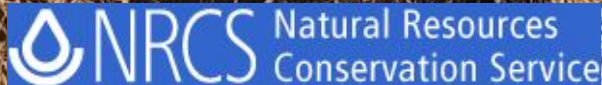


# Strategies for Salt Marsh Migration through NRCS' Wetlands Reserve Easement Program



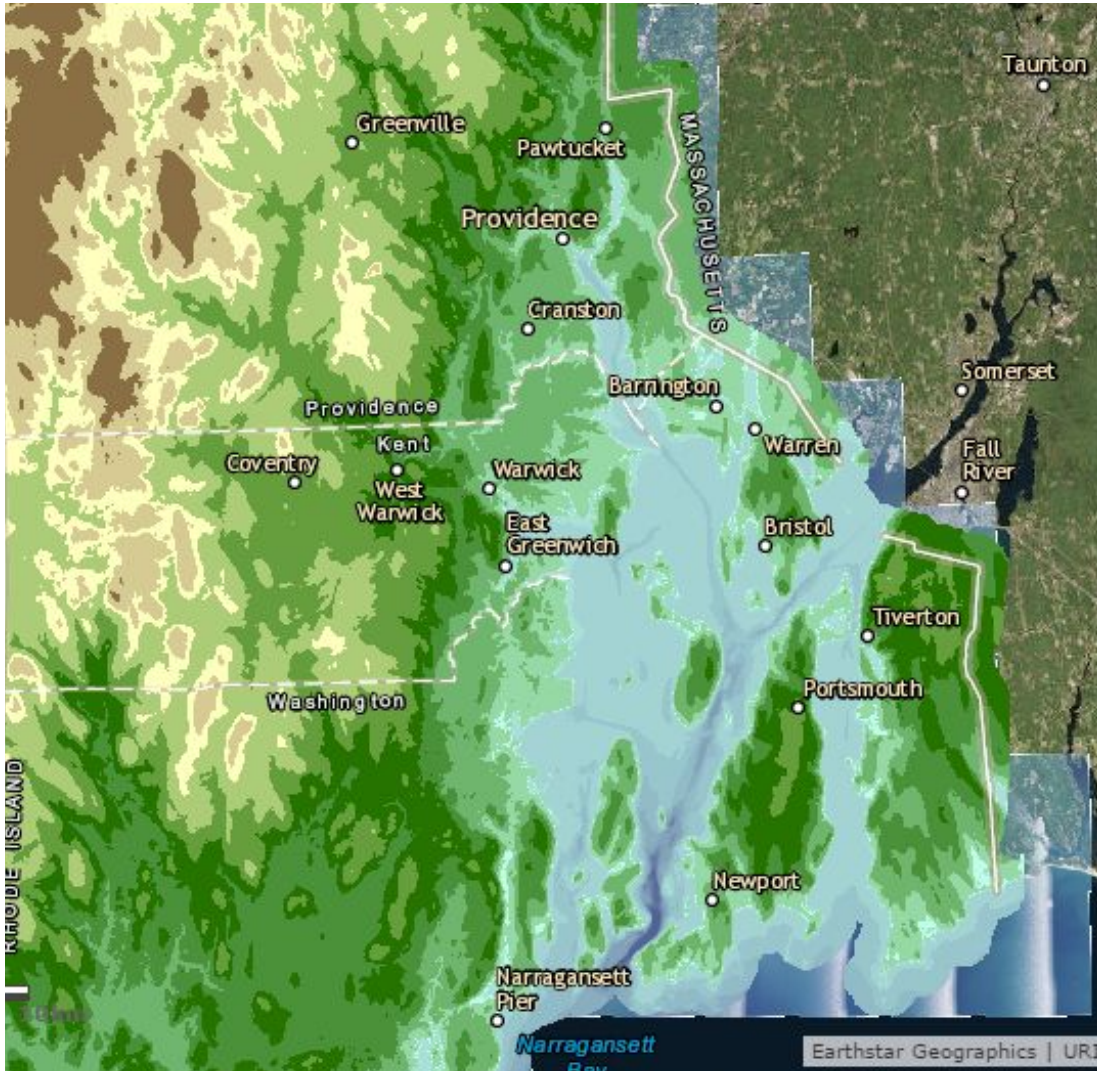
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# Impediments to marsh migration

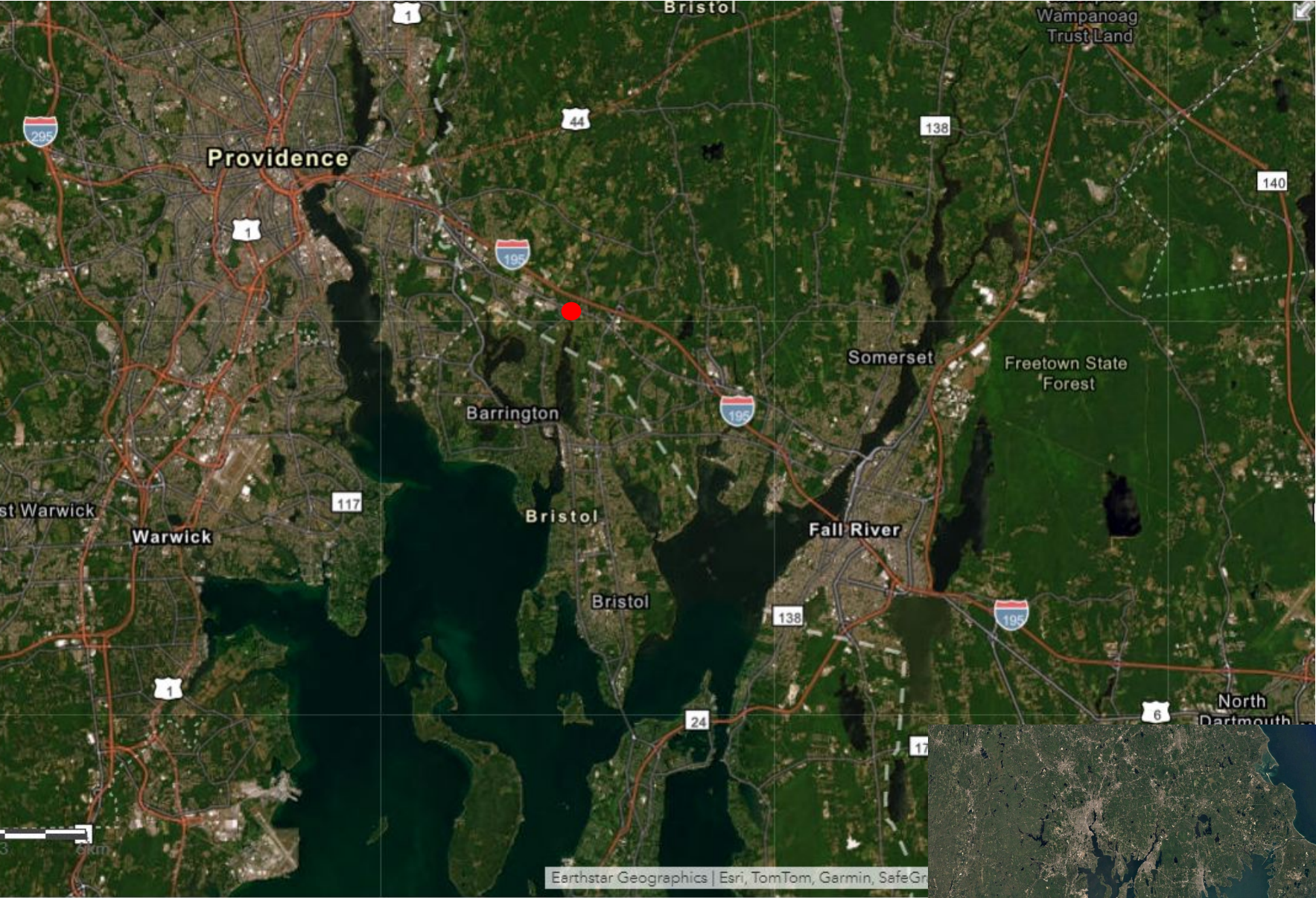
Areas for salt marsh migration are limited due to topography, shoreline hardening and coastal development



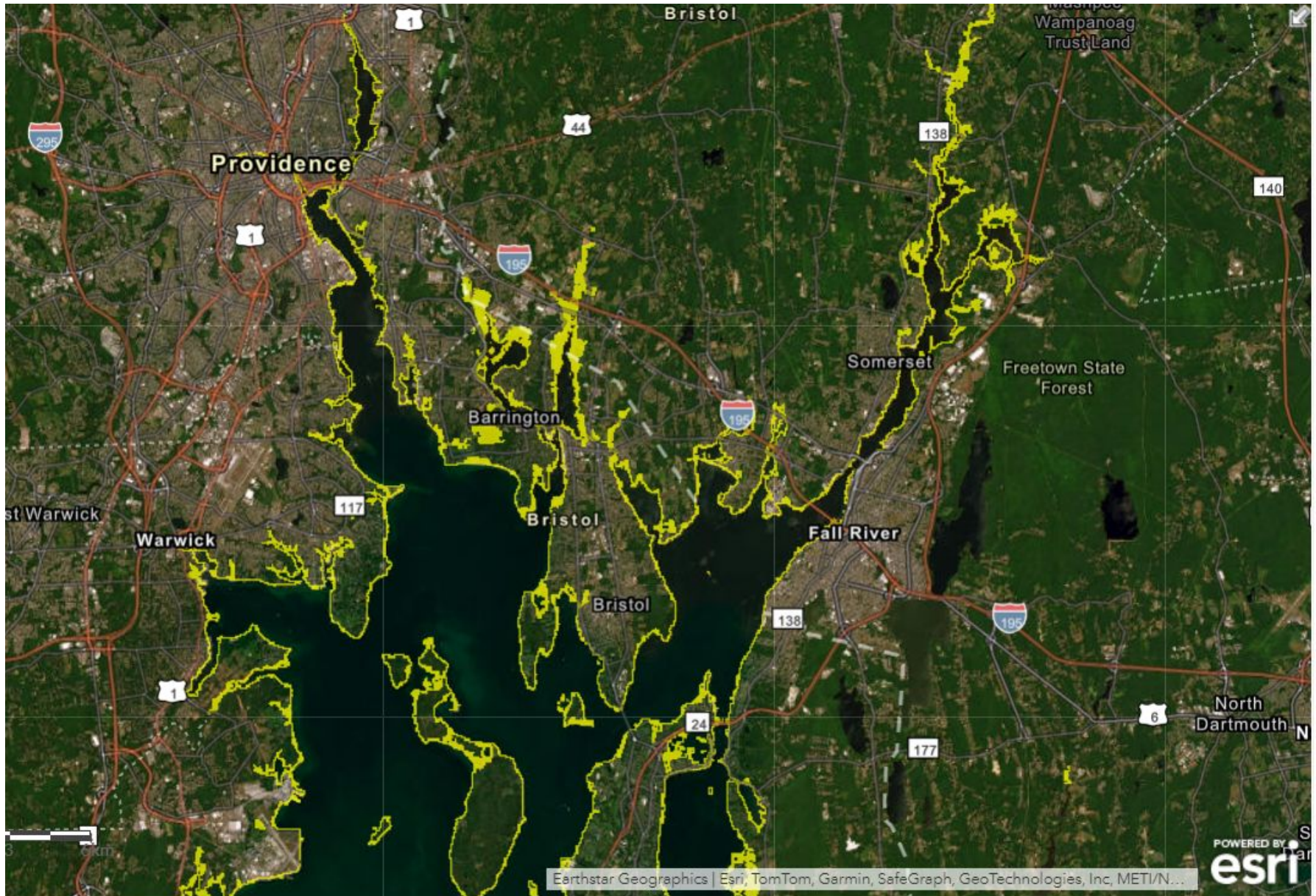
# Impediments to marsh migration: agricultural embankments



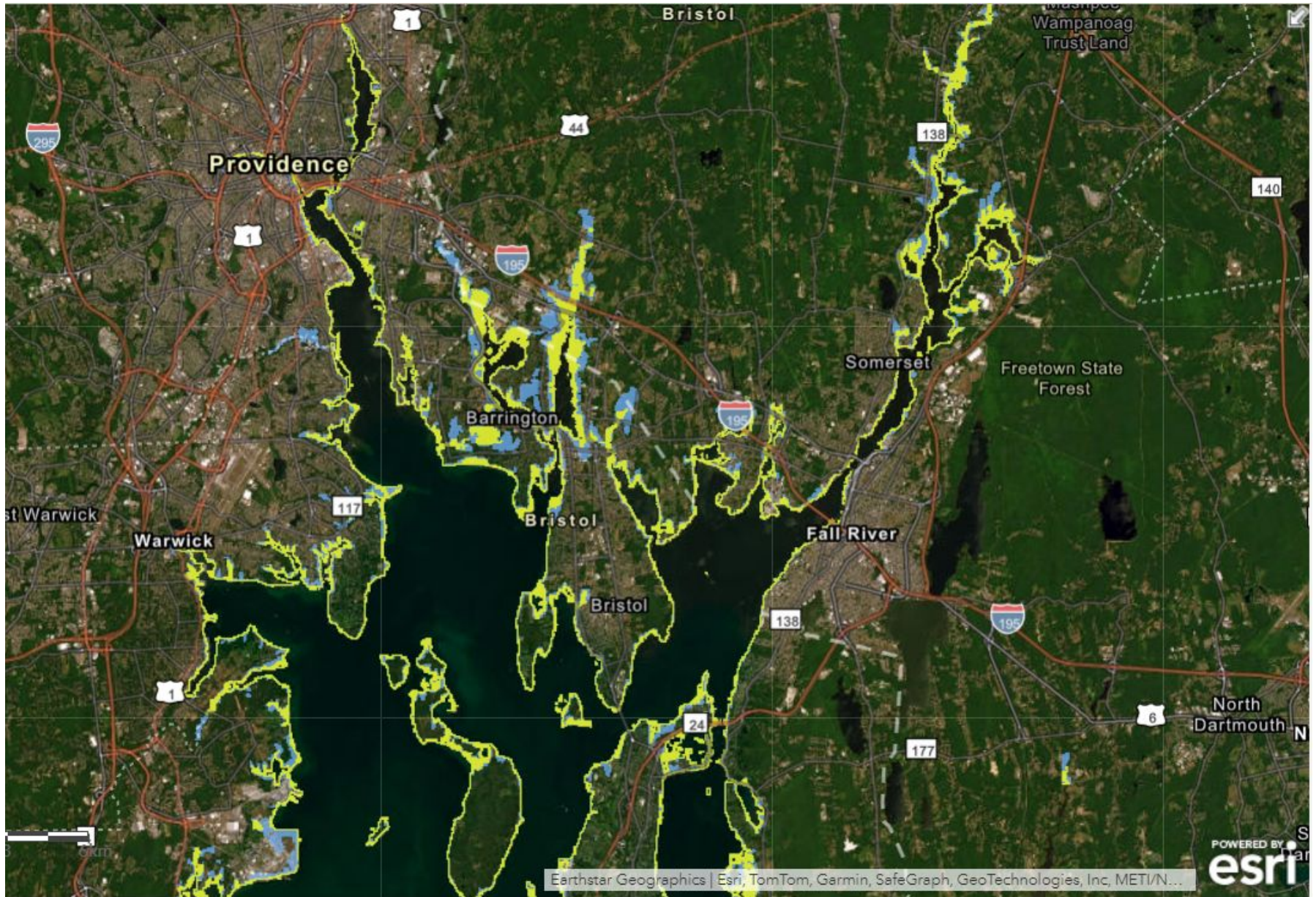
# Palmer River



# URI's STORMTOOLS: 1 foot sea level rise



# URI's STORMTOOLS: 5 feet of sea level rise

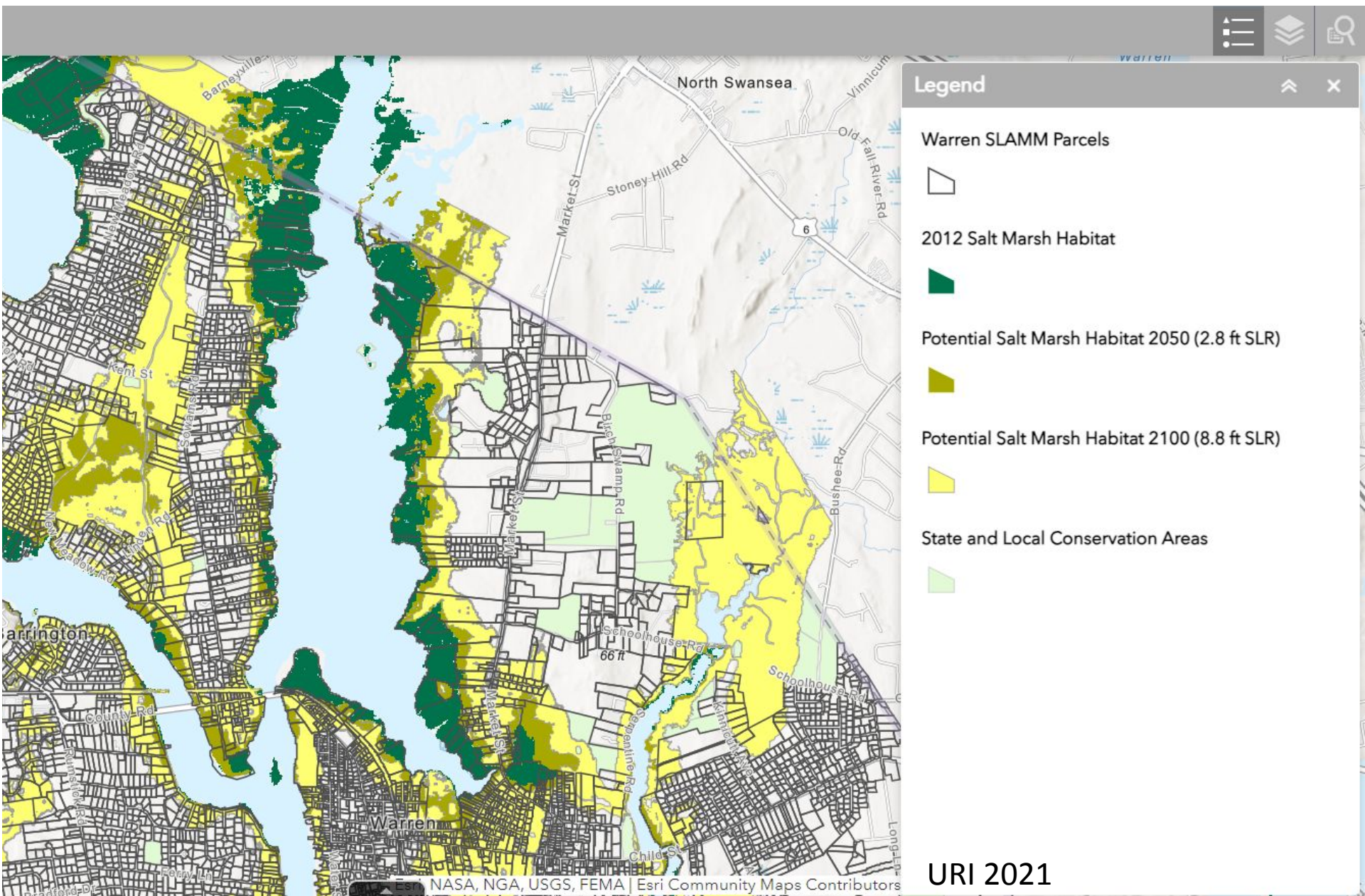


# Marsh Migration Strategies

- Identify marsh migration corridors through field visits and SLAMM modeling
- Protect low lying uplands to create marsh migration corridors
- Modify activities that inhibit migration of coastal habitat i.e. frequent mowing
- Remove physical barriers such as pavement, walls, berms, or dams
- Conduct activities that facilitate marsh migration such as invasive plant management



# Palmer River Sea Level Rise Affecting Marshes Model





# Palmer River Conservation Lands (2017)

Show Details of Map

About Content Legend

## Legend

### Rhode Island Watersheds (Modified HUC10)

Watersheds (modified HUC-10)

□

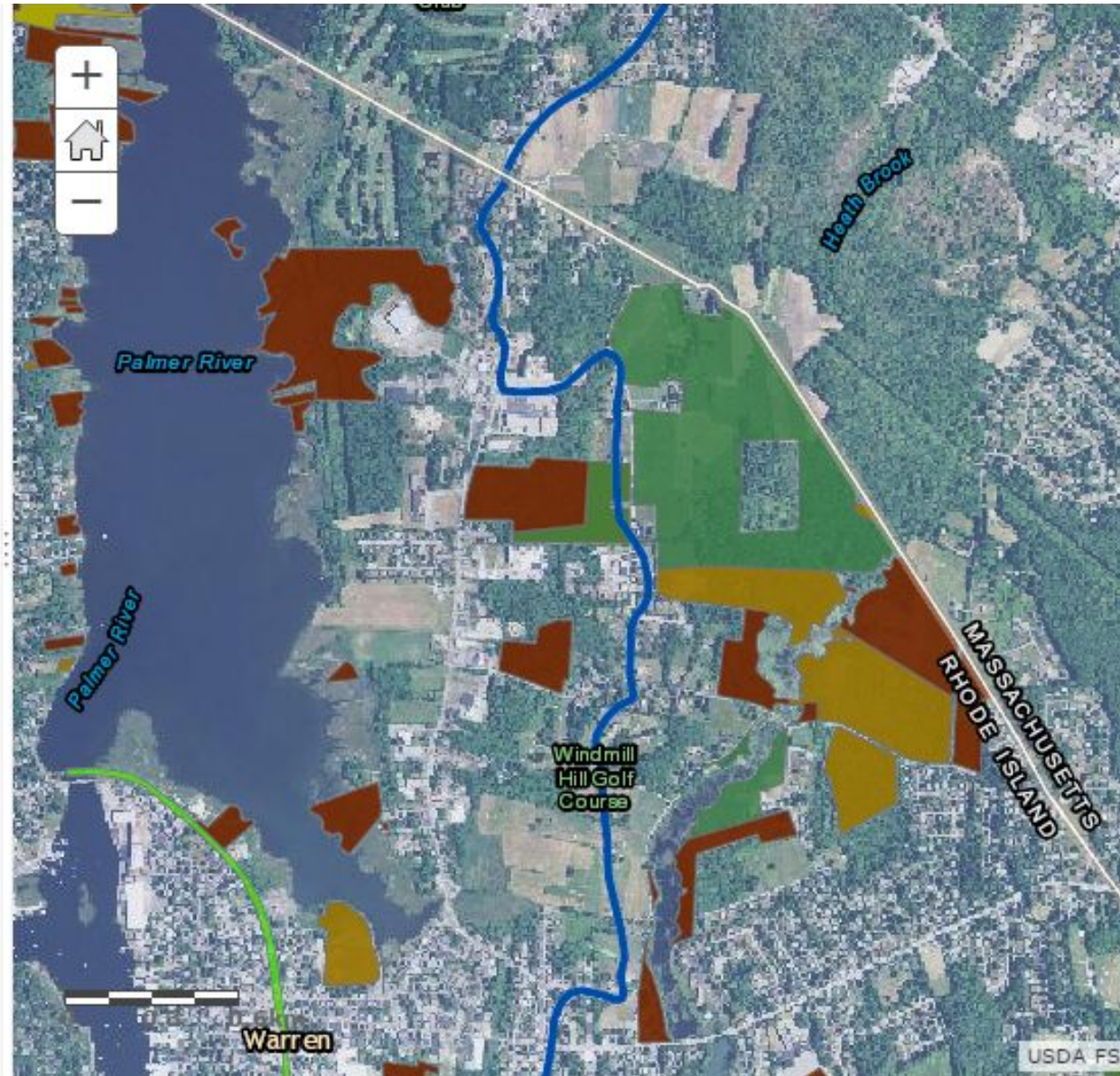
### Rhode Island Conservation Lands

#### State Conservation Land

- Fee Title
- Conservation Easement
- Agricultural Development Rights
- Forestry Easement
- Recreation Easement

#### Local & NGO Conservation Land

- Fee Interest
- Easement Interest
- Deed Restriction
- Conservation Intent



# Land protection of marsh migration corridor: Palmer River



# Project Timeline

2016: Outreach to Town of Warren, Warren Land Trust and NRCS about marsh migration corridor protection

2017: Partner meeting with property owners to discuss ACEP and WRE program

2018: Ongoing outreach to identified property owners

2020: Sowams Preserve easement secured

2022: Highlander Easement secured

2021: State and federal permits submitted for Sowams Preserve

2022: Sowams Preserve restoration begins

# Sowams Preserve NRCS Wetlands Reserve Easement



# Natural Resources Conservation Service

- Soil Conservation Service was created in 1935
- Help producers and partners protect and conserve natural resources on private lands
- We offer voluntary conservation programs
- Deliver conservation solutions that help agricultural producers protect natural resources and feed a growing world



# Agricultural Conservation Easement Programs (ACEP)

- Agricultural Land Easements (ALE)
  - Helps private and tribal landowners, land trusts, and other entities protect croplands and grasslands on working farms by limiting non-agricultural uses of the land through conservation easements.
- Wetland Reserve Easements (WRE)
  - Helps private and tribal landowners protect, restore and enhance wetlands which have been previously degraded due to agricultural uses.



# Wetland Reserve Easements

- Program objectives:
  - Provide habitat for migratory waterfowl and other wetland dependent wildlife, including threatened and endangered species
  - Protection and improvement of water quality
  - Attenuation of floodwater
  - Recharge of groundwater
  - Protection of open space
  - Provide resilience to climate change
  - Provide opportunities for educational, scientific, and limited recreational activities



# Who is eligible?

- Eligible landowners include:
  - Owners of privately held land, including land held by tribes
  - Landowners who meet AGI limitations and HEL and WC provisions of the Food Security Act
  - Must have owned the offered land for 24 months
  - Must have unencumbered, unrestricted, and transferable legal right of access





# What land is eligible?

- Privately held farmed or converted wetlands that were previously degraded due to agricultural uses
- Lands that can be successfully and cost-effectively restored
- NRCS prioritizes applications based on the easement's potential for improving water quality and protecting and enhancing habitat for migratory birds and other wildlife



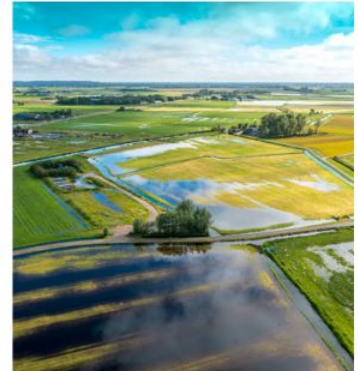
## How does WRE work?

- NRCS enters into purchase agreements with eligible landowners that include the right for NRCS to develop and implement a Wetland Reserve Plan of Operations
  - Plans detail practices to help restore, protect, and enhance the wetland functions and values
- Wetland Reserve enrollment options include:
  - Permanent Easements
  - 30-year Easements
  - Term Easements
  - 30-year Contracts

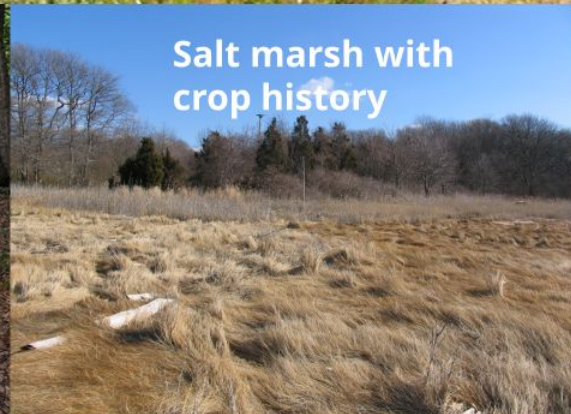


# Common WRE Eligible Land Types in RI

- Farmed or Converted Wetlands
- Riparian Areas
  - Directly link protected lands less than 1 mile apart
- Wetlands Restored or Protected Under a Private, State, or Federal Program
  - Provide significant additional resource protection
  - Provide critical habitat for T&E species
  - Provide additional restoration opportunities
- Adjacent Lands
  - Must contribute significantly to wetland functions and values
  - Must not exceed acres of eligible lands to be enrolled



# WRE Farmed or Degraded Wetland Examples



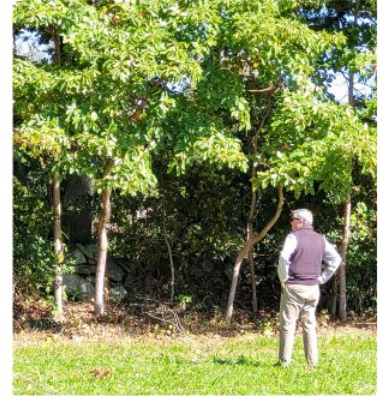
# RI's Salt Marshes and WRE

- RI's coastal salt marshes were historically drained to facilitate harvesting of salt marsh hay
  - Stone walls and man-made ditches are found throughout RI's salt marshes
- Target species for restoration:
  - Saltmarsh sparrow
  - Northern diamondback terrapin



# Agreements and WRE

- NRCS may enter into agreements with state or local agencies, conservation districts, and private conservation organizations to assist with program implementation, including:
  - Easement acquisition functions
  - Restoration planning and design
  - Implementation of restoration plans
  - Maintenance, management, and monitoring activities



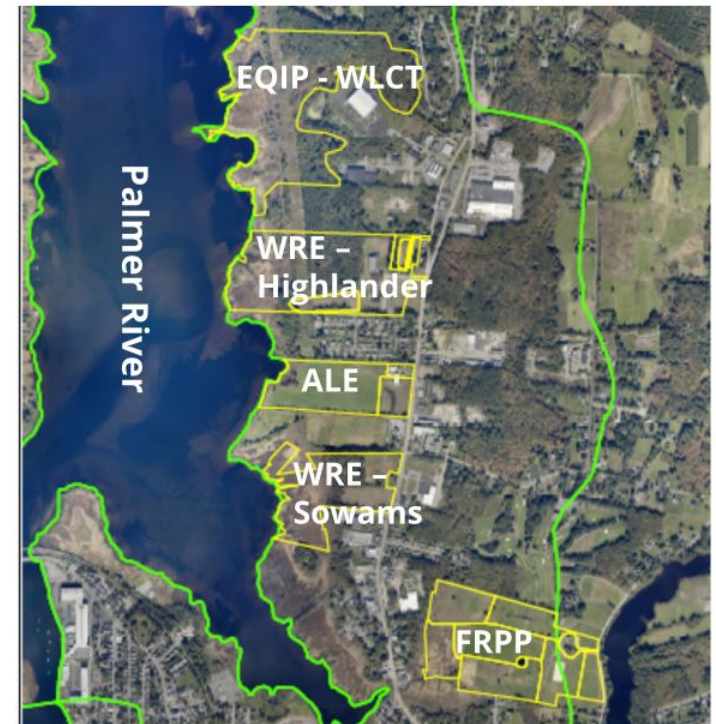
# Common WRE Salt Marsh Restoration Practices in RI

- Tidal channel restoration under CPS 657 Wetland Restoration
  - Restoration of hydrology through excavation of existing ditches
- Turtle nest site creation under CPS 644 Wetland Wildlife Habitat Management
  - Removal of vegetation and scarification of soil on small areas
- Invasive plant management under CPS 314 Brush Management and CPS 315 Herbaceous Weed Treatment
  - Removal of invasives for restoration to native salt marsh species
- Restoration of adjacent agricultural fields to native wetland vegetation through CPS 420 Wildlife Habitat Planting
  - Seeding of native grasses and forbs to provide habitat and facilitate salt marsh migration



# NRCS Work in the Palmer River Watershed

- WLCT Haile Farm – EQIP
- Highlander Charter School – WRE
  - Salt marsh restoration
    - Runnels, Phragmites control
  - Invasive plant control
  - Warm season grass and pollinator establishment
  - Removal of embankment features
- Two private properties protected under agricultural land easements





# Tidal hydrology restoration project goals:

- Restore hydrology impacted by past human activities including legacy impacts such as agricultural embankments and ditch spoils
- Prevent future subsidence by allowing vegetation to recolonize formerly impounded water areas
- Promote revegetation to increase marsh building capacity
- Reduce height and vigor of *Phragmites*
- Facilitate marsh migration
- Reduce mosquito breeding habitat



Agricultural embankments



Impounded water in migration corridor

# Drainage feature dimensions



March 2020



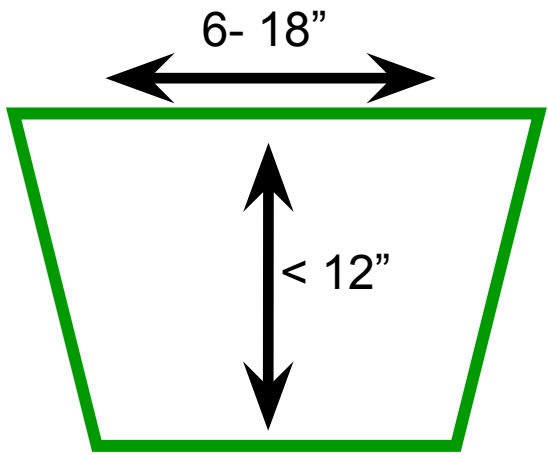
June 2020



September 2020



August 2022

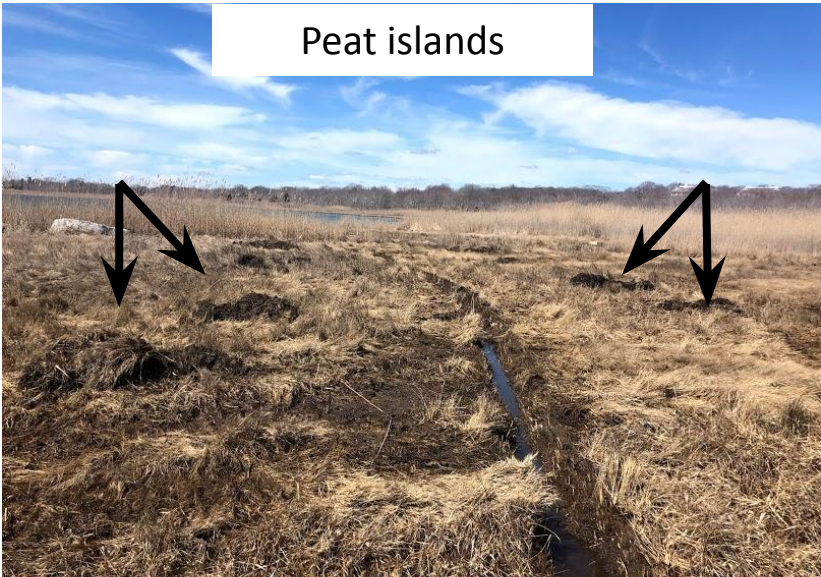


# Peat placement

*Place excavated peat in small islands to create higher elevation areas for plant recolonization and potential structured breeding microtopography*



Peat placement



Peat islands

Peat island vegetated with after 1 growing season

Unvegetated peat colonized with *S. patens* after 2 growing seasons



Peat island after 7 growing seasons



# Sowams Preserve, Palmer River

1939

Agricultural embankments

-71.28141742 Degrees



1997



2019

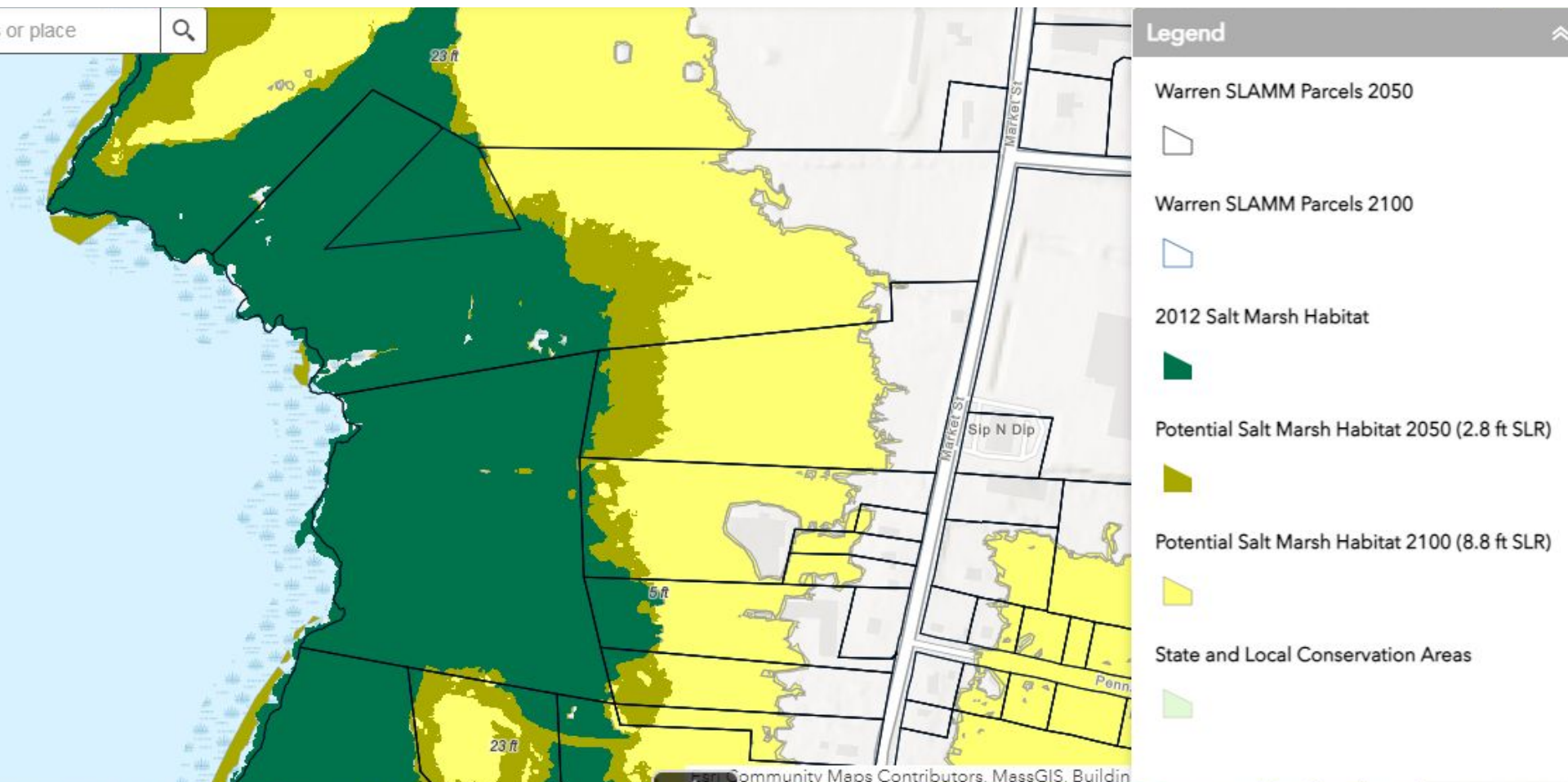


275 41.738 Degrees





# Updated SLAMM mapping tools projecting 8.8' SLR by 2100



# Sowams Preserve restoration plan



Embankment



Excavator access

136

Market St

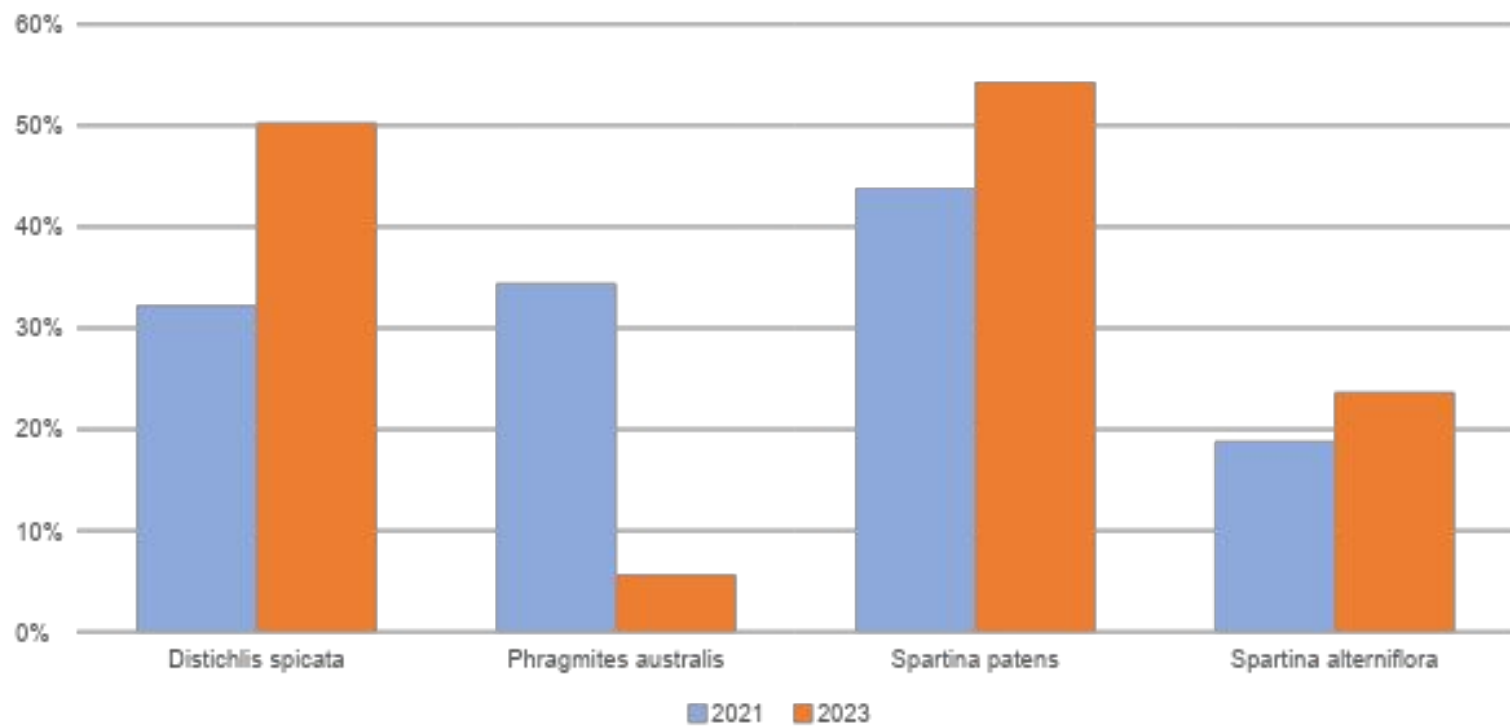
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# Tidal hydrology restoration: 2022-present





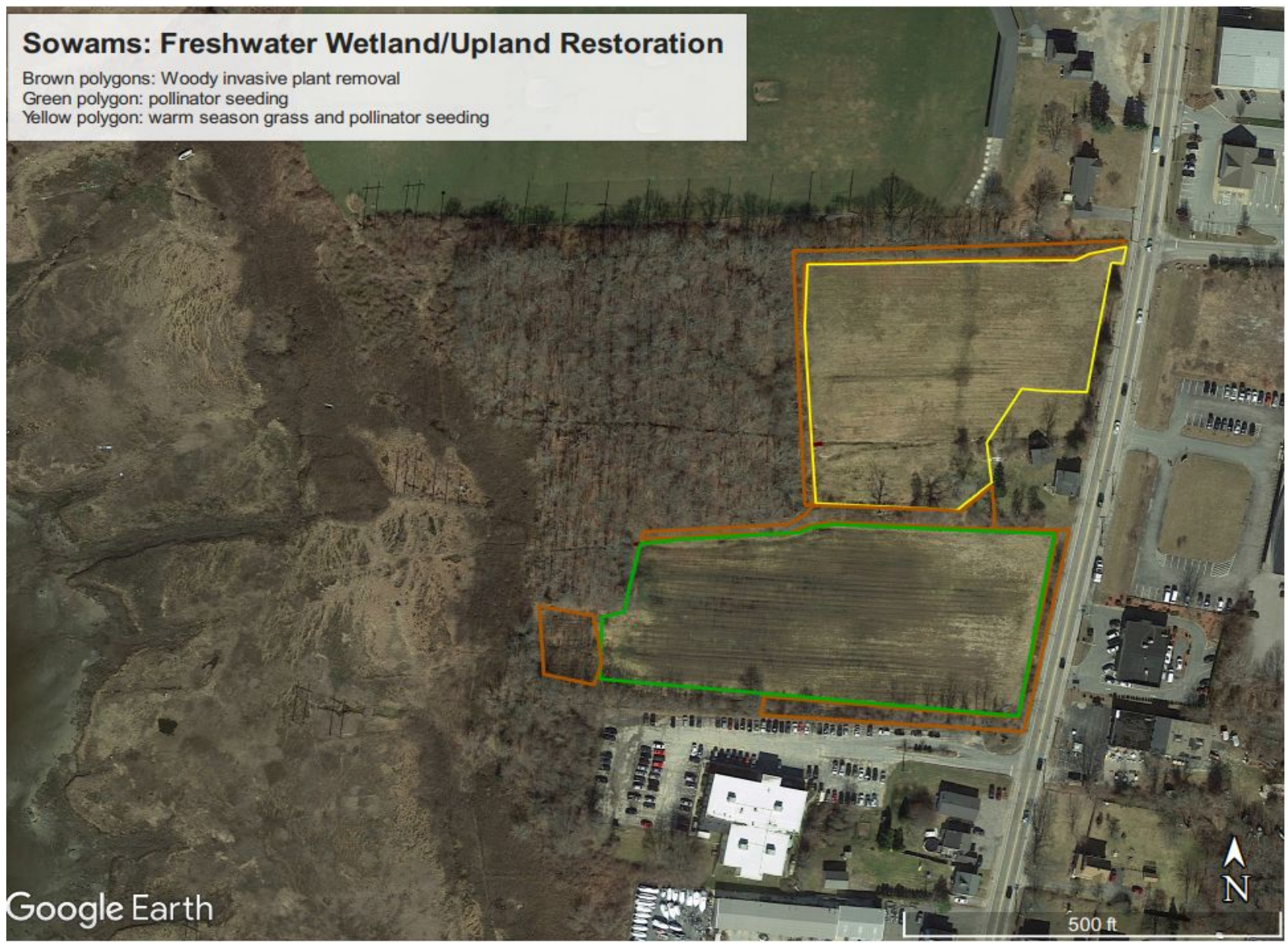
## Vegetation % Cover



# Marsh Migration Corridor, Wet Meadow and Upland Restoration

## Sowams: Freshwater Wetland/Upland Restoration

Brown polygons: Woody invasive plant removal  
Green polygon: pollinator seeding  
Yellow polygon: warm season grass and pollinator seeding



Google Earth

500 ft



# Woody Invasives in Fields and Hedgerow



# Wet Meadow and Agricultural Ditches





# Native plant recolonization



1<sup>st</sup> growing season: Yellow thistle June 2022



1<sup>st</sup> growing season: Seaside goldenrod 11.22

# Fields mow to prep for cover crop



Photo: Singewald, September 2022

# Woody invasive plant management: Fall 2022-Winter 2023



# Native Tree Planting



# Native plant recolonization 2<sup>nd</sup> growing season post invasive plant control



Photos: Singewald: 10.22.23

# Wildlife habitat enhancement: bat and bird boxes



# Ongoing Adaptive Management and Stewardship





# SOWAMS MEADOWS PRESERVE

## Saltmarsh & Meadow Restoration



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