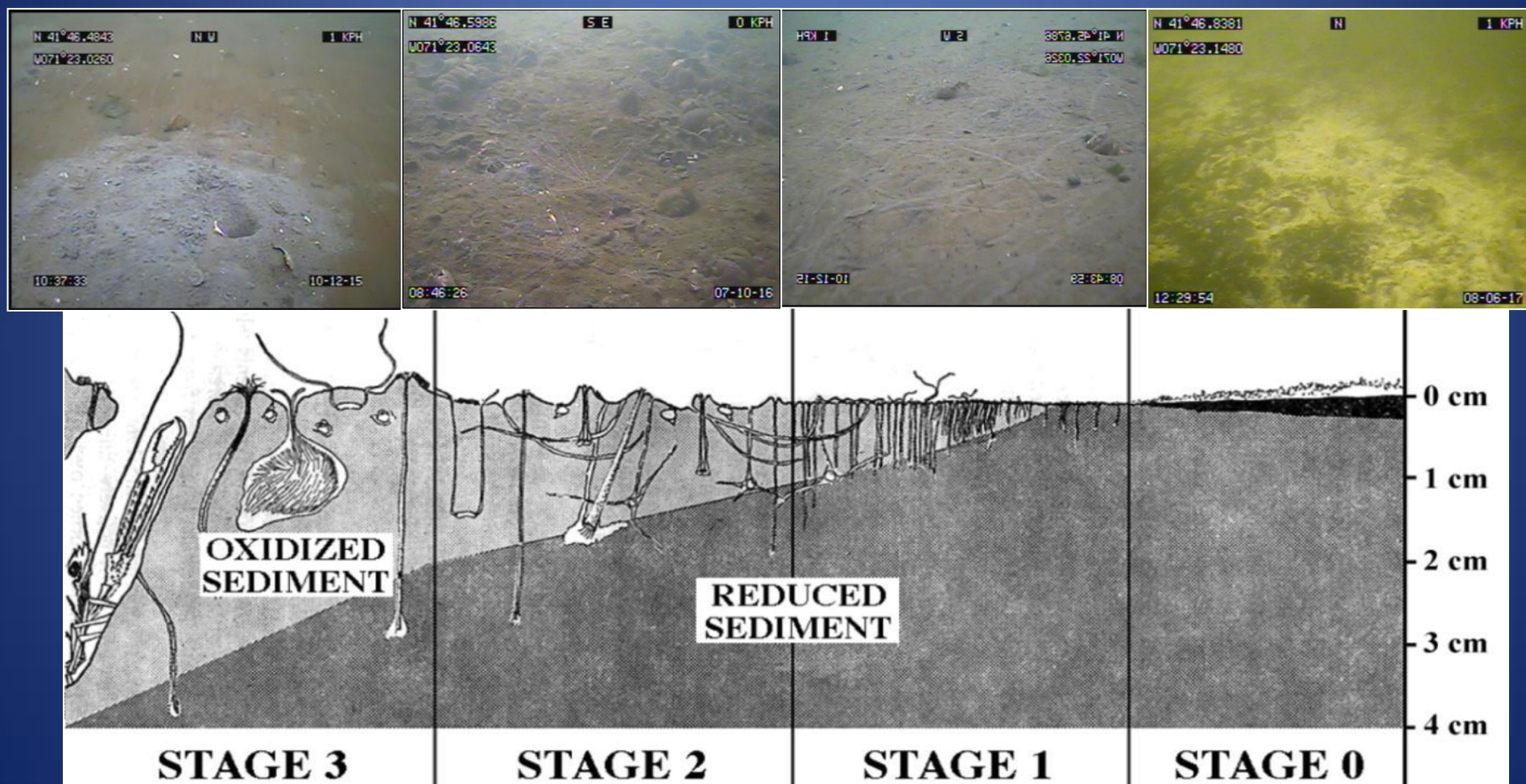
- *Beggiatoa*
 - Bacterial growth indicative of hypoxic/anoxic conditions in turning basin



Video from June 13, 2017

Indicators of Water Quality

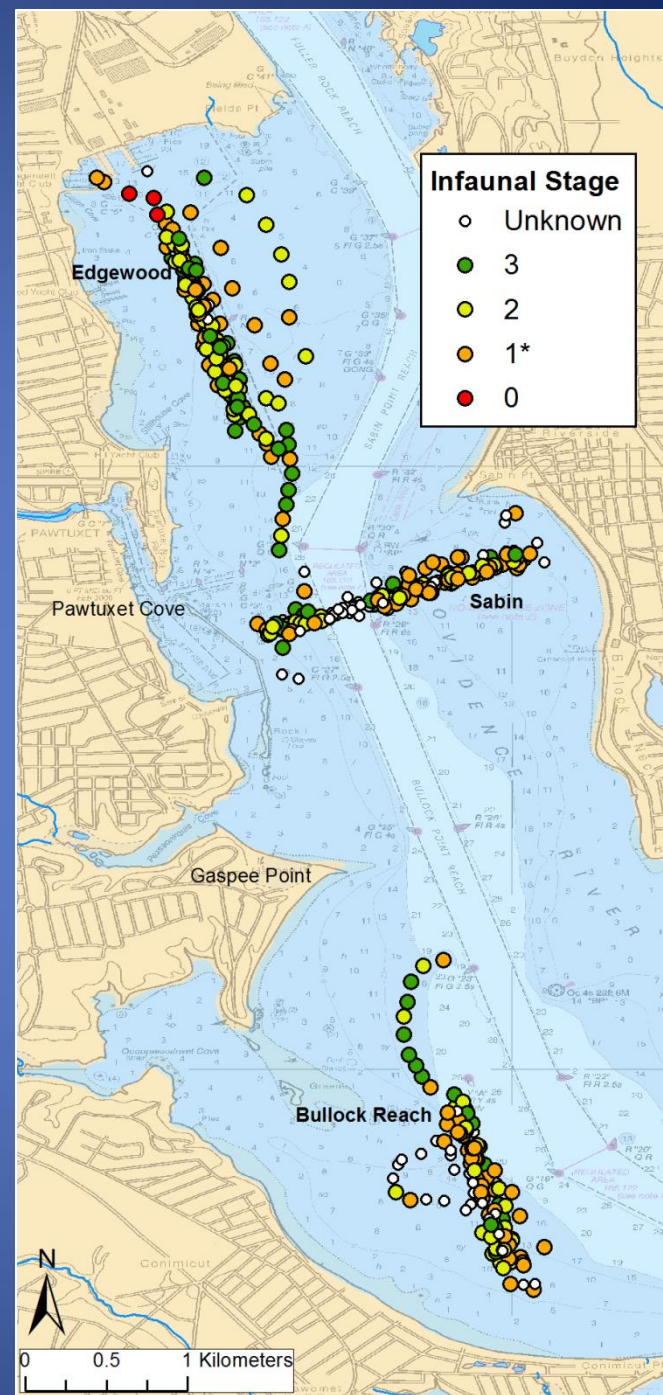
- Infaunal Stage – based on surface-visible evidence



(figure modified from Nilsson and Rosenberg 1997)

Infaunal Stage

- No strong differences (observationally) among transect locations.
- Only extensive area of “0” (*Beggiatoa*) in the turning basin at Edgewood.
- What about temporal differences?



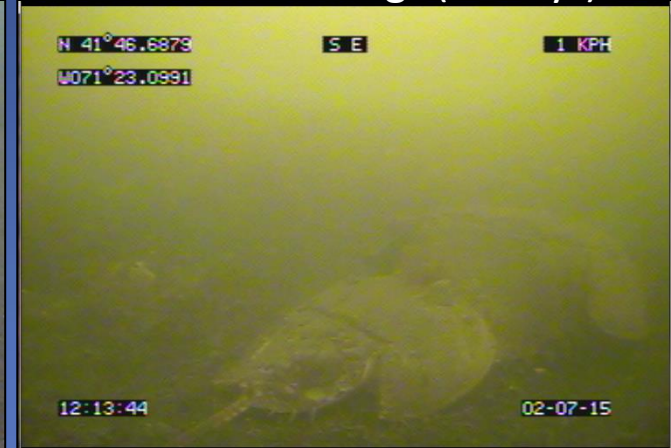
Kelp!



Squilla!



Limulus mating! (oh my!)



Thank you!

- NBC Environmental Monitoring staff
- G. Cicchetti & E. Shumchenia
- “Narragansett Bay Benthic Research Collaborative”
(RI DEM, Nature Conservancy, NBC, EPA, +!)