The Impacts of Dredging on the Ecosystem Health of Edgartown Great Pond

After a decade of dredging (2009-2019), the water quality and ecosystem health of Edgartown Great Pond have improved as a result of increased and pond-wide flushing capacity during periodic barrier beach breaches to the Atlantic Ocean.

GREAT POND foundation

Flash Report

April 2020

Impacts of Dredging in Edgartown Great Pond

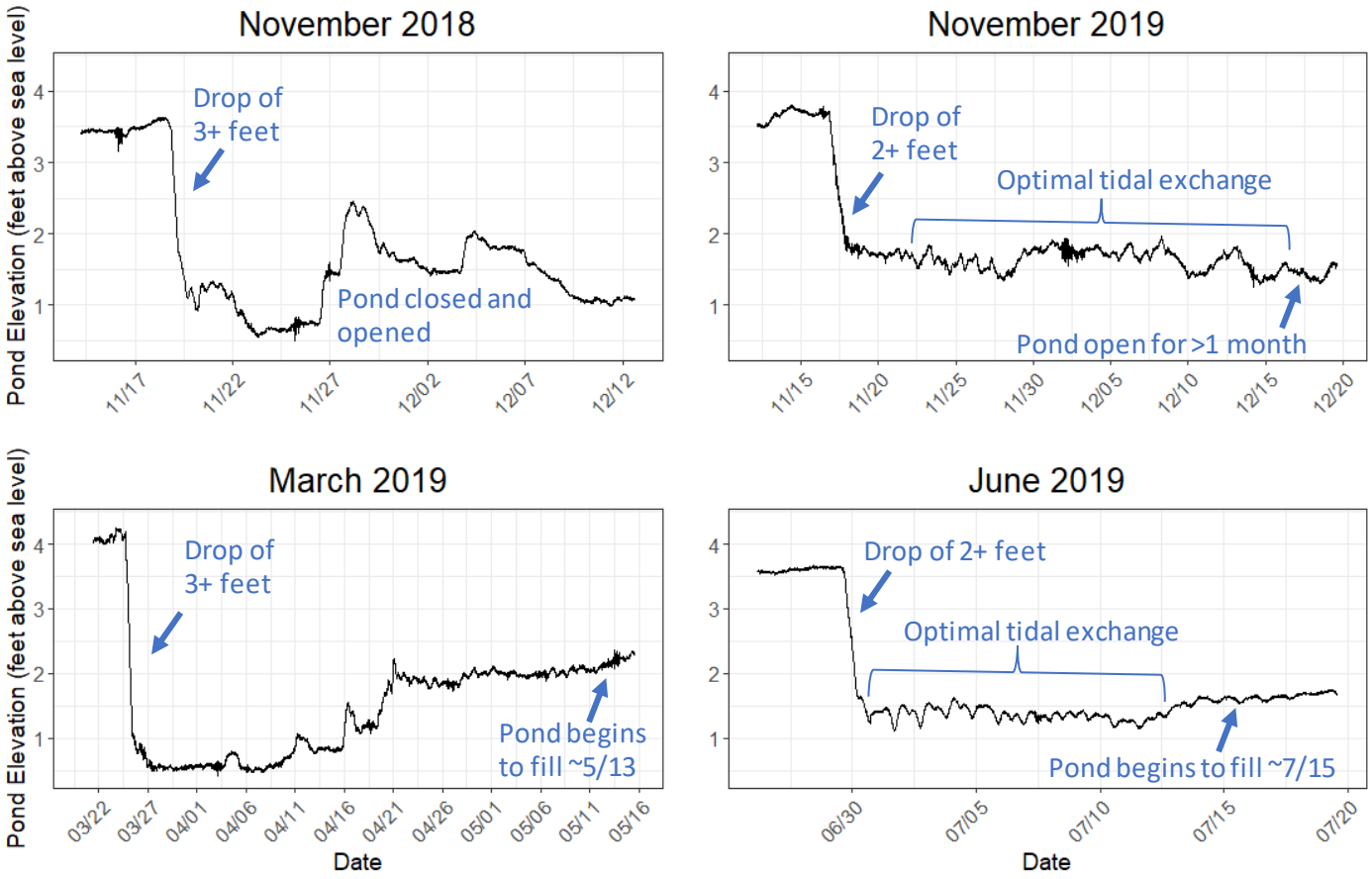
2009-2019

Improved Ecosystem Health

- Water Quality Improved & Meeting Standards
  - Increased Dissolved Oxygen
    - 6.0 mg/L
  - Increased Water Clarity
    - can see bottom 2-3m
  - Decreased Total Nitrogen
    - < 0.5 mg/L target
- Eelgrass Meadows Expanding
  - First observed in 2015
  - Sign of long-term ecosystem stability
  - Benefits of Eelgrass
    - Increases water quality
    - Provides habitat
    - Sequesters Carbon
- Shellfish
  - Oyster restoration was possible with improved water quality and flushing
  - Oysters had several good natural sets
  - EGP re-opened to commercial oyster harvest

Edgartown Great Pond is dredged to improve the circulation of seawater throughout the Pond during openings. Successful openings of the Pond occur when the volume of Pond water exchanged with seawater is maximized such that the salinity increases pond-wide. The volume of water exchanged is a function of cut duration and tidal amplitude during the cut.

Every Cut is Unique



Characteristics of a Successful Cut

- Two Phases
  1. Drainage (~24 hours)
  2. Tidal Exchange (9-11 days, given ideal conditions)
- Duration of Opening
  - sufficient for seawater to reach entire pond
- Tidal Amplitude
  - The volume of water entering and exiting the pond is a function of the variation in elevation between the high and low tides

Previous Cut Modeling (Gaines, 1993)

- Estimates for flushing and duration suggest a minimum of 12 days of tidal exchange for 90% flush

Ideal Flushing: Summer Cut 2019

Cut= 6/29/2019		
date	average salinity (ppt) at mid-depth	days since cut
6/26/2019	18.61	-3
7/2/2019	22.39	3
7/5/2019	26.70	6
7/8/2019	28.36	9
7/10/2019	28.38	11
7/15/2019	27.42	16

	6/26	7/5	7/8	7/10	7/15
EGP02	18.74	28.56	28.61	28.82	26.72
EGP04	18.76	27.44	27.72	28.6	28.44
EGP09	17.66	15.8	25.84	24.34	25.65
EGP10	18.36	25.19	27.61	27.7	27.84
EGP11	18.59	17.98	26.84	25.25	26.29

Salinity (ppt) in coves at mid-depth
Red corresponds to maximum salinity

- After decade of annual dredging, it takes 11 days of tidal exchange for salinity to reach its peak pond-wide
- These data are from the summer cut, 2019, but this same trend is seen for other cuts: minimum of 10 days to maximize flushing