



# 2019-2020 Water Quality and Eelgrass Survey Updates

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MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

*Protecting Maine's Air, Land and Water*

## Reasonable Potential Analyses (2015- )

- DEP's discharge permits started including RP analyses, using eelgrass as aquatic life indicator and total nitrogen (TN) threshold of 0.32 mg/L
- Need three pieces of info. for RP analysis: effluent TN loading, ambient TN concentrations, biological indicator data
- Portland Water District's East End permit renewed in early 2017
  - *requirement* to monitor effluent [nitrogen] and reduce TN load by 20-40% (PWD), conduct ambient water quality and biological monitoring 2017-2020 (DEP)



# East End Vicinity Monitoring

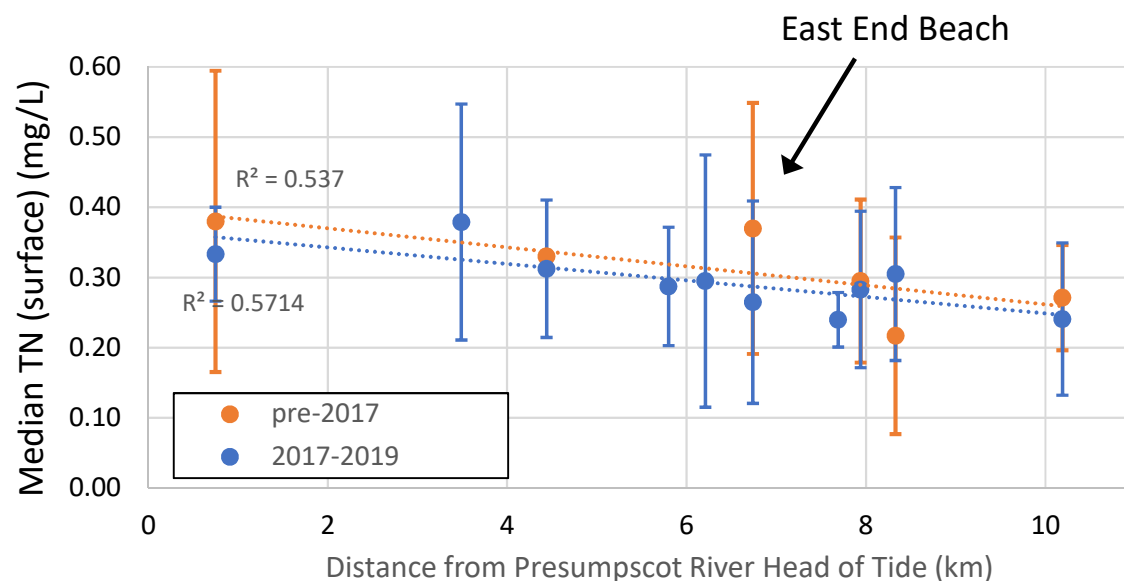
- Sampled every three weeks from June-Sept. (2017) and May-Oct. (2018, 2019) on alternating ebb and flood tides
  - Temperature (c)
  - Salinity (c)
  - pH (c)
  - Dissolved oxygen (c)
  - Turbidity
  - Chlorophyll
  - Transparency (Secchi)
  - Light attenuation (PAR)
  - Grabs: surface (and bottom at sites >10 m depth) water
    - Nutrients: nitrate+nitrite, ammonium, TN, orthop., TP
    - Chlorophyll *a*
    - Total Suspended Solids
  - Eelgrass mapping and “health” assessments

\* (c) indicates additional continuous monitoring of this parameter

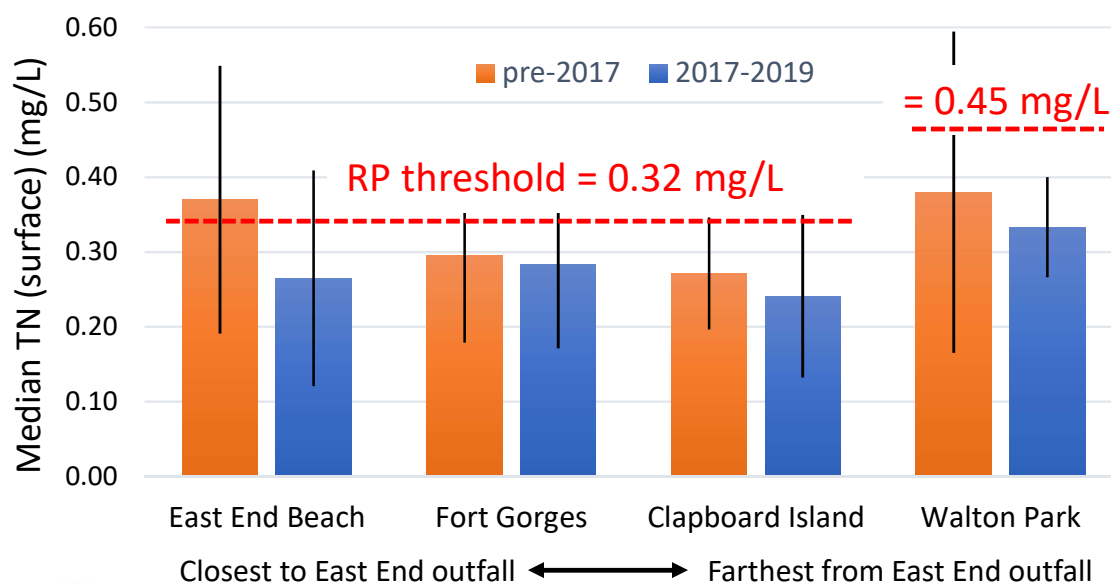








➤ Total Nitrogen values still reflect estuarine gradient with subtle difference between oligohaline to euhaline areas



➤ East End vicinity [TN] under RP threshold in 2017-2019

➤ Since pre-2017, East End Beach site median [TN] 30% lower





- June and Sept. monitoring (shoot density, % cover, canopy height, depth at deep edge, video transect, light intensity and attenuation), temp. and light continuous during July
- No eelgrass bed edge mapping in 2019

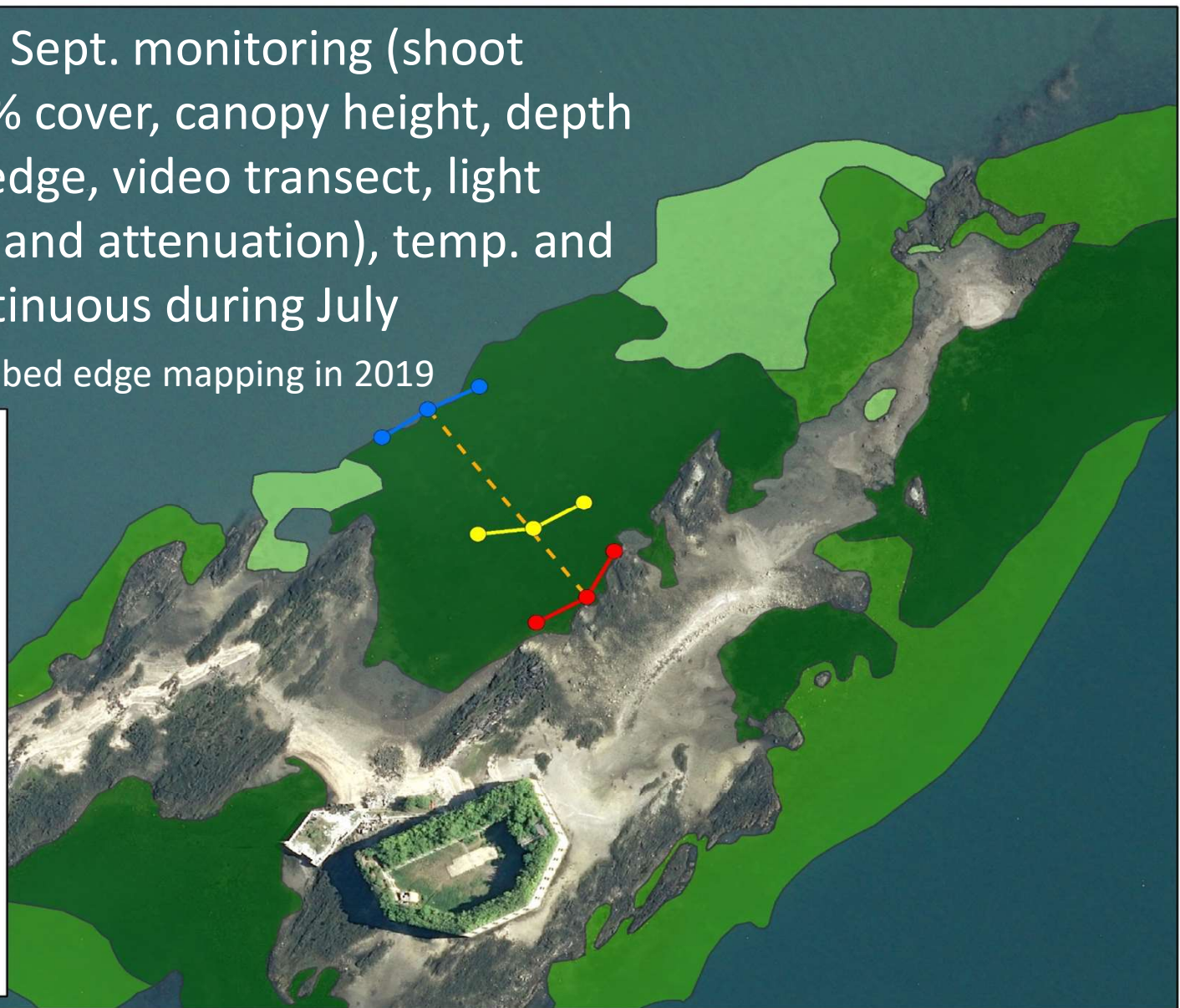
**Fig. 4: Fort Gorges  
Transects 2018**

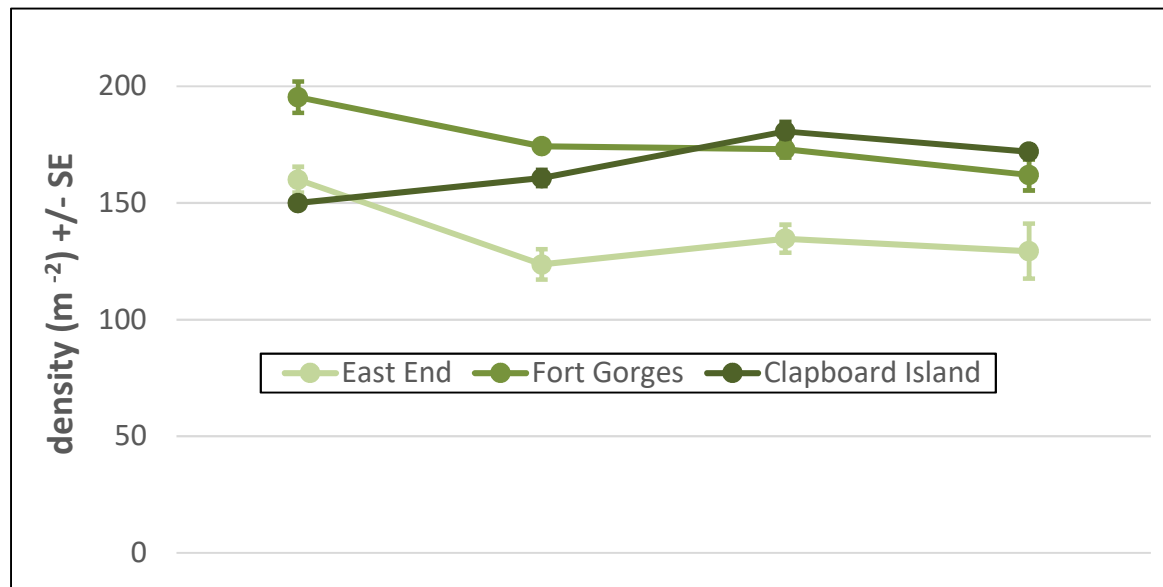
- Transect 1
- Transect 2
- Transect 3
- - - Transect 4

**Eelgrass**

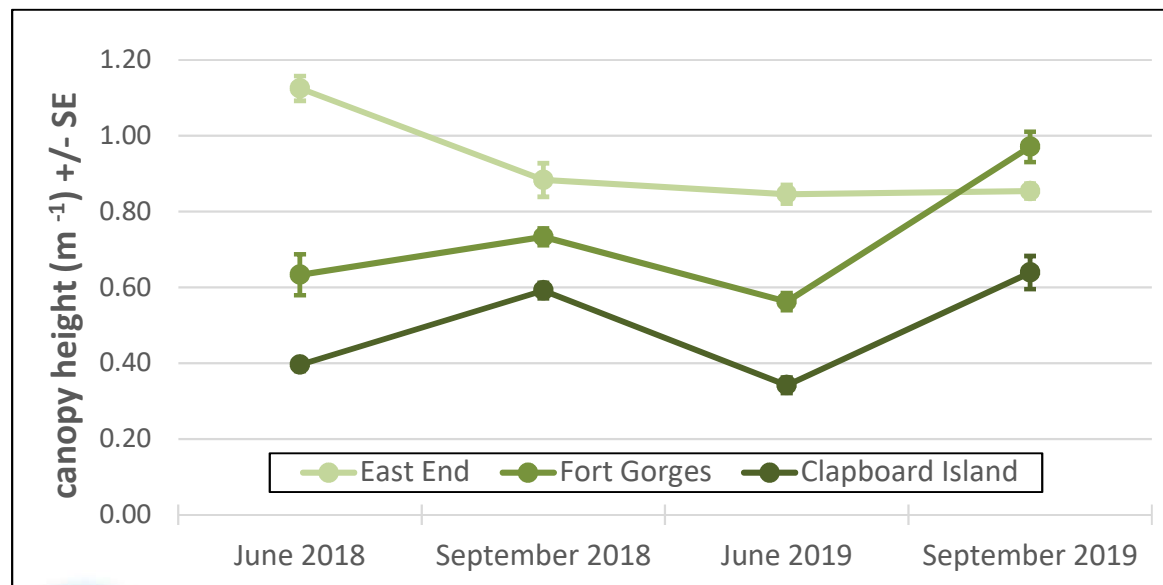
**Cover Class 2018**

- 1: 0 - 10%
- 2: 10.1 - 40%
- 3: 40.1 - 70%
- 4: >70%





- Intermediate transect density data showed no evident within site differences, though East End least dense site in 2019

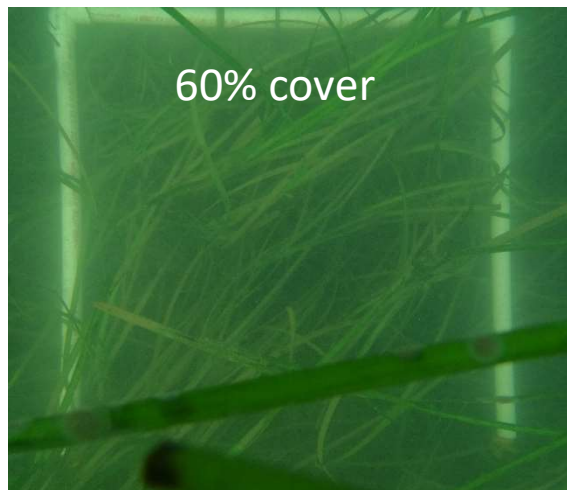


- Intermediate transect canopy height data showed longer shoots with proximity to East End, interesting uptick in canopy height in Sept. 2019

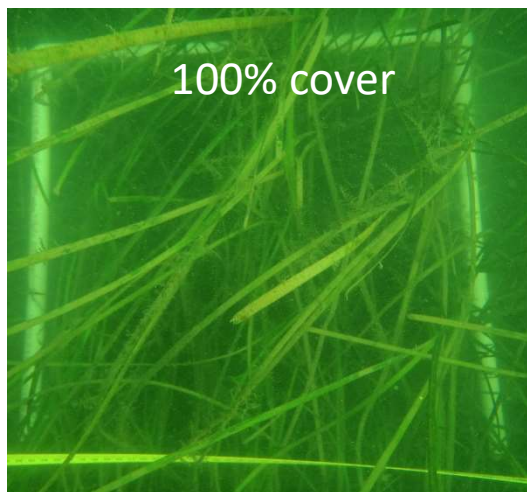


Sept. 2018

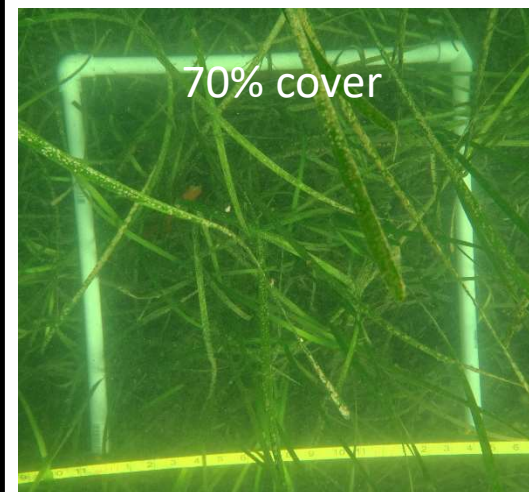
East End



Fort Gorges

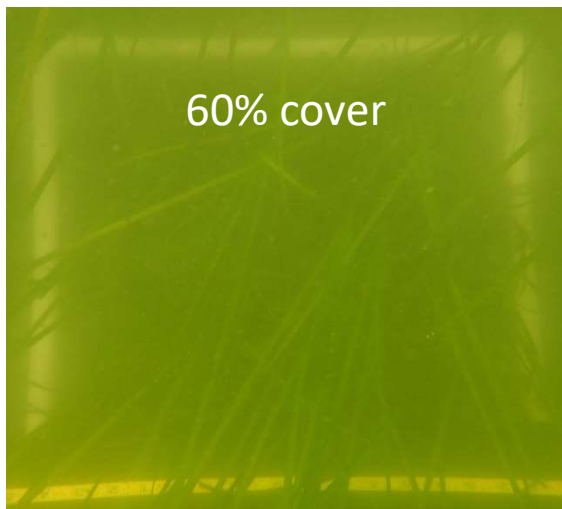


Clapboard Isl.



Sept. 2019

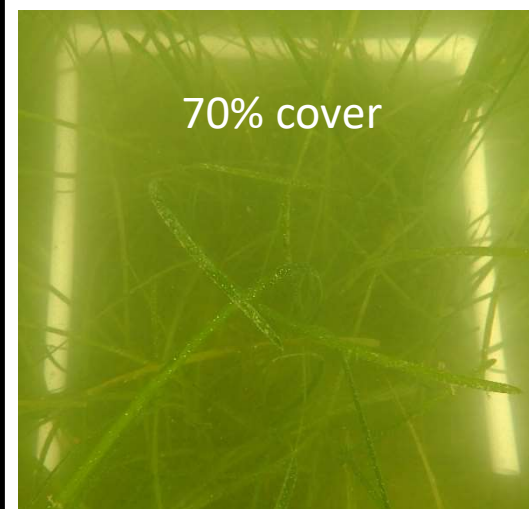
60% cover



100% cover



70% cover





Site	Mean % surface irradiance 2019 (2m)	Mean % surface irradiance 2019 (2.5m)
EAST END DEEP EDGE	26.69	20.63
FORT GORGES DEEP EDGE	28.45	21.48
CLAPBOARD ISLAND DEEP EDGE	34.18	28.61

- Light limiting for eelgrass growth at ~20-22% surface light
- Deep edge depths:
  - East End: 7.8 ft (2.4 m) below MLLW (2018)
  - Fort Gorges: 7.7 ft (2.3 m) below MLLW (2019)
  - Clapboard Island: 10.6 ft (3.2 m) below MLLW (2019)
- In 2020, eelgrass monitoring will be enhanced through quantification of shoot epiphytes,  $\delta^{15}\text{N}$  in shoots, and continuous PAR and temperature monitoring, aerial imagery (plane?)



- 2020 plans:
  - Water quality monitoring the same as in 2018 and 2019
  - Addition of sediment grabs for infauna (lowest identifiable taxonomic level, abundance / species) at four sites along Presumpscot R. alignment
  - Addition of support for UMaine LOBO buoy?
  - National Coastal Condition Assessment to be conducted by contractor in June-September (eight of 36 sites in Casco Bay): new parameters for 2020 include surface water total alkalinity, sediment  $\delta^{15}\text{N}$  and sediment microplastics
- COVID-19 accommodations:
  - 1<sup>st</sup> May water quality sampling event cancelled
  - Awaiting Department guidance on allowable fieldwork





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