

Belle Isle Marsh

Marsh Management Plan

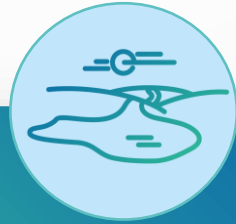
May 19, 2022



What We'll Cover



Marsh History



Field Research /
Existing
Conditions



Marsh
Vulnerability
and Modeling



Next Steps

What is Belle Isle Marsh?



- Largest remaining salt marsh in Boston Harbor
- 300+ acres
- Spans East Boston, Revere, and Winthrop
- Supports important wildlife



Why is Belle Isle Marsh important?



- Clean Water
- Storm Protection
- Cooling from the Summer Heat
- Coastal Wildlife Habitat
- They're Beautiful!
- Carbon Storage
- *Area of Critical Environmental Concern* Designation



Habitat Map

Extent of Belle Isle Marsh with Habitats outlined



Habitat Map

The L-Berm



Habitat Map

The Key



Belle Isle Marsh History



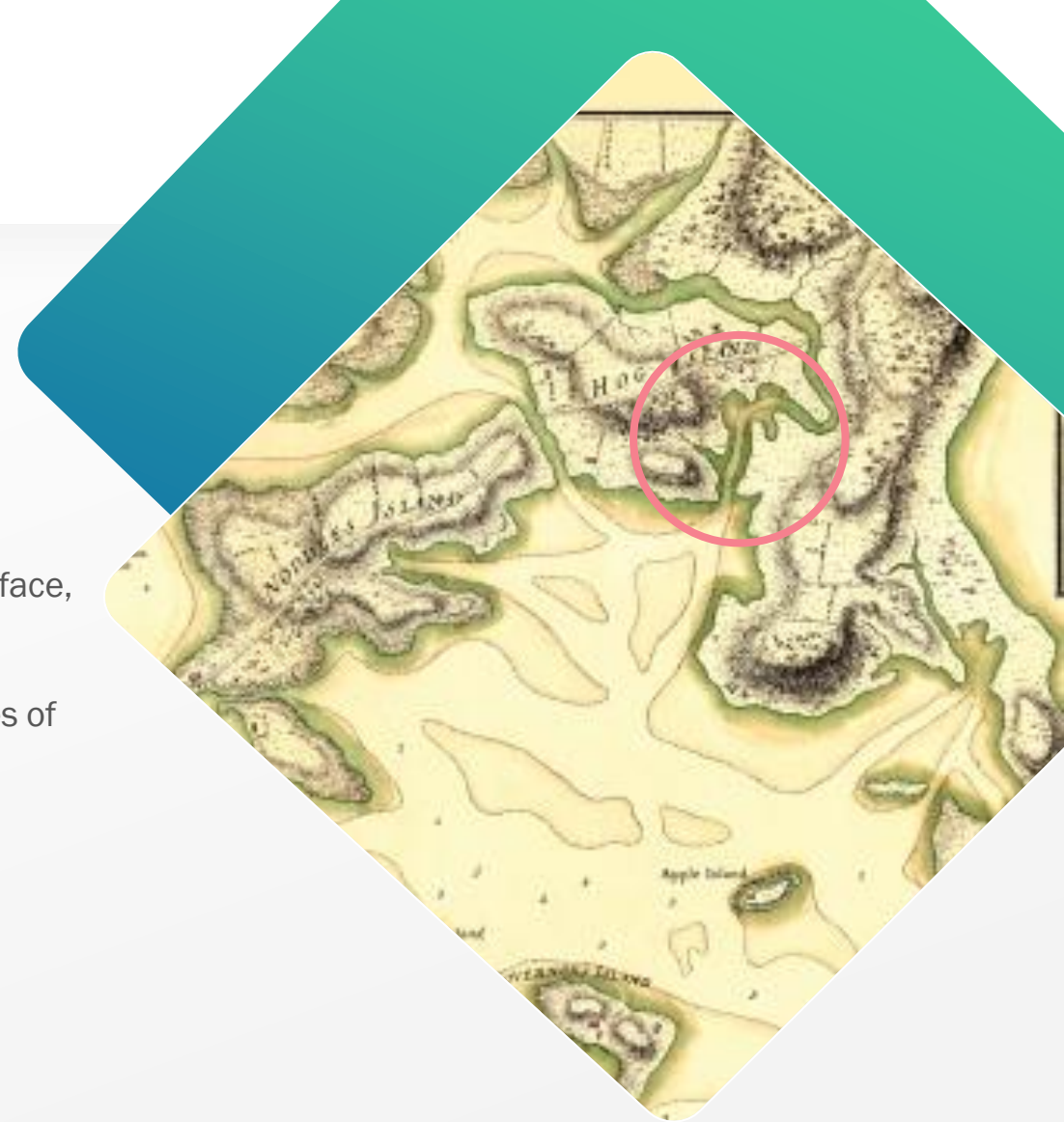
- 1600s-1800s – Livestock and agricultural use
- 1800s/1900s – Wetlands filled, landfill created, development moves in
- 1930s
 - Mosquito ditching to drain water from the entire marsh surface, eliminating salt pannes and small tidal creeks. Essential habitat lost while mosquitos persisted
 - Creation of 7,000 ft long earthen berm separating 52 acres of salt marsh from tidal inundation



- 1941 – Rock berm constructed around the 7 acres Key Parcel to protect radio towers
- 1980-1986 – Belle Isle Marsh Reservation Park was designed and constructed



- 1978-1989 – Continued illegal filling of wetland
- 1988 – Water quality monitoring reveals severe pollution
- 1990s-2002 – Small projects to restore lost habitat
- 1990s-2020 – Addition land acquisition and protection



Public Poll #1

1. How do you enjoy Belle Isle Marsh?

- As a park space to relax or walk
- As open water for boating or fishing
- As a nature reserve for wildlife
- Nature walks and educational/special events
- Belle Isle Marsh is new to me
- Other...(please type your answer in the chat!)



Science in the Marsh

Vegetation



Sediment



Bathymetry



Topography



Science in the Marsh

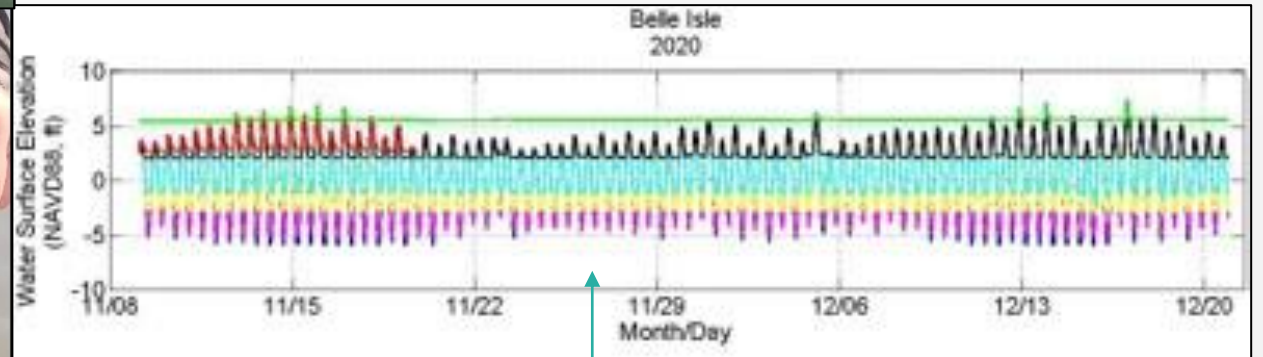


Major takeaways:

- The main channel tidal range is about 9.5 ft
- The tide range throughout the marsh is not the same
- Freshwater regularly flushes into the upstream end of the main channel



Pressure sensor that measures tides

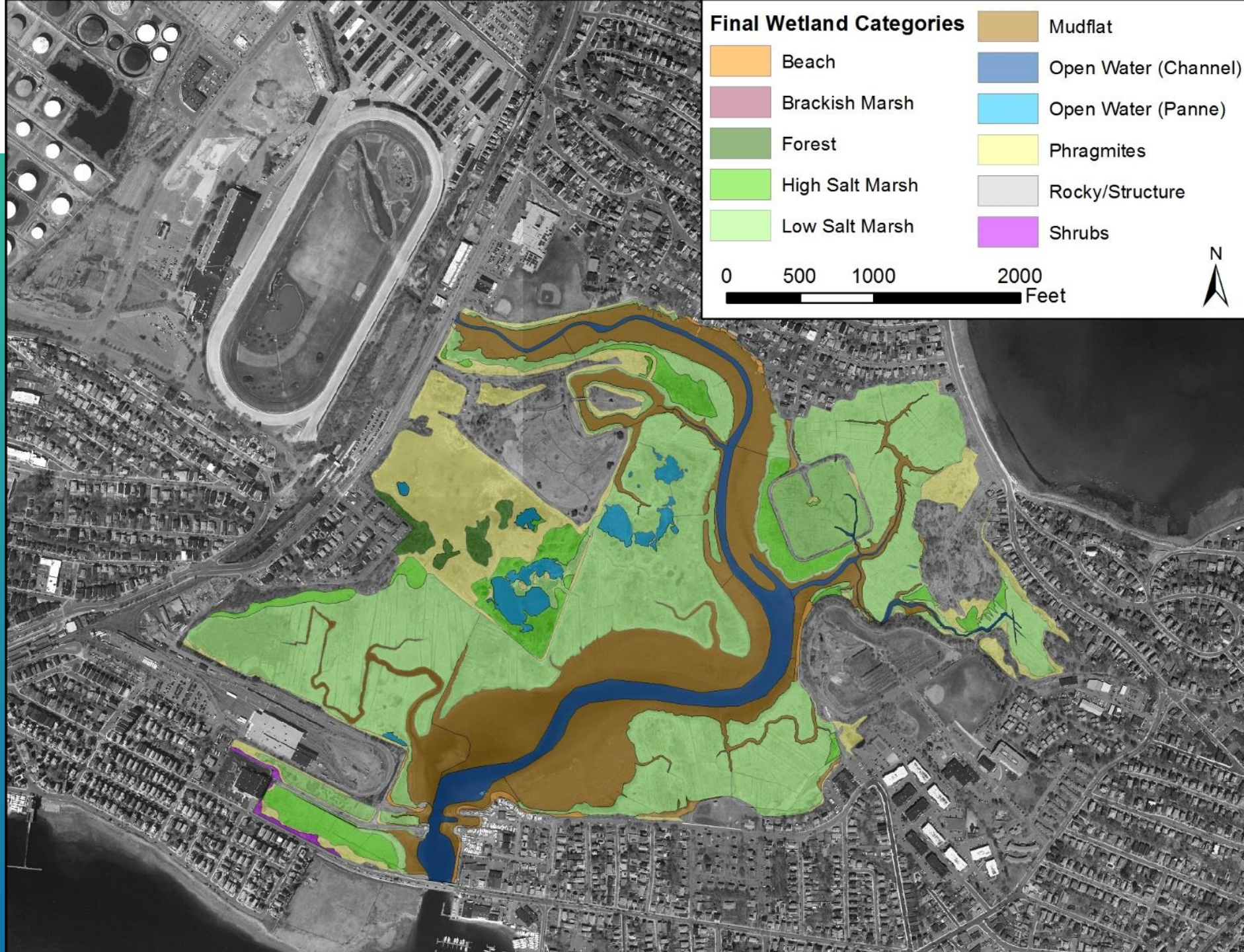


What the sensor gave us – tidal water levels

Environmental Stressors

Human impacts are limiting the natural function of Belle Isle Marsh

- Sea Level Rise
- Storm Flooding
- Mosquito Ditching
- Invasive Species
- Berms
- Coastal Squeeze
- Reduced Sediment Input



Public Poll #2

2. What do you value about Belle Isle Marsh?

- Open, undeveloped space
- Recreational space
- Natural space and wildlife habitat
- Storm surge buffer
- Other...(please post your response in the chat)



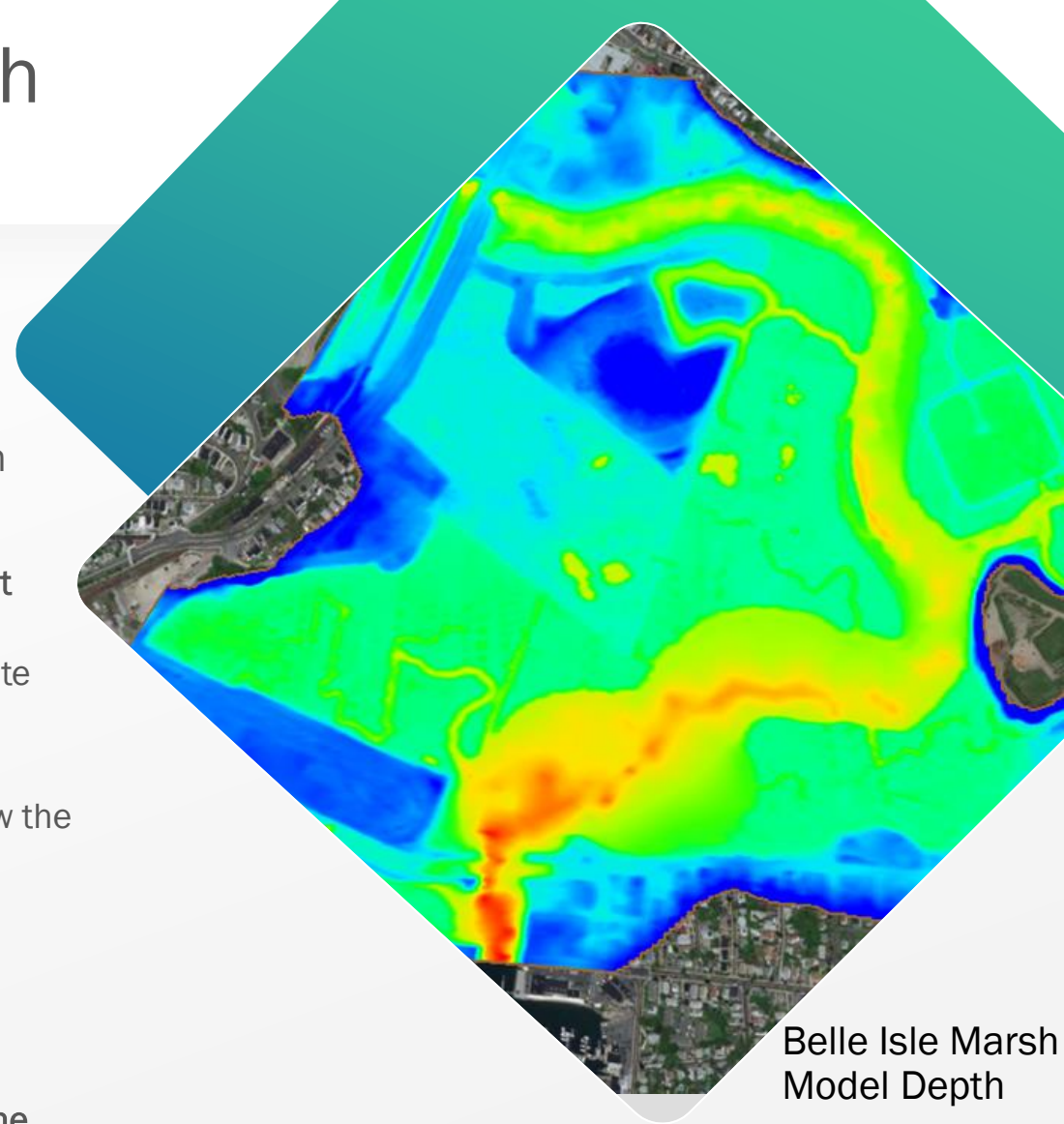
Modeling Studies : Tidal Flow and Salt Marsh Migration



- As part of the Belle Isle Marsh science, we created a modeling tool to help inform the marsh management plan
- Our Belle Isle Marsh Model gives us the opportunity to :
 - Learn about the system as a whole – including **regions we can't measure!**
 - **Look at different conditions** : Normal conditions, Storms, Climate Change
 - **Identify regions where marsh habitat is in trouble**
 - **Identify and rank marsh stressors** (SLR, human impacts on how the saltmarsh functions)
 - Develop **restoration alternatives**
 - This tool will **inform marsh management plans**



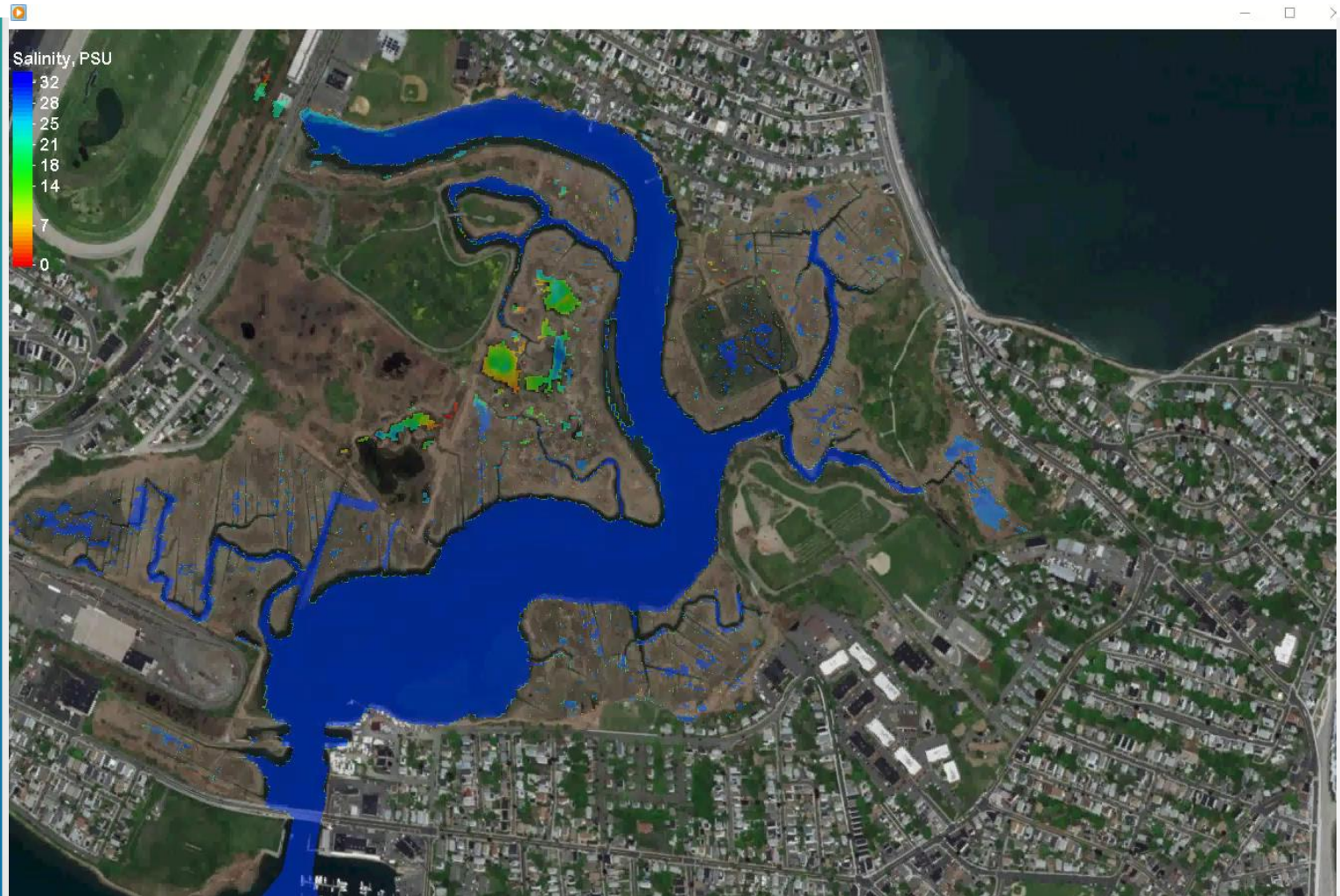
- › **Key takeaway** : Modeling is being used to paint a picture of the future of Belle Isle Marsh without intervention, and will be used to test our proposed restoration projects



Belle Isle Marsh
Model Depth

Movement of the Tides in Belle Isle Marsh

Modeled salinity during a small storm



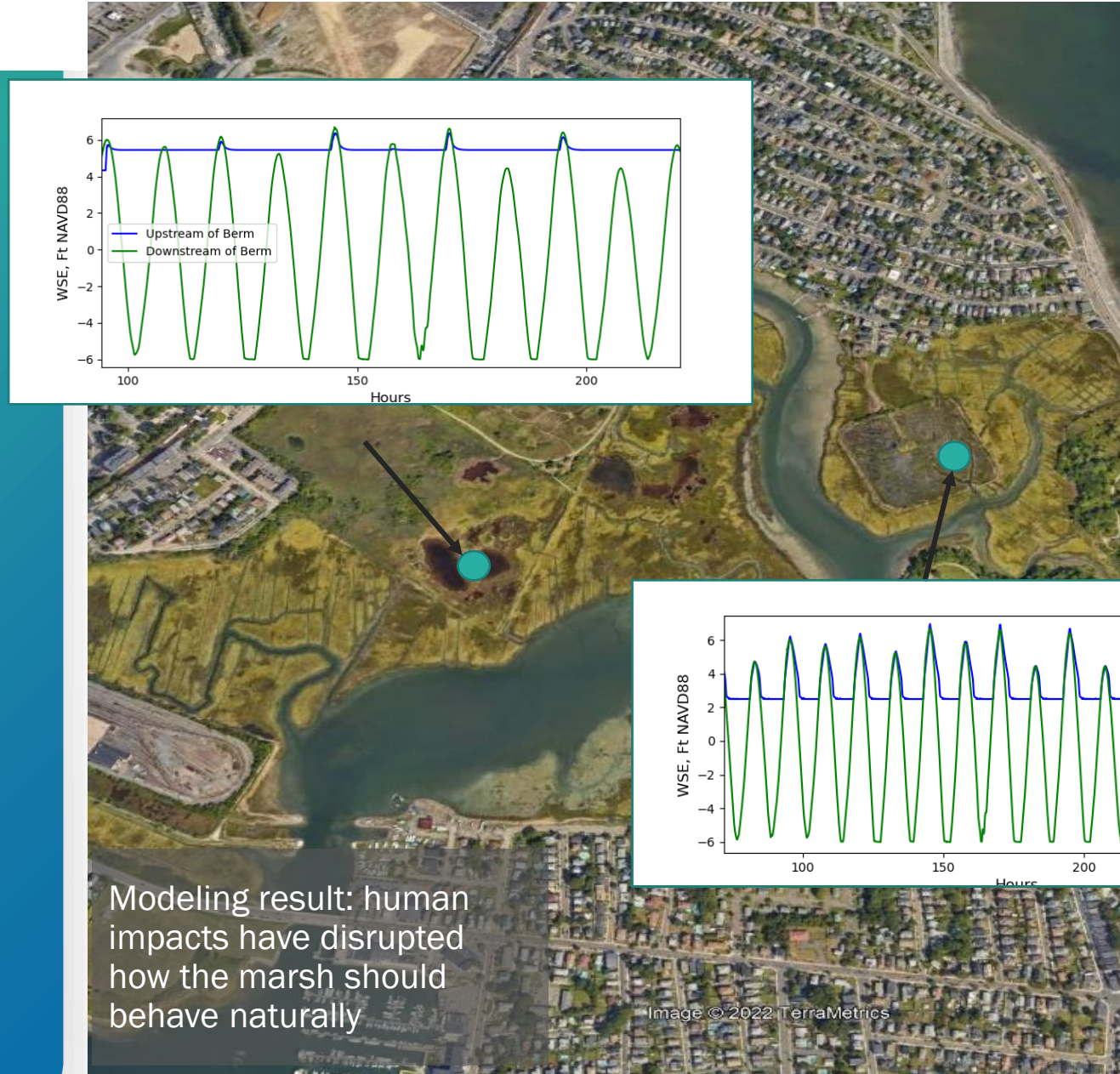
Present-Day Belle Isle Marsh

Goal #1: Identifying areas of standing water



Present-Day Belle Isle Marsh

Goal # 2 : Human impact has disrupted natural function



Modeling result: human impacts have disrupted how the marsh should behave naturally

Image © 2022 TerraMetrics

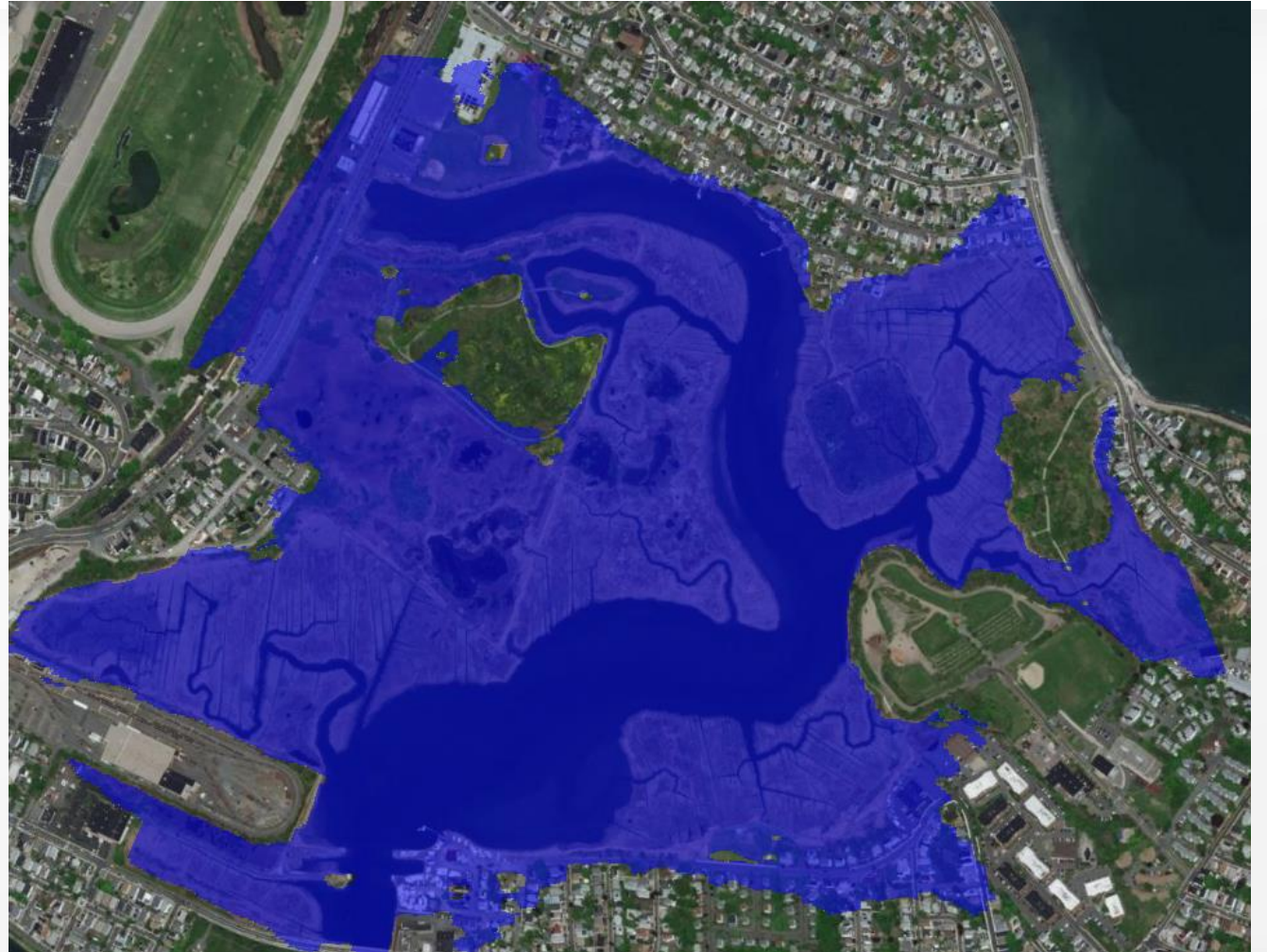
Identify issues in Belle Isle Marsh

Goal # 3 : Identifying zones that qualify for restoration projects



Future Belle Isle Marsh

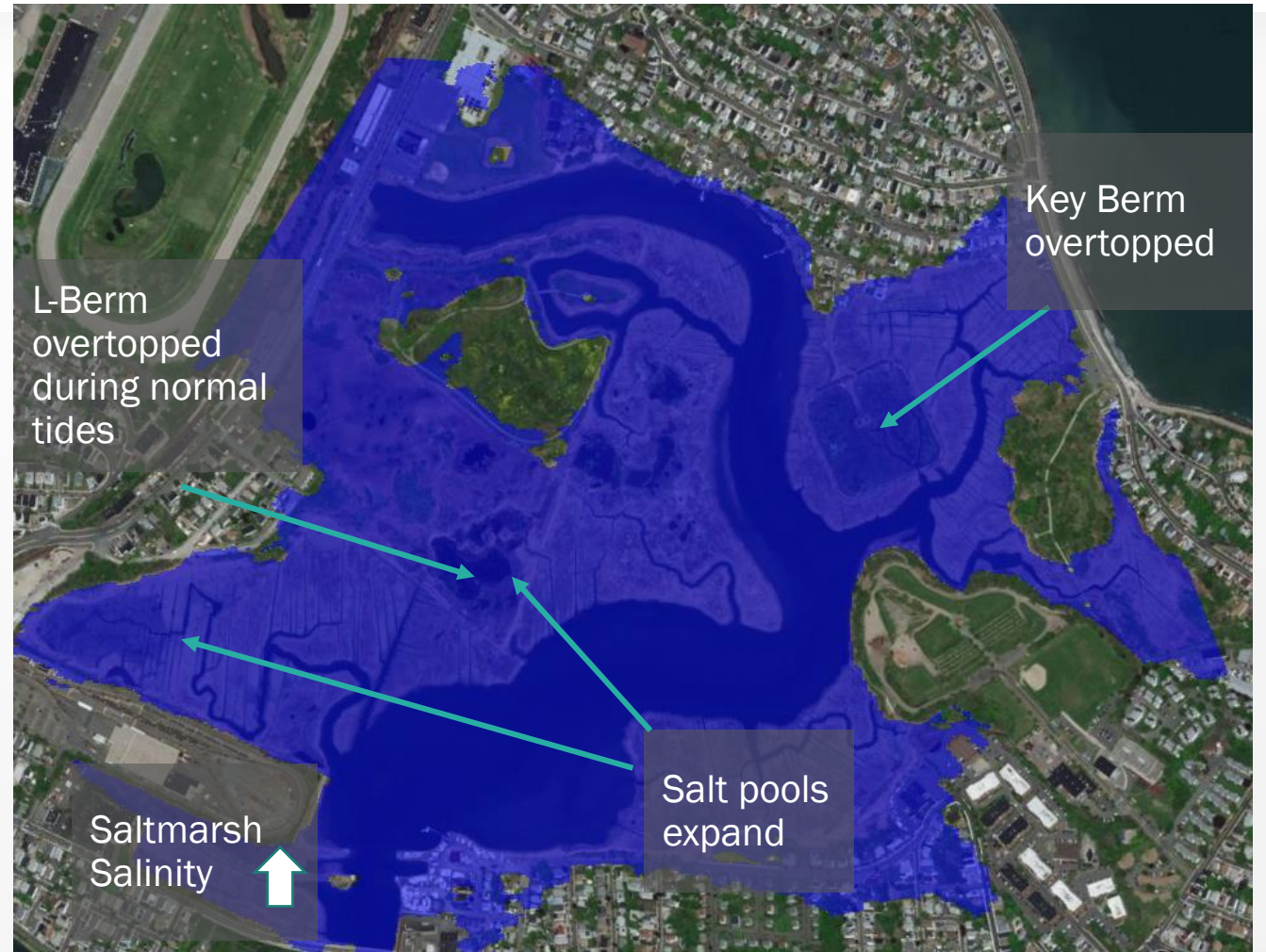
Goal # 4 : Identifying
Changes with Sea Level Rise



Tide water levels in the Year 2070

Future Belle Isle Marsh

Goal # 4 : Identifying
Changes with Sea Level Rise



Tide water levels in the Year 2070

Public Poll #3

3. What changes have you seen in the marsh?

- Less wildlife
- Coastal flooding near my home or neighborhood
- Erosion of marsh habitat
- None
- I want to know what to look for!
- Other...(please place your answer in the chat)

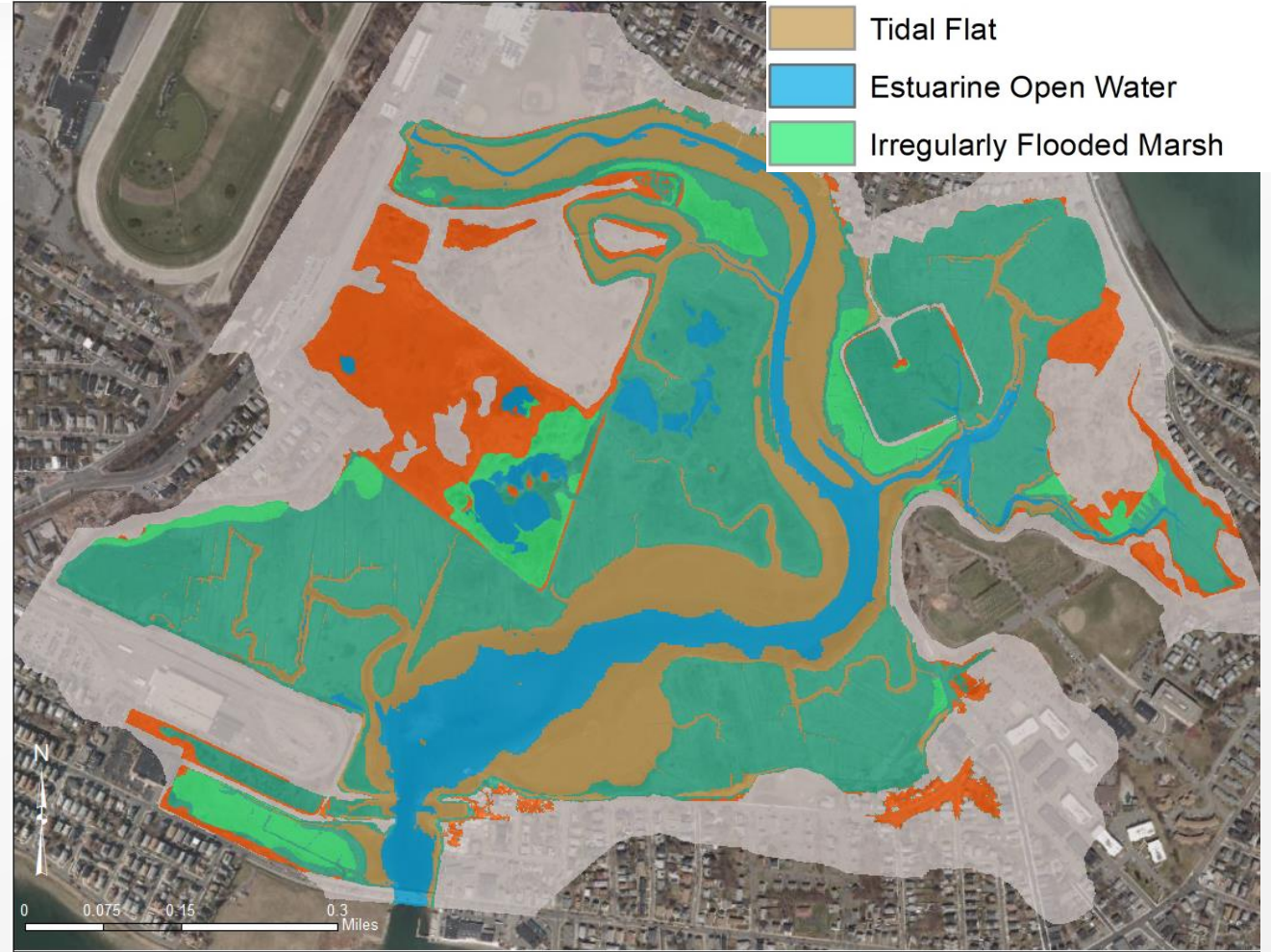


Marsh Migration

- Upland
- Transitional Marsh/Scrub-Shrub
- Regularly Flooded Marsh
- Tidal Flat
- Estuarine Open Water
- Irregularly Flooded Marsh



Present Day



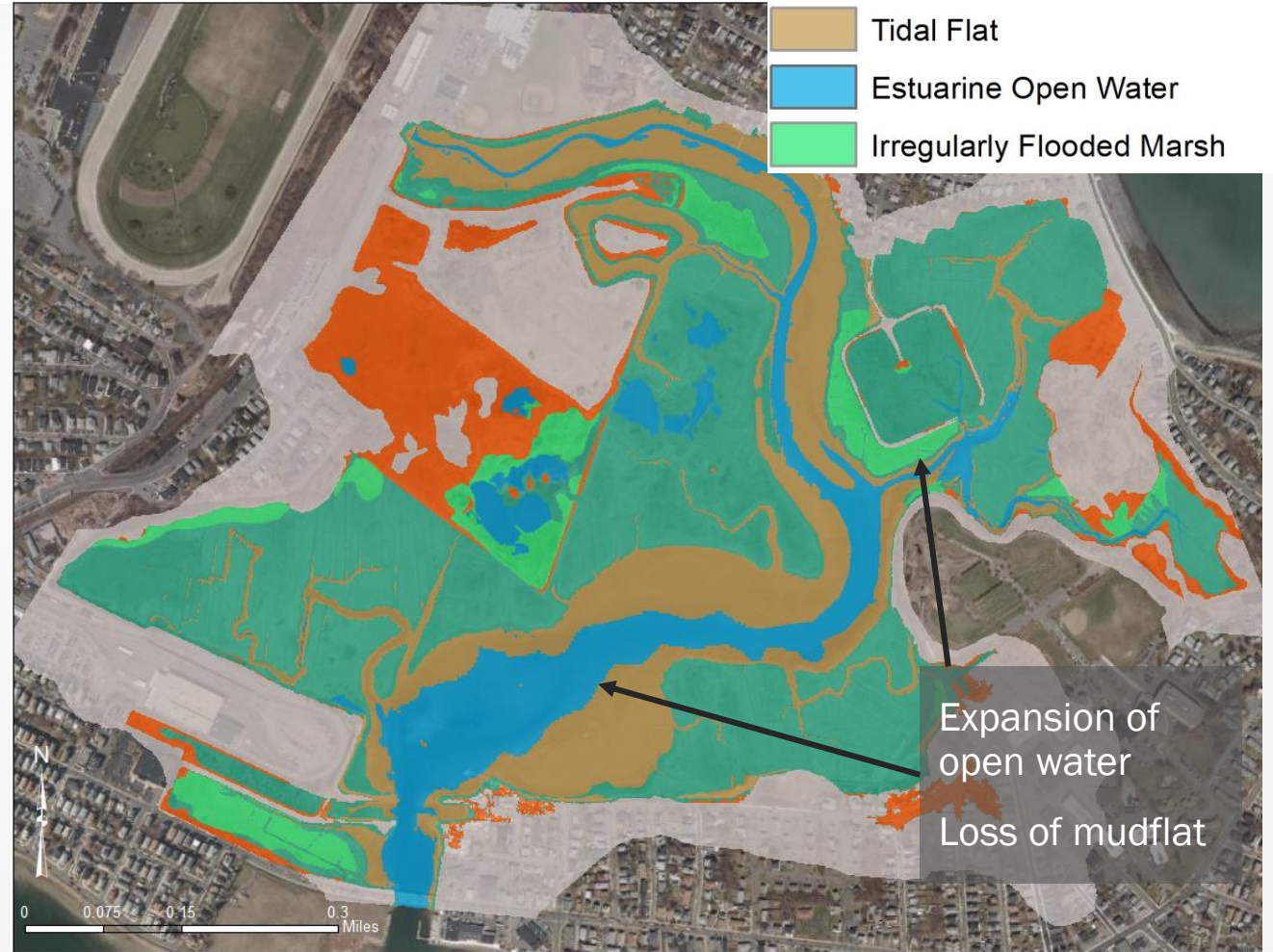
2050

Marsh Migration

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Present Day



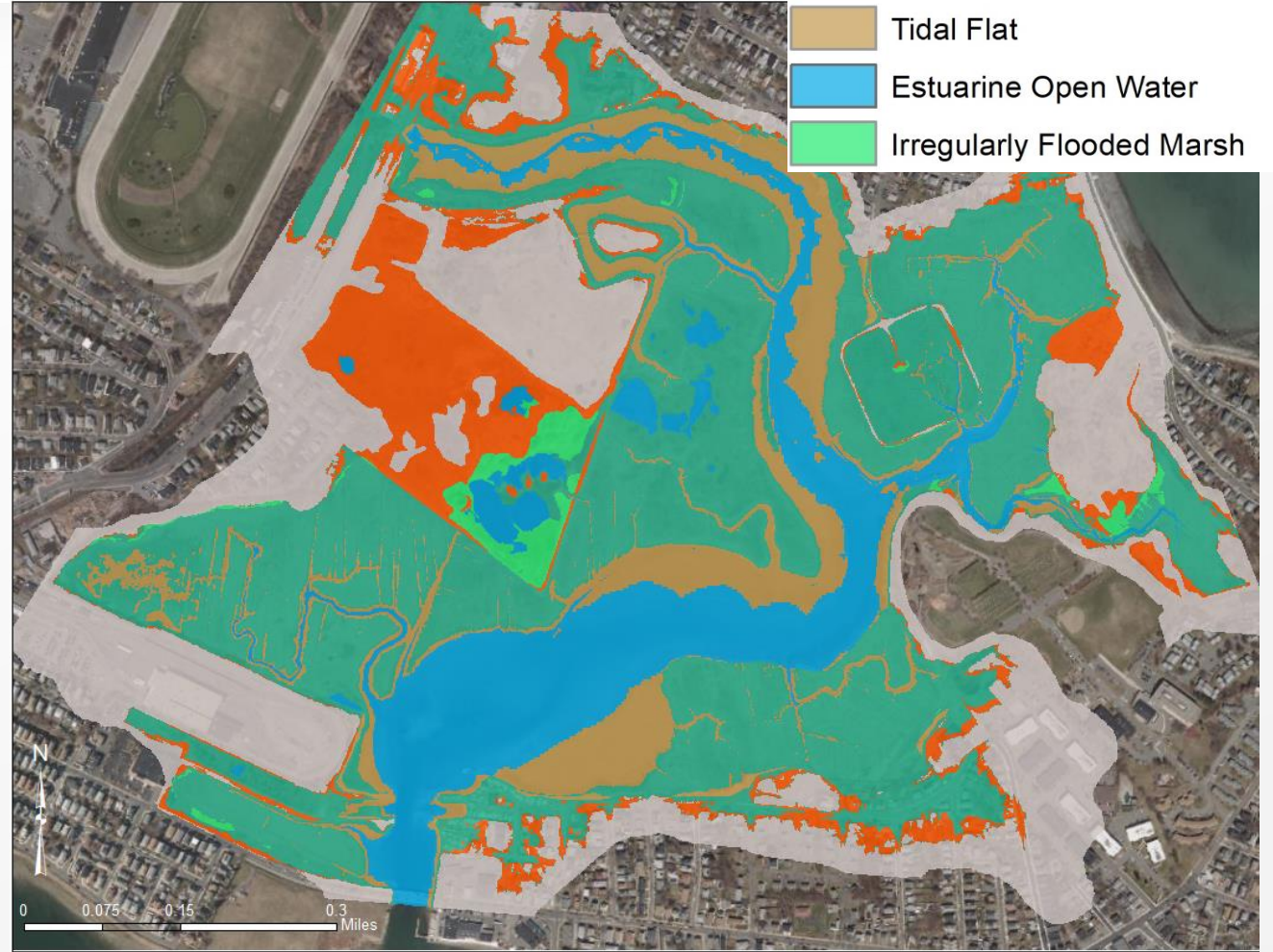
2050

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Present Day



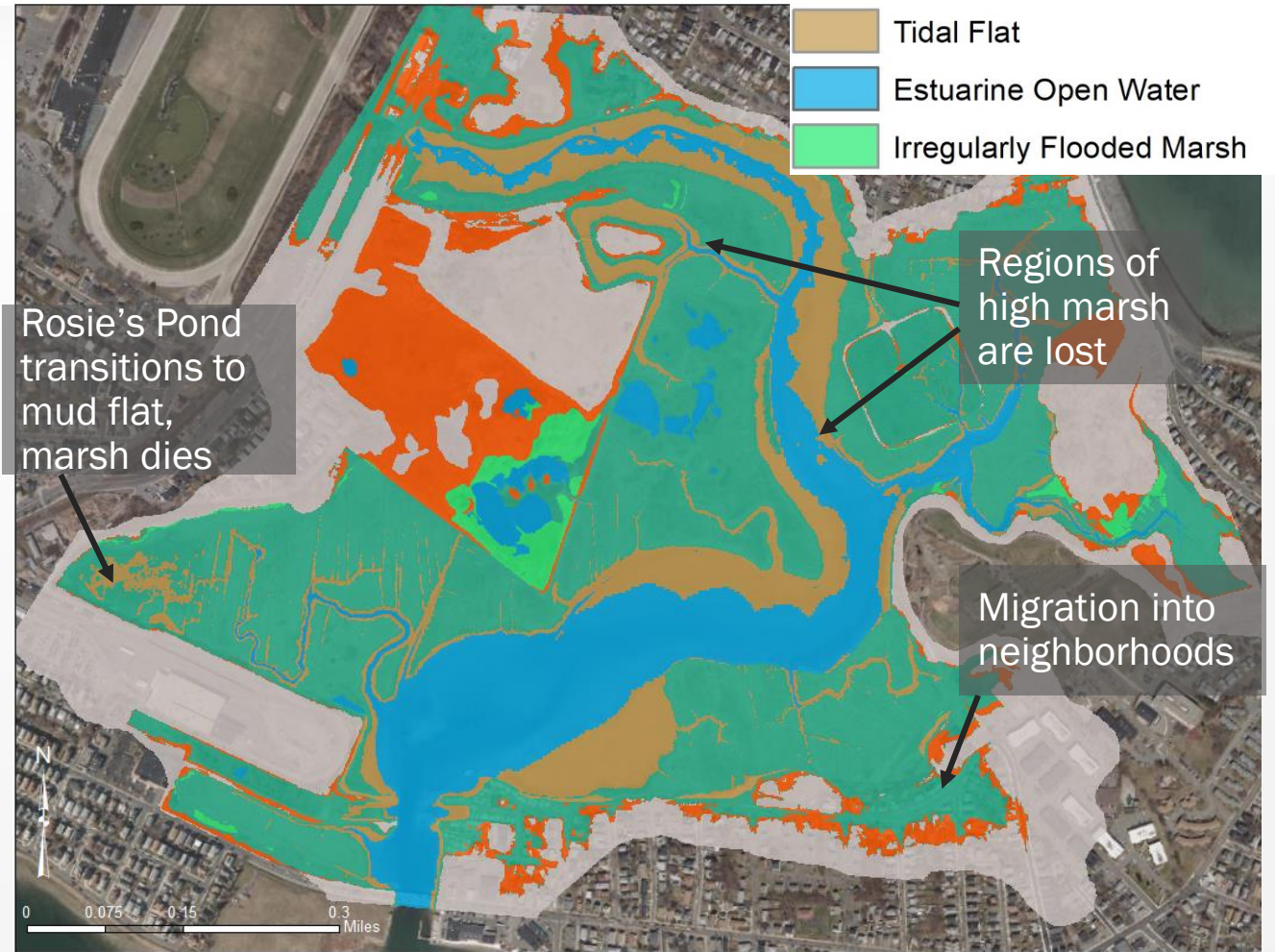
2070

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Present Day



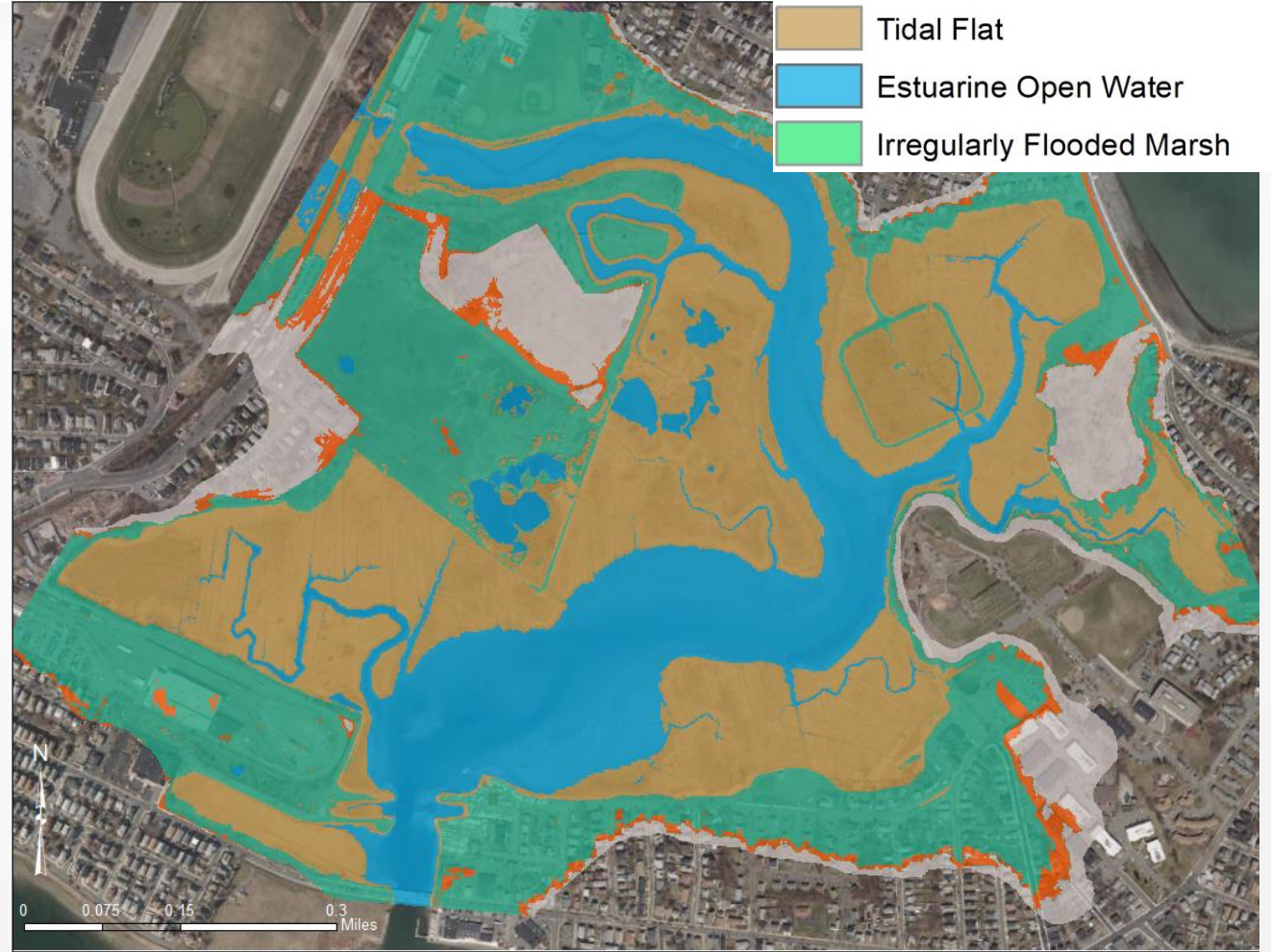
2070

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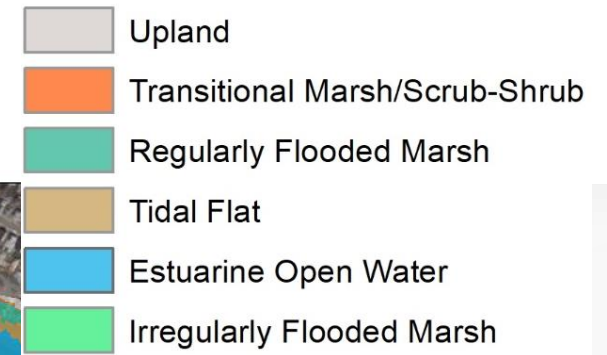


Present Day



2100

Marsh Migration



Tipping point occurs between 2070 and 2100, majority of low marsh transitions to tidal flat

High marsh loss behind L-Berm

Rosie's Pond becomes open water

Migration into critical infrastructure

2100



Present Day

Public Poll #4

4. What type of restoration would you prioritize?

- Reversing human impacts
- Enhancing habitat and supporting wildlife
- Restoring tidal flows
- Protecting communities from flooding
- None
- Other...(please enter your answer in the chat)



Restoration Priorities

- Habitat Survival
 - Food web and biodiversity preservation
- Water Quality
 - Sediment and nutrient cycling, chemical and metal retention, pathogen removal
- Protection from Storms
- Reversal of negative human impacts
- Stormwater conveyance and discharge
- Services to humans
 - Aesthetics, natural heritage, recreation/ecotourism, education, physical and psychological health
- Carbon storage
 - Climate change mitigation



Next Steps



Design restoration alternatives



Model hydrodynamics of restoration alternatives



Climate Vulnerability Assessment and Marsh Management Plan



Move towards engineering, permitting, and ultimately construction

Public Poll #5

5. How would you like to stay involved?

- I'd like progress updates by email
- I'd like to join future workshops and site walks
- I'd like to volunteer with Friends of Belle Isle Marsh
- Not interested
- Other...(please enter your answer in the chat)



Thank You

**BELLE ISLE
MARSH
RESERVATION**

dcr  MASSACHUSETTS DEPARTMENT OF
CONSERVATION AND RECREATION

Questions?

Discussion...

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Sea Level Rise Projections

Mean Sea Level (feet NAVD88)

