



NJ State Updates

MAWWG 2023

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Beneficial use of dredged material to Enhance Salt Marsh Habitat in New Jersey: Monitoring and Project Assessment

Dates: 2018 – 2022

8 years of data on 56 metrics collected by 9 different organizations

Placement	TNC/ GreenVest
Plant Community	TNC
Benthic Invertebrate Species	Rutgers/ TNC
Avian Use	The Wetlands Institute/ Princeton Hydro
Habitat Change Analyses	BGIS/ Stockton/ TNC
Site Visits	TNC/ DEP F&W/ DEP DSR and Dredging
Surface Elevation Tables	TNC/ DEP DSR
Topographic Surveys	USACE/ GreenVest/ DEP DSR/ DOT
Sediment Characteristics	Rutgers/ DOT/ Princeton Hydro/ DEP/ USACE
Water Level	DEP DSR/ GreenVest/ Princeton Hydro
Nekton	Princeton Hydro
Water Chemistry	The Wetlands Institute/ DEP DSR/ Princeton Hydro

Beneficial Use of Dredged Material to Enhance Salt Marsh Habitat in New Jersey

New Jersey's first pilot projects for the beneficial use of dredged material to enhance coastal wetland habitat

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Beneficial Use of Dredged Material to Enhance Salt Marsh Habitat in New Jersey

The salt marshes of the New Jersey coast are under threat of diversification due to a growing deterioration of sediment and underlying soil layers and rapid erosion resulting from global climate change. Along with the degradation of habitat, increasingly frequent storms and sea level rise have led to loss of marsh habitat. The New Jersey Department of Environmental Protection and Heritage has implemented three beneficial use of dredged material pilot projects within the state: (1) Rancocas Island in Middle Township, Cape May County; (2) the Cooks Bay Wetlands Wildlife Management Area in Waterford, Cape May County; and (3) the Fenwick Wildlife Management Area in Fenwick (Carroll and Camden Counties). Beneficial use of dredged material in the coastal zone is the application of sediments and materials dredged from the New Jersey Intra-coastal Mainline and other mainline navigational channels to enhance marsh habitat. Several methods of sediment placement were employed in these sites, including the use of sediment placement in Fenwick Bay in 2018, the use of sediment placement in Rancocas Island and the Fenwick Wildlife Management Area in 2019, and the use of sediment placement in Fenwick Bay in 2020. The project also includes the use of sediment placement in Fenwick Bay in 2021 and 2022. The project also includes the use of sediment placement in Fenwick Bay in 2021 and 2022. The project also includes the use of sediment placement in Fenwick Bay in 2021 and 2022.

Funding

This project was supported and funded by:

- National Estuary and Wetland Restoration through the National Estuary Program (NEP) Grant #18094.
- The U.S. Environmental Protection Agency, Wetland Restoration Development Grant (DE-6073-00).
- U.S. Fish and Wildlife Service, Wetland Restoration Grant (W-18-00000001).

Partners

- GreenVest, LLC
- N.J. DEP Bureau of AS
- N.J. DEP Division of Fish and Wildlife
- N.J. DEP Division of Science
- N.J. DEP Office of Dredging and Sediment Technology
- N.J. Department of Transportation – Office of Marine Resources
- Princeton Hydro, LLC
- Rutgers University
- Stockton University
- The Nature Conservancy in New Jersey

Reports

- Monitoring Plan (2018)
- Wetland Use and Project Summary – Full Report (2021)
- Monitoring and Project Assessment – Full Report (2022)
- Wetland Use and Project Assessment – Full Report (2022)
- Wetland Use and Project Assessment – Full Report (2022)

Beneficial Use of Dredged Material to Enhance Salt Marsh Habitat in New Jersey

Monitoring and Project Assessment

January 2023



Link

Tools That Support Living Shoreline Efforts

What is the Problem?



WATCH: Wetlands Assessment Tool for Condition & Health (PDE, NJDEP)



What is WATCH?

How to enter data

+ Hydrology

+ Soil Condition

+ Water Chemistry

Horizontal Position

Vertical Position

Biology

Sediment

Permit Alignment

Reset all data

Output

Overall Status

Further information requested: to get the best out of this analysis, please address the attributes that contain a yellow exclamation point in the table.

Generate Report

Table 1: Output Summary

Violations	Horizontal	Vertical	Biology	Hydrology
Future	✓	✘	✘	✓
Current	✓	✓	✓	!

✘ deficiency detected ! need more info ✓ meets user criteria

Table 2: Sediment Summary

! Sediment Accumulation(Vertical & Horizontal): Building concentrated in low marsh
! High Marsh Sediment Delivery(Vertical & Hydrology): Investigate subsidence, surface accretion, & decomposition
✘ High Marsh Integrity(Vertical & Biology): Poor platform resilience
✓ Low Marsh Sediment Delivery(Horizontal & Hydrology): Good sediment delivery to low marsh
! Low Marsh/Shoreline Integrity(Horizontal & Biology): Low marsh building but potentially soft/unstable
! Accumulation Resistance(Hydrology & Biology): Investigate source and composition of TSS

Soil Condition

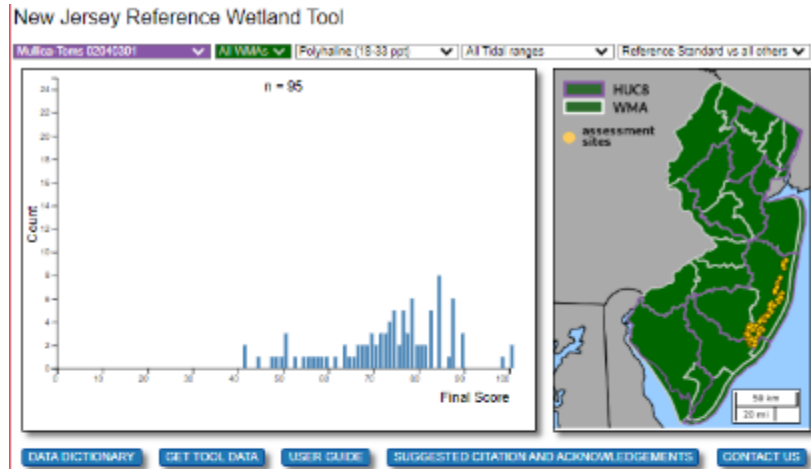
Soil type: Boxiron

Soil grade: B

These values are based on an organic depth of 40cm with a parent type of silty-loam, loam at a depth of 15-51' and a decomposition level of U: H1-H4, Fabric, Peat, OI at a depth of 50 cm.

- On-the-ground quantitative data
- Summary output
- Translation
- Requires access to reference data

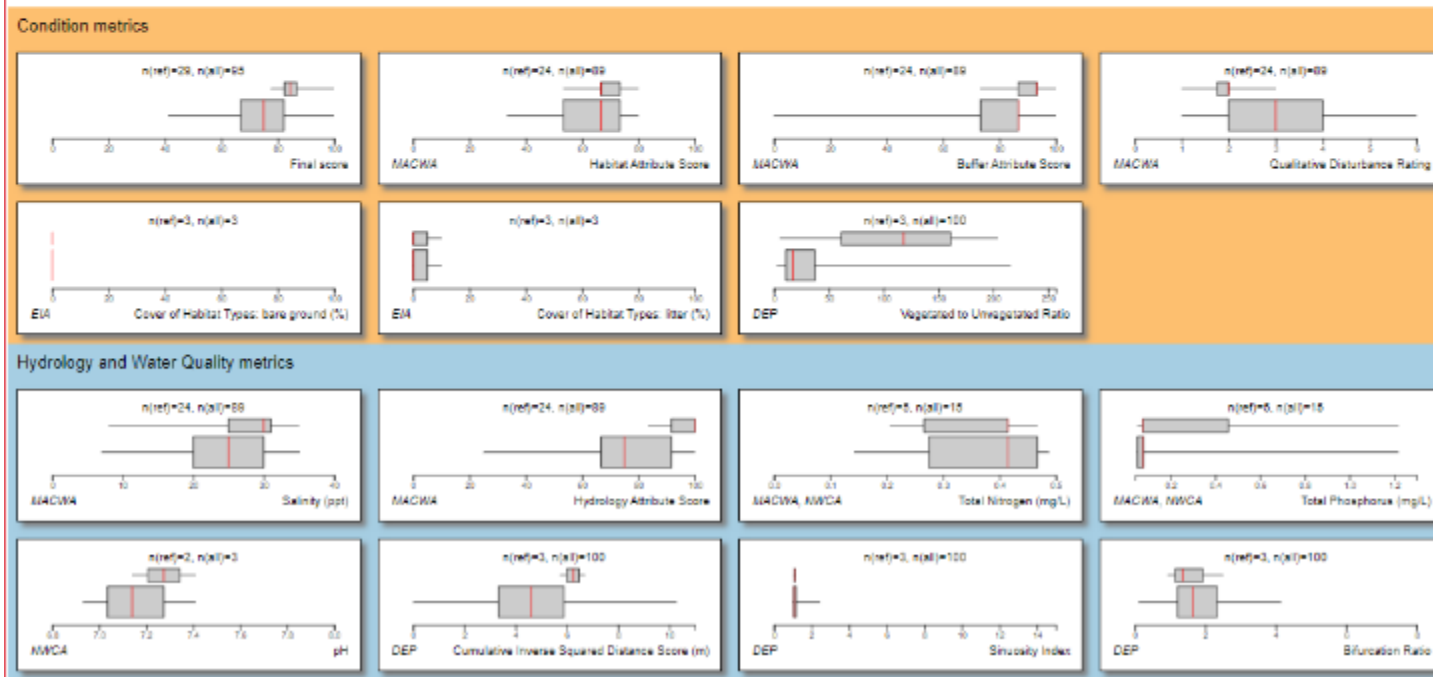
Adding New Jersey Reference Wetlands to a Regional Interactive Data Base



Link to New Jersey Reference Wetland Tool:
<https://tools.cei.psu.edu/wetlands/njdep/>

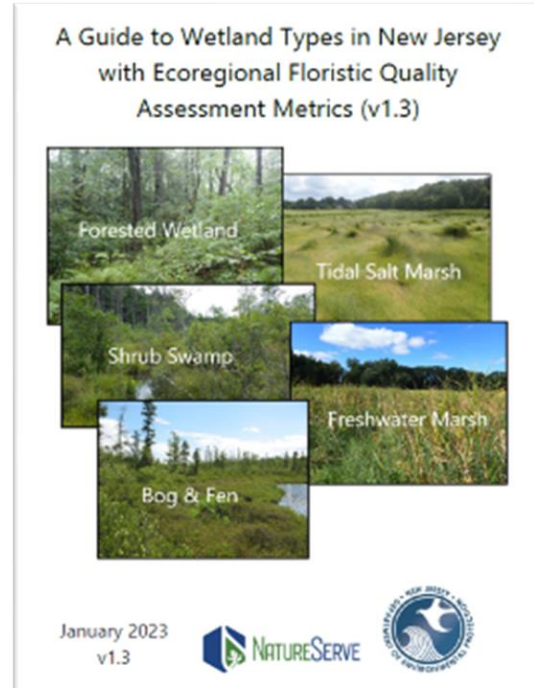
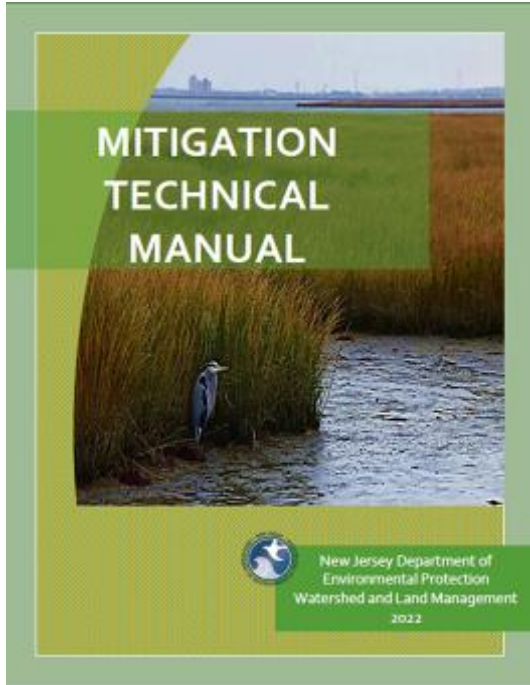
Link to User Guide:
<https://storymaps.arcgis.com/stories/caae4374e6ef48fe965efabec299c47e>

Link to all metrics:
https://tools.cei.psu.edu/wetlands/njdep/2022_Data_Dictionary.pdf



Peer reviewed!

NJDEP Mitigation Technical Manual with A Guide to Wetland Types in NJ with eFQA Metrics



Coastal Plain Swamp Forest Wetlands

- 7a. Combinations of willow oak, red maple, sweetgum, characteristic; loblolly pine may be present in the Cape May region ----- **Coastal Plain Hardwood Basin Swamp (G038)**
- 7b. Pitch pine or Atlantic white cedar characteristic, on peat, including freshwater tidal swamps ----- **Northern Coastal Plain Swamp (G039)**

Piedmont, Highlands, Ridge and Valley Swamp Forest Wetlands

- 8a. Generally small ephemeral wetlands, vegetation very variable, from sedge meadows to open water.
- 8b. Canopy trees are rooted in bedrock (dolomite, limestone).
- 9a. Swamp forests of the northern Coastal Plain.
- 9b. Swamp forests of northern Piedmont.

Atlantic White-cedar - Pitch Pine Swamp Group (G039)

Floristic Composition: Species listed by Growth Form and Constancy (percentage of stands that contain the species)

Scientific Name	Common Name	USDA Plants Code	Constancy	Mean % Cover	NJ State CoC
TREE					
<i>Acer rubrum</i>	Red maple	ACRU	94	33.5	3
<i>Nyssa sylvatica</i>	Sourgum	NYSY	50	8.5	4
<i>Chamaecyparis thyoides</i>	Atlantic white-cedar	CHTH2	37	17.9	9
<i>Pinus rigida</i>	Pitch pine	PIRI	34		
<i>Pinus strobus</i>	Eastern white pine	PIST	34		
<i>Betula alleghaniensis</i>	Yellow birch	BEAL2	23		
<i>Tsuga canadensis</i>	Eastern hemlock	TSCA	23		
<i>Quercus rubra</i>	Northern red oak	QURU	21		
<i>Liquidambar styraciflua</i>	Sweetgum	LIST2	20		
SHRUB					
<i>Vaccinium corymbosum</i>	Highbush blueberry	VACO	83		
<i>Clethra alnifolia</i>	Sweet pepperbush	CLAL3	55		



The Role of FQA Metrics in Wetland Monitoring, Mitigation, and Restoration

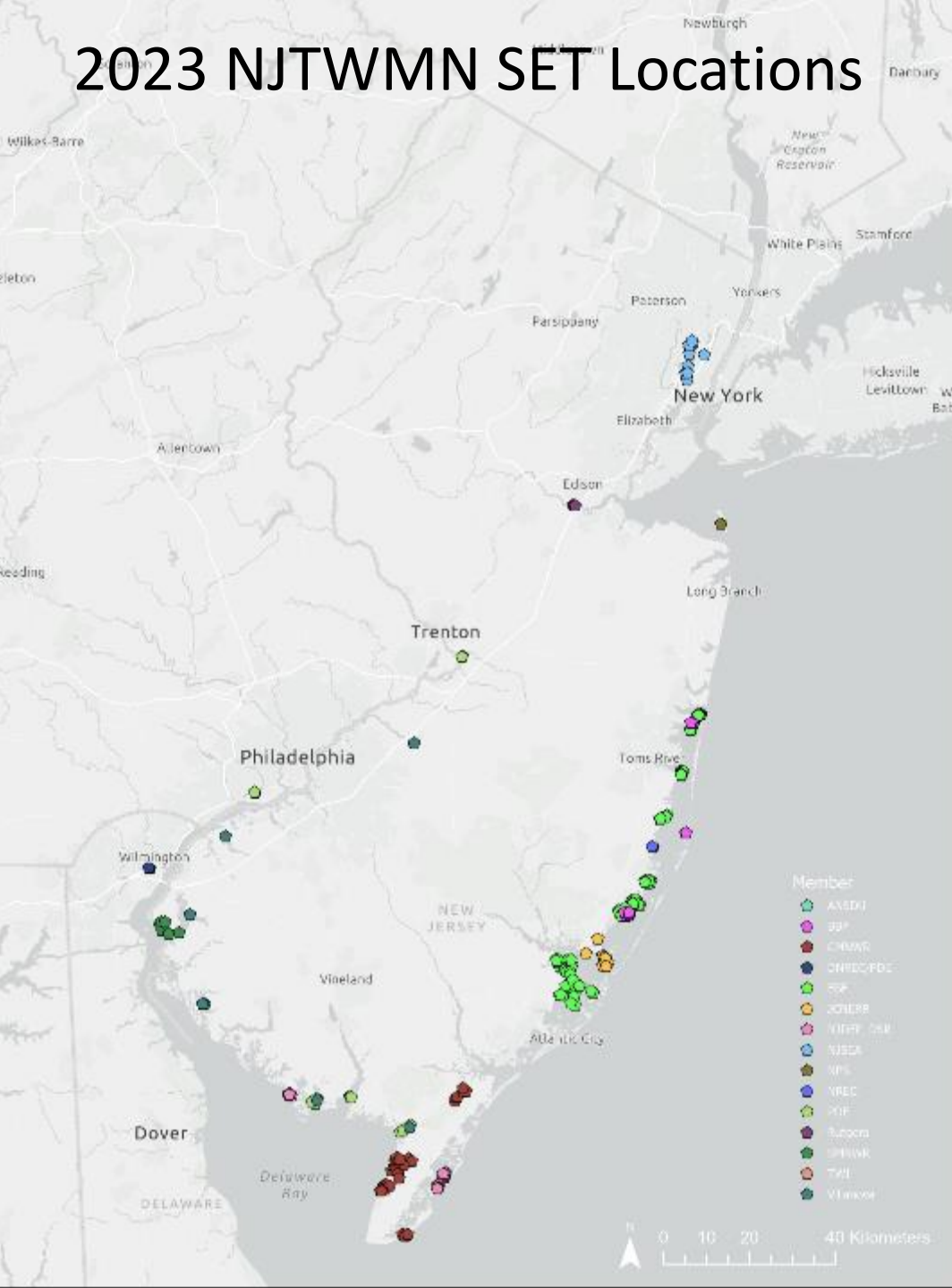
Our development of thresholds of FQA metric response to the stressor gradient can provide guidance to ongoing monitoring and assessment programs, where knowledge of reference conditions can guide interpretation of the status of wetlands in a watershed, state, or region. Similarly, these thresholds can guide restoration and mitigation efforts by helping set standards for restoration success or, in the case of mitigation, compliance.



FQA Metric Thresholds for Mean C and Cover-weighted Mean C G039 Northern Coastal Plain Swamp Atlantic White-cedar - Pitch Pine Swamp Group

FQA Metric	Excellent	Good	Fair	Poor
Mean C	>5.7	5.7-5.0	5.0-4.0	<4.0
Cover-Weighted Mean C	>6.0	6.0-4.7	4.7-2.6	<2.6

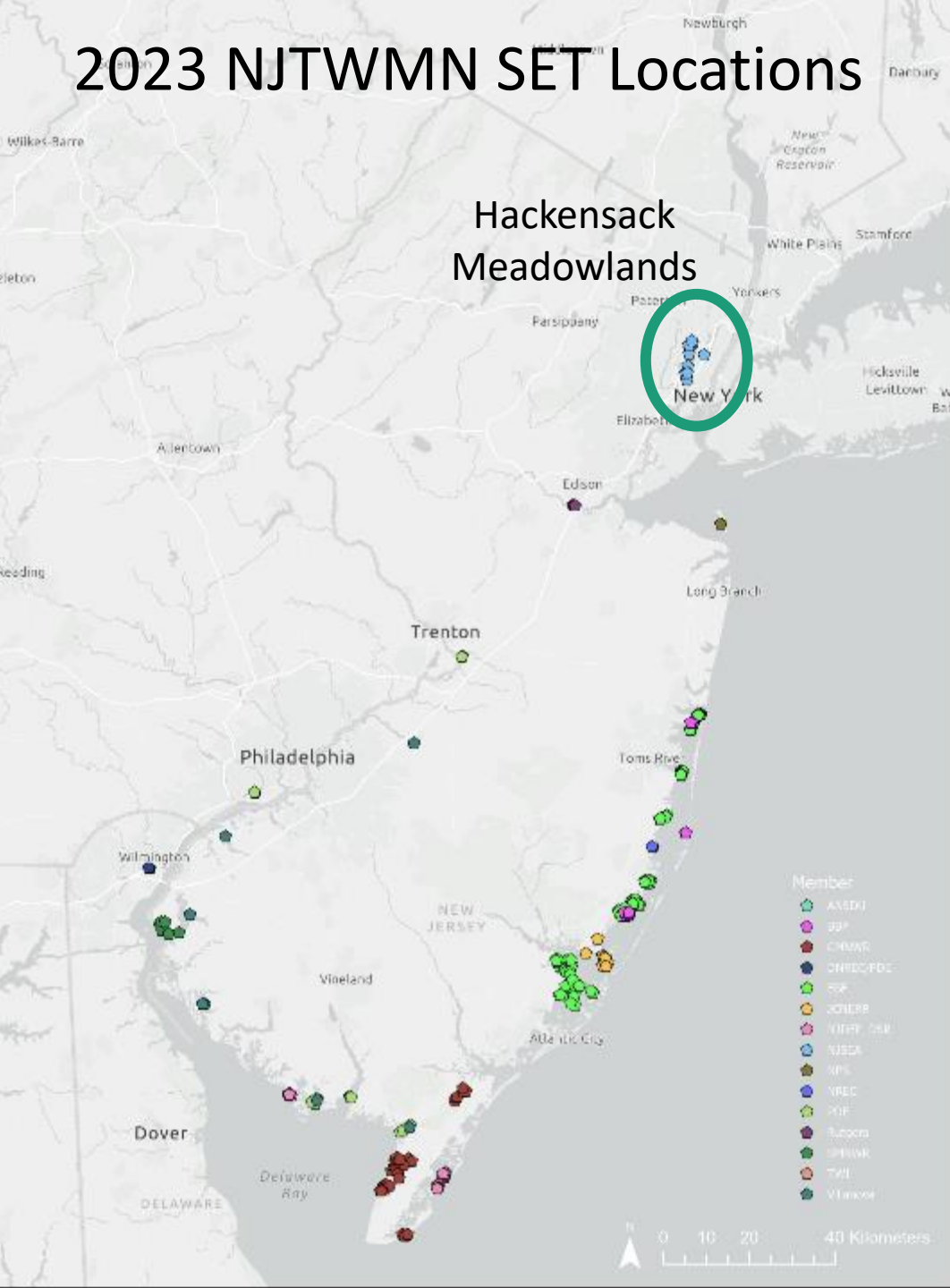
2023 NJTWMN SET Locations



Ongoing Work

- **NJ Tidal Wetland Monitoring Network (NJTWMN)**
 - Framework for statewide database on coastal wetland elevations
 - Website created and will be published fully 2024 with data visualizations
 - CZM funding provided annually for continuous SET monitoring
- **Methodology for Multispectral Drone Mapping in Tidal Wetlands**
 - Intended to speed up arduous vegetation surveying across sensitive habitat
 - Methodology and report will be completed in 2024
- **WatershedNJ**
 - In partnership with Rutgers University CRSSA and Climate Resiliency Office
 - Wetland function mapping based on modified WV RAM for freshwater and tidal wetlands in NJ
 - To characterize watersheds based on current and projected future condition and to focus appropriate types of future restoration, enhancement, or mitigation measures
 - A web-based platform to provide users with a single location for data assistance in the development of watershed plans, water quality permitting, and water quality improvement grant related projects

2023 NJTWMN SET Locations



Ongoing Work

- **Meadowlands Research and Restoration Institute (MRR) 2021 WPDG:**
 - Obtained Q1 LiDAR data and conducted a tidal datum evaluation to reassess the estuary's hydrology and update the flood risk assessment plan in preparation for future sea level rise
 - Acquired hyperspectral imagery and updated the estuary's saltwater and freshwater wetland mapping in light of recent changes in federally protected waterways
 - 3-year study of potential ecological restoration alternatives for the Sawmill Creek Wildlife Management Area based on baselines ecological evaluations, SET data, and a 2D hydrological and sediment transport model
- **Additional MRR work:**
 - To enhance on-going long-term monitoring of the wetlands and adjacent areas of the Meadowlands, over the past year MRR has obtained a number of Acoustic Recording Units to assist in our monitoring of the wildlife in the area including Atlantic Coast Leopard Frogs, bats, secretive marsh birds and Saltmarsh Sparrows
 - Also using radio telemetry to monitor migrating songbirds and Diamondback Terrapin

Projects Getting Started

- **NJ Carbon Budget Pilot Project**
 - In partnership with Rowan University
 - Determine C pools and carbon flux in freshwater wetlands of NJ by type
 - Using combination of vegetation biomass, NEE, groundwater flux
 - Ultimate goal is to create calculators of carbon exchange based on wetland class
- **2023 NJDEP WPDG applications:**
 - Groundtruthing Wetland Land Use/Land Cover (LULC) Mapping Methods
 - Improve future LULC classifications
 - Testing three different LULC classification models to determine which is most accurate
 - Meadowlands Nutrient and Oxygen Flux Study
 - Quantification of the carbon, nutrient, silicates and dissolved oxygen fluxes between the tidal brackish or oligohaline wetlands of Meadowlands into the Hackensack River over tidal cycles
 - Acoustic Doppler current profiler (ADCP) and water quality sondes





Thank you

Questions?

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or

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Completed Projects



- **Beneficial Reuse of Dredged Material Pilot Projects**
 - Ring Island, Avalon, and Fortescue in southern coastal NJ
 - [Beneficial Reuse of Dredged Material DSR Website](#)
- **Wetlands Assessment Tool for Condition and Health (WATCH) v2.0**
 - Online tool to evaluate the condition and trajectory of a tidal wetland site to inform decision-making, restoration project prioritization, and the selection of restoration tactics
 - [WATCH 2.0](#)
- **NJ Wetland Reference Tool**
 - Online tool to compare common coastal wetland metrics of selected wetland(s) to reference wetlands to determine relative condition
 - [NJ Wetland Reference Tool](#)
- **Mitigation Technical Manual & A Guide to Wetland Types in NJ with eFQA Metrics**
 - Provide descriptions of wetland types using NVC groups, classifications and a way to evaluate their condition using an ecoregional floristic quality assessment condition threshold scoring system
 - [Mitigation Technical Manual](#)
 - [A Guide to Wetland Types in NJ with eFQA Metrics](#)