Restoring the Kickemuit Estuary

Narragansett Bay Estuary Program
June 3, 2025

BCW
Bristol County Water Authority

SAVE THE BAY®
NARRAGANSETT BAY

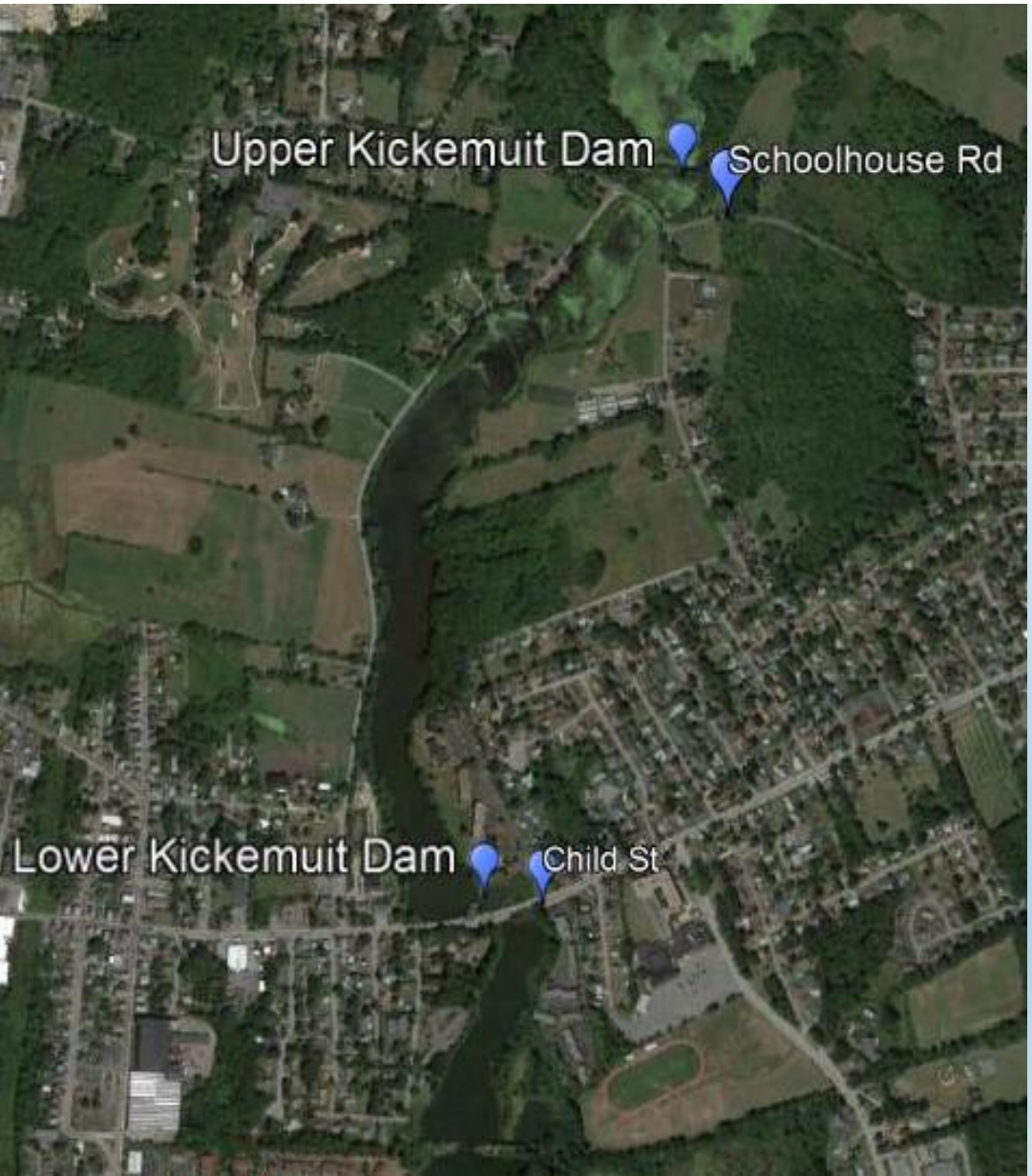
BRISTOL COUNTY WATER AUTHORITY

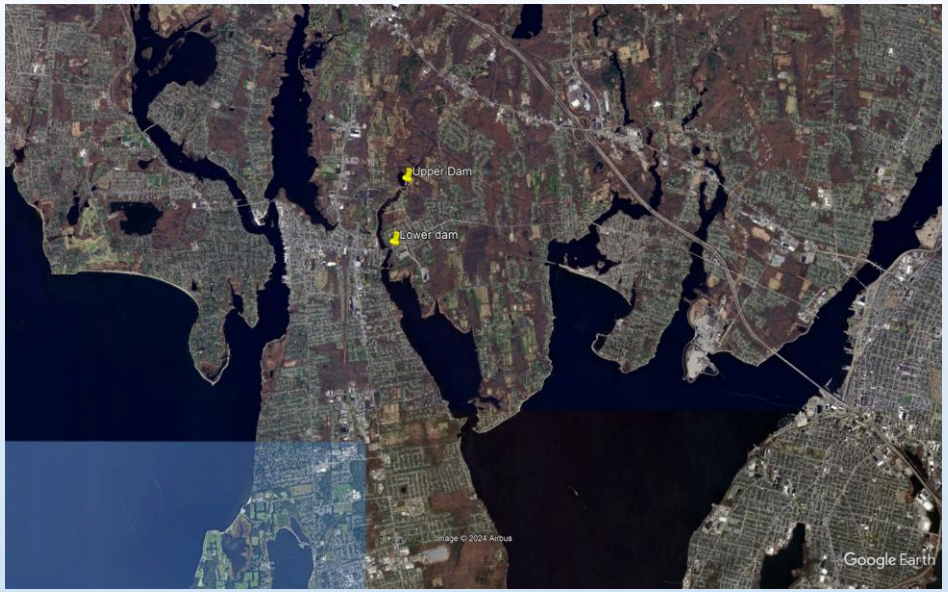
BCWA Serves:

- Towns of Barrington, Bristol, Warren
- 50,793 customer population (per 2020 census)
- Averages 3.2 million gallons per day

Former Kickemuit River Impoundments

-watershed in Swansea and Warren





Lower Dam at head of tide

BCWA Dam History

Lower Kickemuit Reservoir Dam

- Head of tide dam built in 1883 for water supply
- 130 feet long with tide gates, and fish ladder
- Treatment Plant built in 1908
- Kickemuit Reservoir was narrow and shallow with poor water quality and insufficient quantity
- Over-topping led to construction of Upper Dam in the 1960s

Moon tide flowing into Kickemuit Reservoir

BCWA Dam History

Upper Kickemuit Reservoir Dam

- Berm built in 1961 to protect water supply during coastal storms, prevent salt water intrusion
- 1000 foot long earthen berm
- Dam required repairs and not built to current RIDEM Office of Dam Safety standards

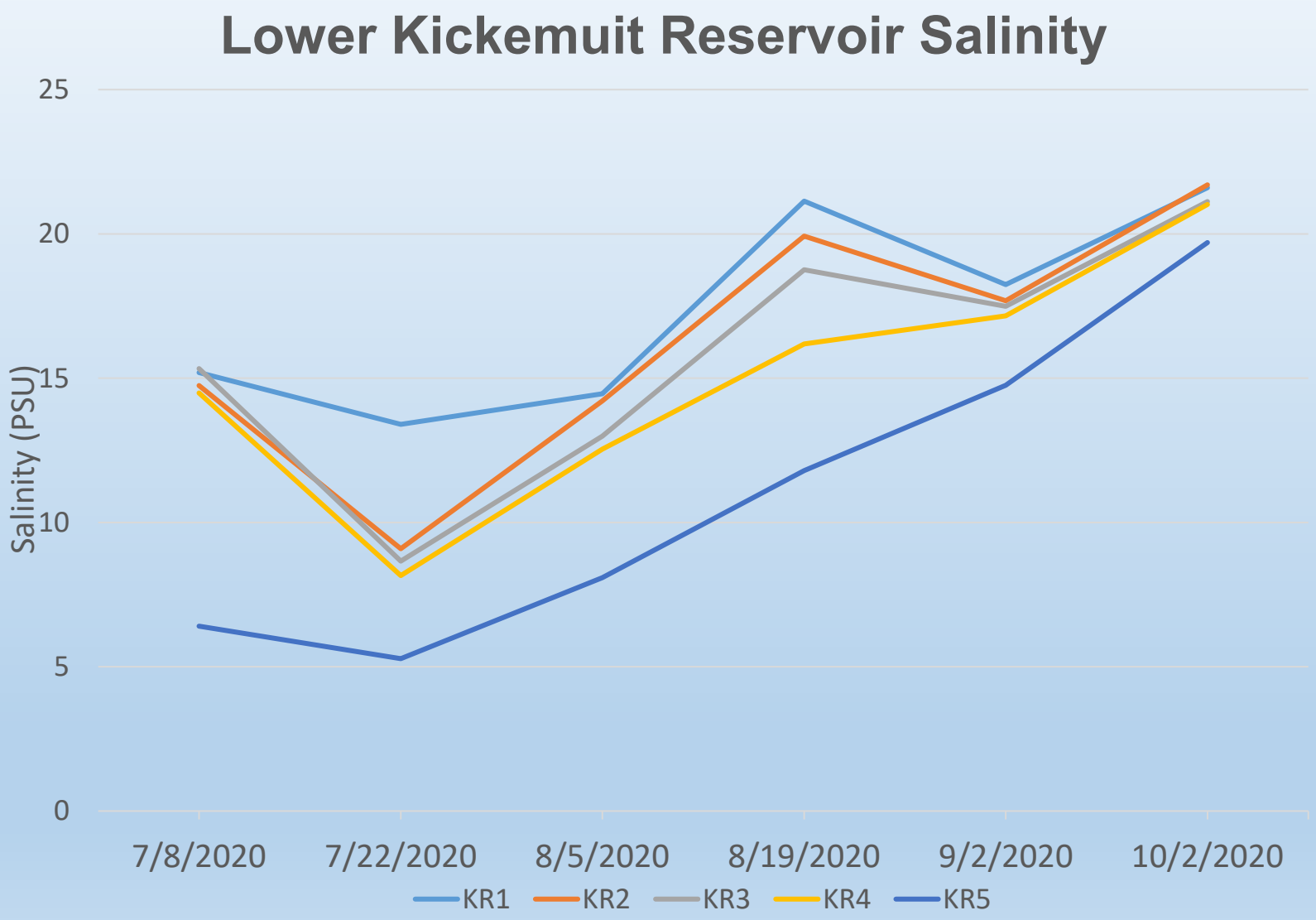
BCWA Water Supply

- Kickemuit supply – poor water quality, required expensive treatment plant upgrades along with insufficient quantity supply led to construction of East Bay Pipeline to connect to Providence Water in 1998.
- The 1908 water treatment plant continued as a backup until 2011 and formally decommissioned in 2019
- Kickemuit Reservoir delisted as a public water supply.
- Dams were no longer needed. RIDEM NOV on Upper Dam (dam did not meet regulations, required expensive upgrades)
- BCWA began investigation to remove the Upper Dam in 2015.
- Hydraulic modeling, flood and water quality studies led to investigation of Lower Dam removal in 2019.

Project goals:

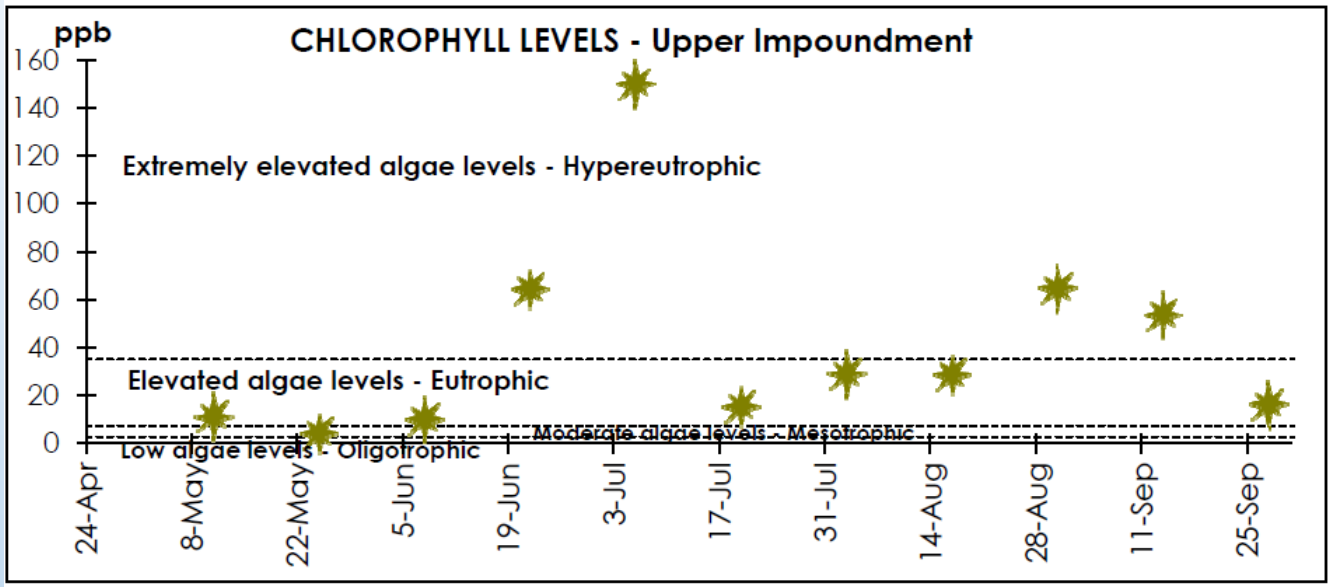
- Remove obsolete water system infrastructure
- Eliminate future maintenance costs and liability
- Improve water quality
- Restore estuarine habitat and connectivity for estuarine species
- Enhance marsh migration corridor
- Increase community resilience

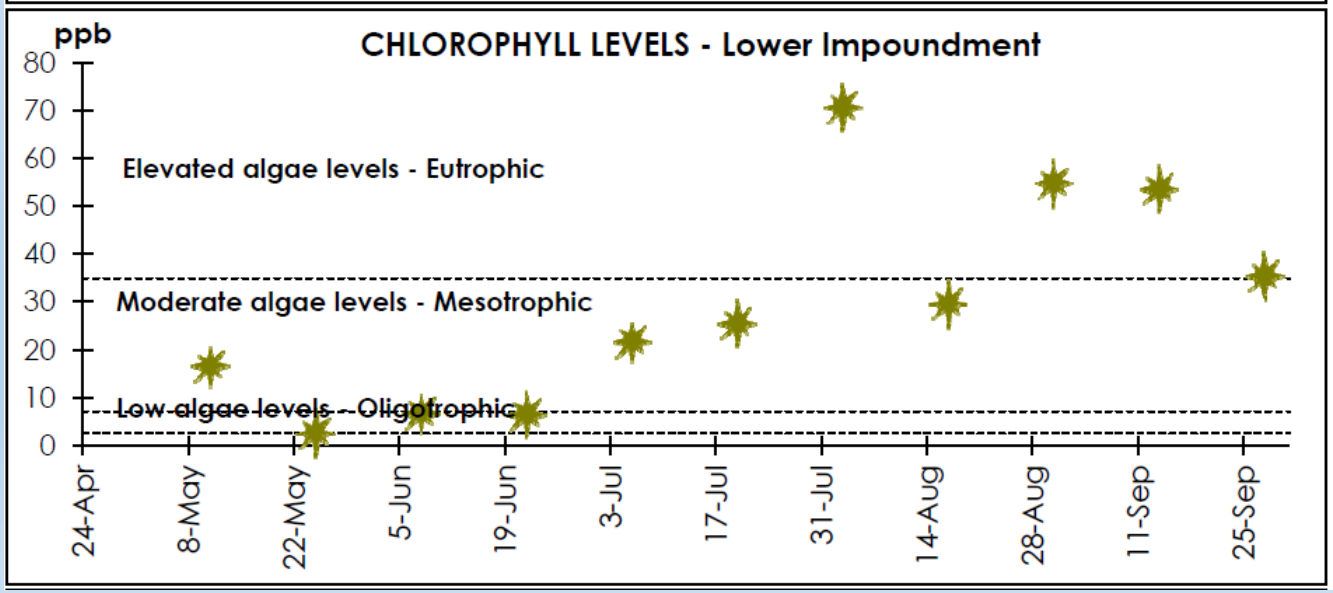
Water Supply Impaired for Drinking Water



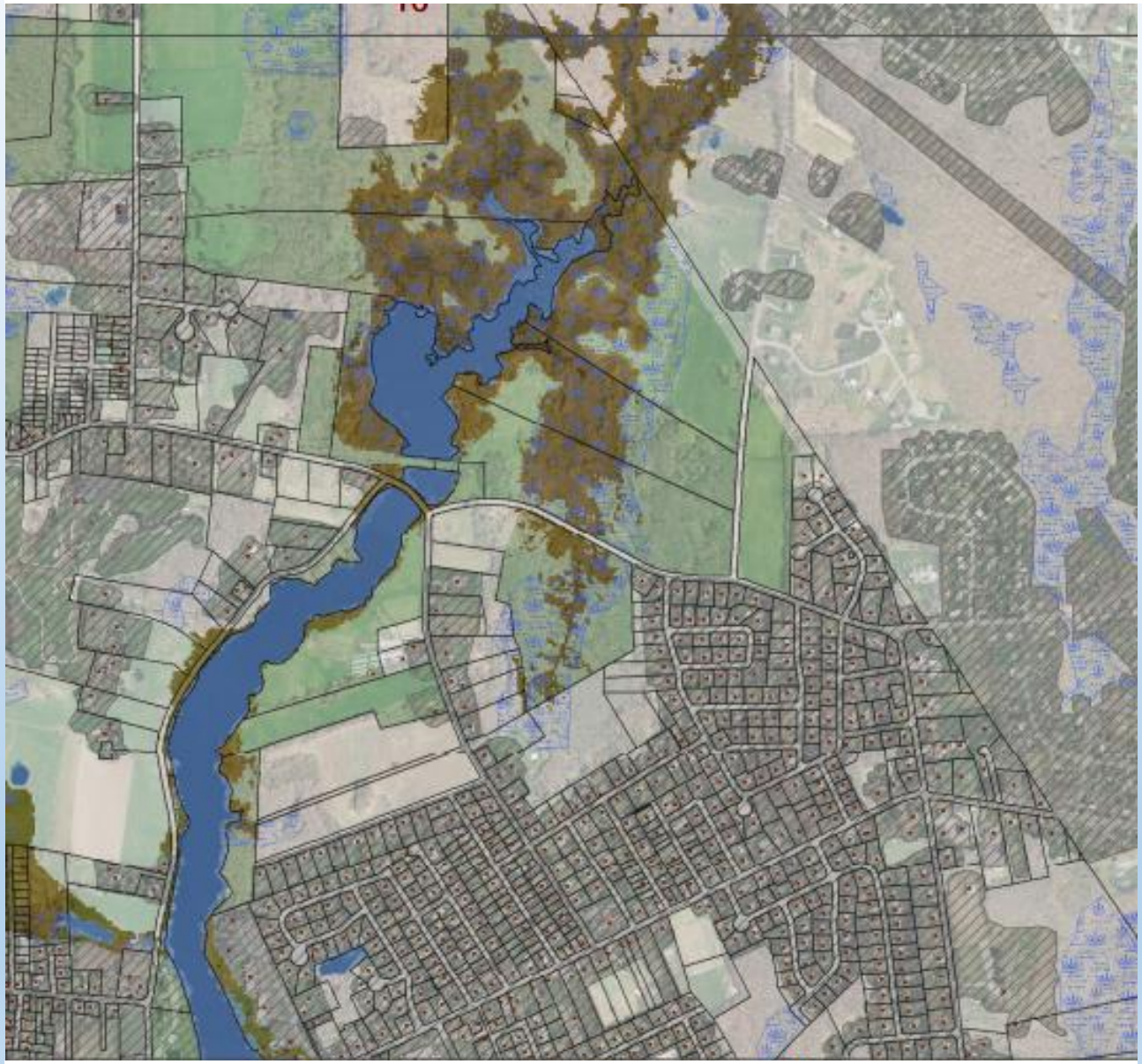
Lower impoundment at former water intake

Water quality degradation of impoundments





Opportunity for future marsh migration



Marsh migration with 3 feet of sea level rise

Project Timeline

2012: BCWA begins to secure a new back up water supply

2015: Consultant conducts Upper Dam removal assessment

2017: Upper Dam H and H modeling & sediment sampling conducted

2018: Modeling determines Lower and Upper Dams have to be removed together and Schoolhouse Road needs to be elevated

2018: Outreach to RIDOT about elevation and installation of new culverts at Schoolhouse Road

2019: RIDOT commits to project; engineering dam removals

Fall 2021: Permit applications submitted

2022: RIDOT upgrades Schoolhouse Road

June 2023: Final permits received

Fall 2023: Lower dam removal begins

Fall 2024: Upper dam removal completed

2025: Final grading, seeding, planting, adaptive management and monitoring

Project Funding

Design

Coastal and Estuarine Habitat Restoration Trust Fund	$150,000

Construction

• RIDEM Climate Resilience Fund	$1,200,000
• National Fish and Wildlife Foundation	$1,391,000
• NFWF Amended Increase	$500,000
• EPA SNEP	$600,000
• RIDEM 319 Grant	$400,000
• RIDEM BWRF Grant	$100,000
Total Grant Funds	$4,341,000

Public Outreach:

- Community partner committee established in early project phase
- Public meetings and direct abutter outreach

Public Concerns

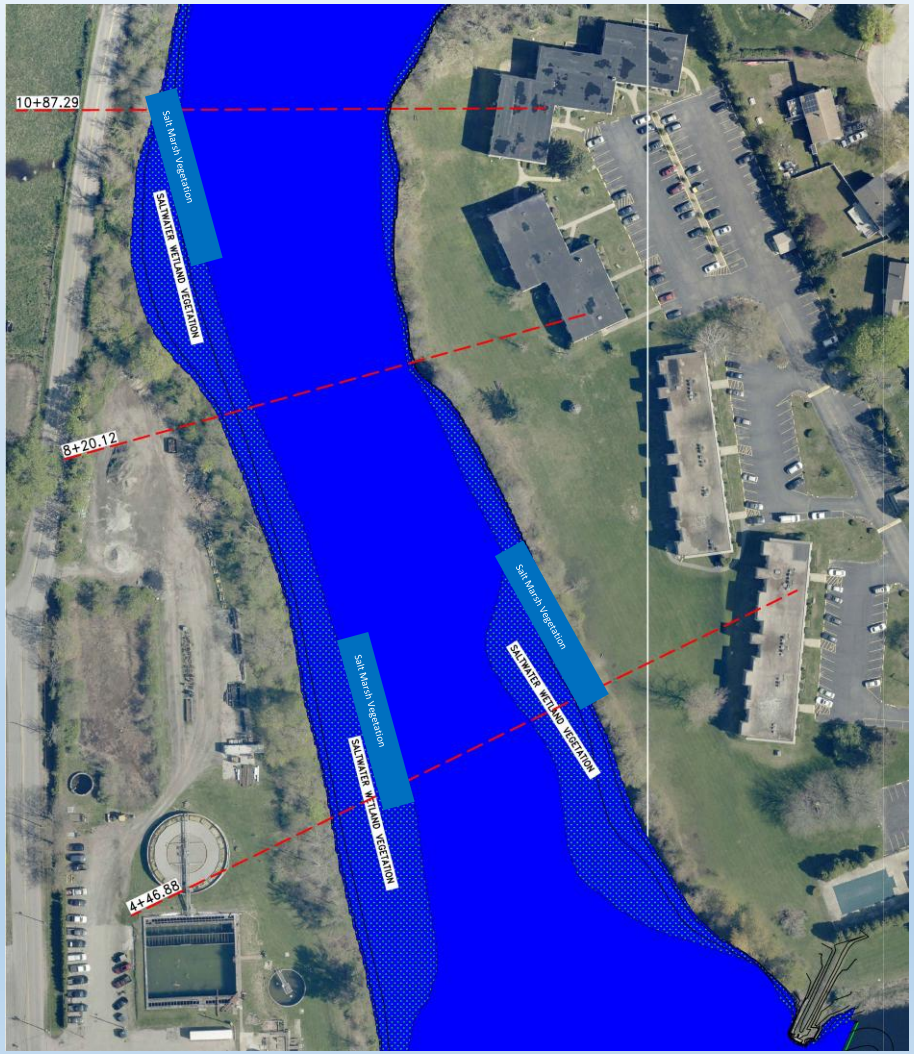
- Flooding
- Private property impacts - concern with salinity within private wells; BCWA offered to conduct testing pre and post dam removal for abutting properties
- Aesthetics post dam removal
- Historic preservation: historic cemetery adjacent to the reservoir
- Water quality of the Kickemuit Reservoirs

Response to public concerns:

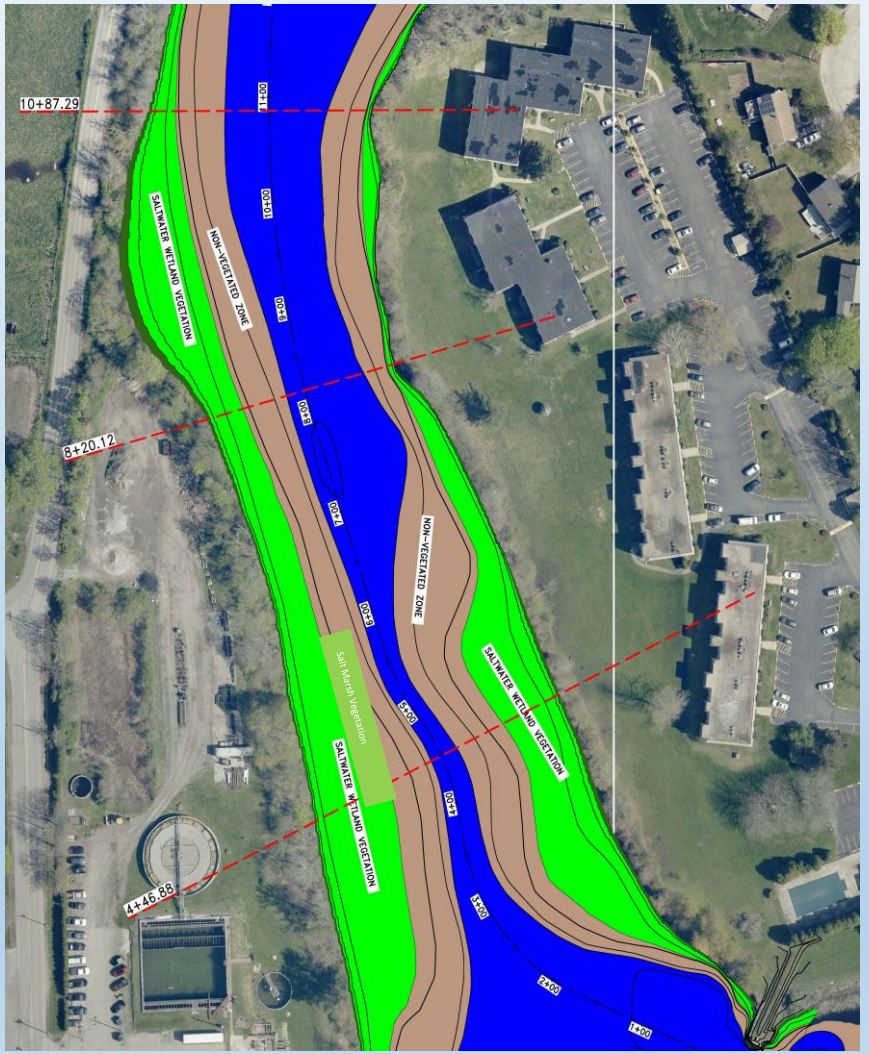
- Flap gates installed at culverts along Serpentine Road

Modeling and hydraulic analysis provided visuals at public meetings

Tidal Conditions at the Waterview Condominiums

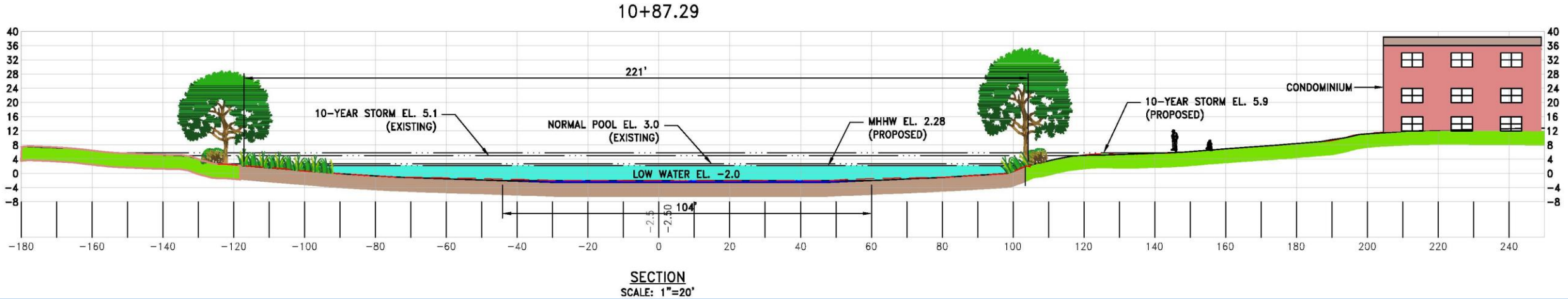


High Tide



Low Tide

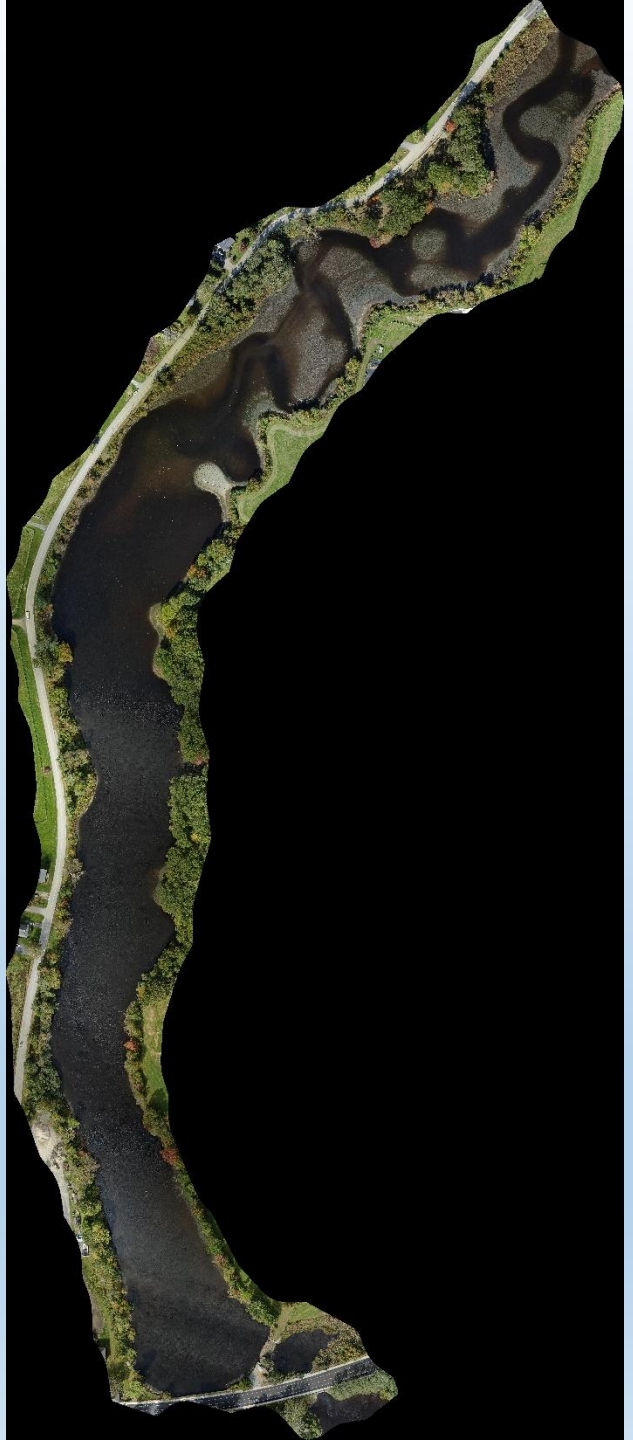
Lower impoundment cross section



Phase 1: RIDOT elevated state-owned road and resized culverts (2022)

Phase 2: Lower Dam Removal

Fall 2023 – Winter 2024



Relocation of oysters located just below Lower Dam prior to dam removal activity

Phase 3: Upper Dam Removal

- Full removal in Fall of 2024

Upper Dam Removal

Low Tide

High Tide

Upper Dam Removal

- Western berm removed December 2024

Upper Dam Removal: Regrading former berm for wetland habitat

Next Steps

- Seeding by contractor; assessment of sediment mobilization
- Planting of former berm area with brackish plants and trees
- Shoreline plantings, long-term monitoring and adaptive management by Save The Bay

Project Challenges

- Multi-jurisdictional permitting
- Permitting duration
- Bid prices significantly higher than engineer's cost estimates
- Value engineer project resulted in savings of $500,000
- Work during winter months with record rainfall and tidal surges
- Sediment removal was potential challenge however there was very little sediment migration during removal of the Lower Dam

Post dam removal: subsidence of former wetland area

Wildlife Response

- Wading and shorebird use of mud flats
- Osprey and eagles feeding in estuary
- Turtles upstream of former upper dam
- Estuarine species including mummichogs, grass shrimp, ctenophores
- Diadromous species: American eel

Thank You to Our Partners

RI DOT

NRCS
Natural Resources Conservation Service

Roger Williams University

National Fish and Wildlife Foundation
NFWF

National Oceanic and Atmospheric Administration
NOAA
US Department of Commerce

DEM
Rhode Island

CRMC
Coastal Resources Management Council

United States Environmental Protection Agency

SNEP
Southeast New England Program

Restore America's Estuaries