The NJ Meadowlands: Restoring for the Future
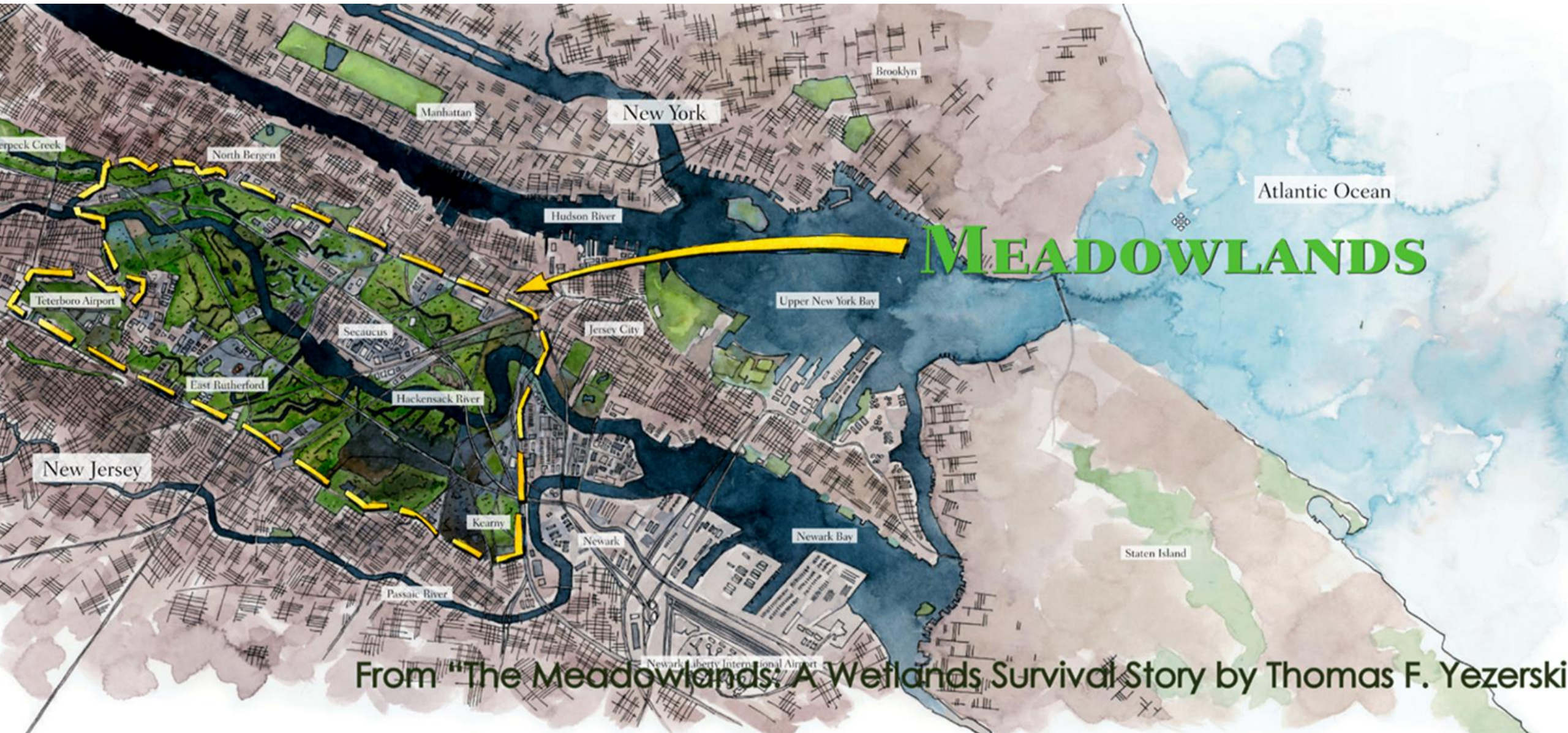
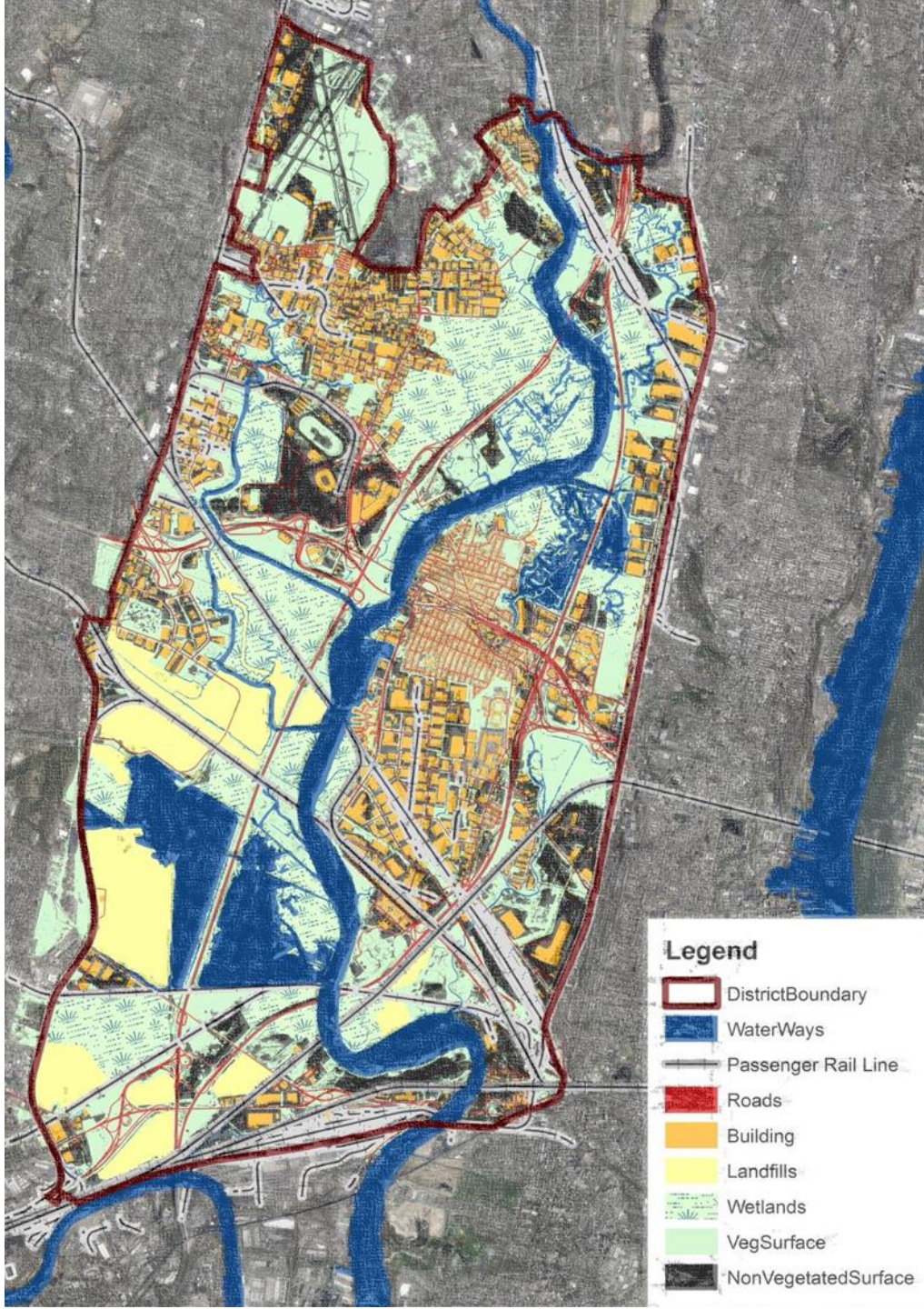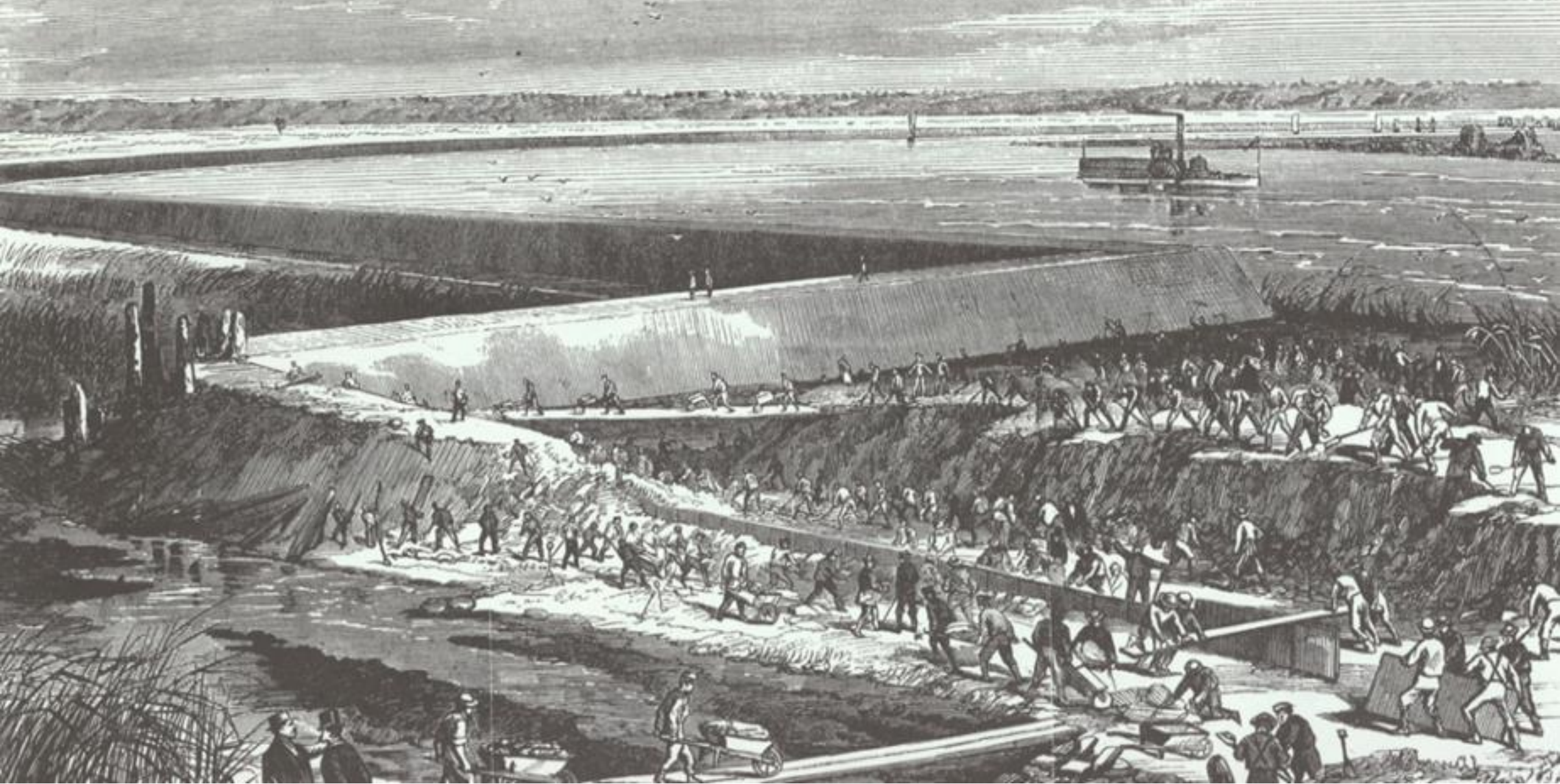From "The Meadowlands: A Wetlands Survival Story by Thomas F. Yezerski

Meadowlands Research & Restoration Institute

"to protect the delicate balance of nature"

Legend
- DistrictBoundary
- WaterWays
- Passenger Rail Line
- Roads
- Building
- Landfills
- Wetlands
- VegSurface
- NonVegetatedSurface

"frustrate the tide and the ubiquitous muskrat"

Legend
- Wetlands
- Water
- Upland
- Study Area Boundary
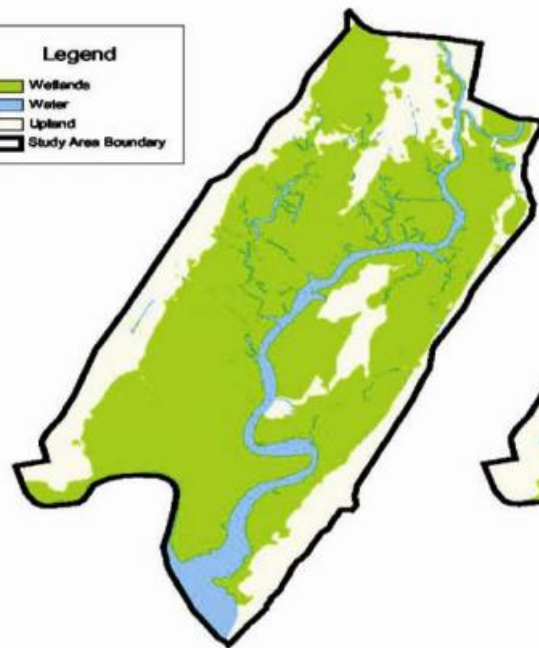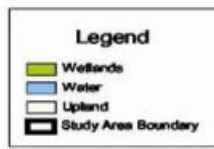
1889

1953/54

1966

1976

1984/85

1995

"The Hackensack Meadows are not at the present time of significance to fish or wildlife."
- USFWS letter to the USACE, 1962

1980s (277 ac)
DeKorte Park Restoration
Bellman's Creek Marsh Mitigation
Carpet Mountain Mitigation
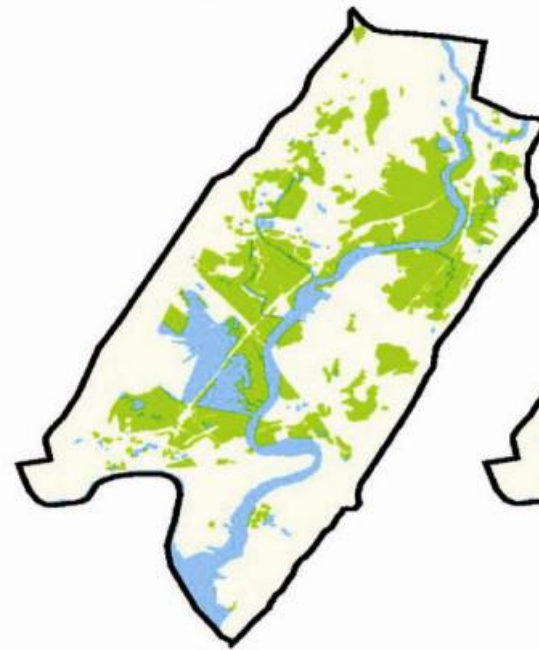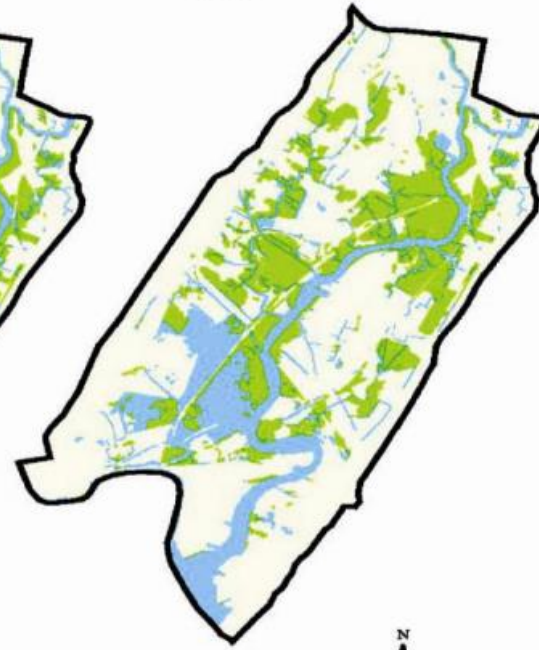Cromakill Mitigation
Eastern Brackish Mitigation
Mill Creek Marsh Mitigation
Vince Lombardi Mitigation
Western Brackish Marsh Mitigation

1990s (308 ac)
Bellemeade Mitigation
Eighty Assoc. Wetland Mitigation Site
Harrier Meadow Wetland Enhancement
Hess Mitigation Site
Marsh Resources I & II Mitigation Bank
Pan Am Freshwater Wetland Mitigation
Russo Ponds Mitigation Site
Skeetkill Creek Marsh Mitigation Site

2000s (238 ac)
Encap Wetland Mitigation Site
FD&P Wetland Mitigation
Franks Creek Mitigation Site
Hudson County Improvement Authority
Mill Creek Wetland Enhancement Site
NJSEA Wetland Mitigation
Norfolk Southern Railway Company
Secaucus High School Wetland Enhancement
WLIB Radio Towers

2010s (306 ac)
Global Terminals Wetland Mitigation Site
Marsh Resources Phase III Mitigation Bank
NYS&W Railroad Mitigation Site
Richard P. Kane Freshwater Wetland Mitigation
Richard P. Kane Tidal Wetland Mitigation Bank
Rockefeller Group Development Mitigation Site

2020s (13 ac)
FAA Mitigation Site on Losen Slote

Currently being studied for mitigation/restoration (1268 ac)
Upper Penhorn Creek Marsh
Kearny Brackish Marsh
Kearny Freshwater Marsh
Sawmill Creek Wildlife Management Area
Losen Slote Park
Riverbend Wetland Preserve

Future Restoration (898 ac)
Anderson Creek Marsh
Laurel Hill Park Wetland
Losen Slote Creek Park
Meadowlark Marsh
Metromedia Marsh
Oritani Marsh
Richard P. Kane Natural Area

Other (453 ac)
Bellman's Creek Marsh
Mori Tract
Petrillo Tract
Secaucus Tract
Steiners Marsh
Teterboro Woods

Remediation Sites (390 ac)
Berrys Creek Marsh
Eight Day Swamp
Walden Swamp

Preserved (265 ac)
Hawk Property
Kingsland Impoundment
Lyndhurst Riverside Marsh Preserve
Mehrhof Pond & Park
Murray Hill Parkway Properties
River Barge Park
Schmidt's Woods
Snipes Park

Landfill Remediation/Restoration:
1-E Landfill
Erie Landfill
Keegan Landfill
Kingsland Landfill
Malanka Landfill

THE GOOD

Proper hydrology and protection from herbivory –
    successful plant survival and habitat rehabilitation

Diversity of plants will volunteer given suitable site conditions

Permitting delays allow for more research –
    resulting in better designs and success

Innovative features mimicking natural systems and use of natural materials (sand, wood, cobblestone) create more biodiversity

If invasives are eradicated before remediation/restoration, more biodiversity and less invasive maintenance needed into the future

MORE GOOD

Water quality has improved

Landfills have closed and contaminated sites continue to be remediated

Populations are more abundant and biodiversity continues to increase:

> Fish
> Diamondback terrapin
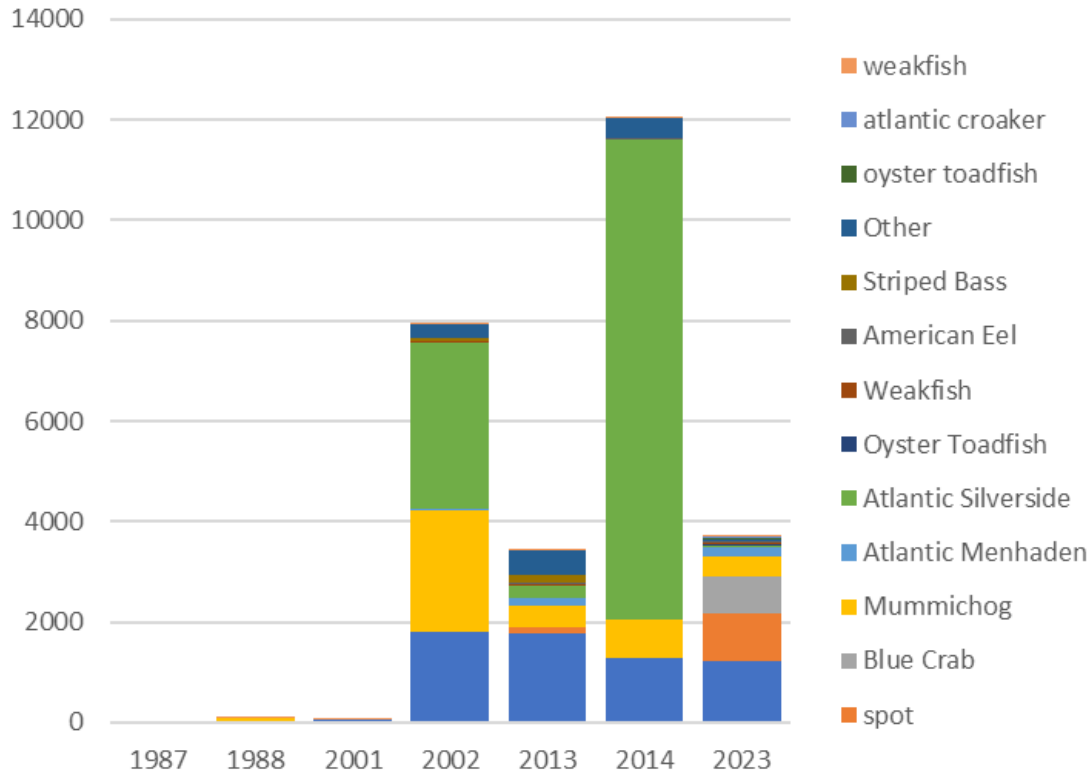> Songbirds
> Raptors
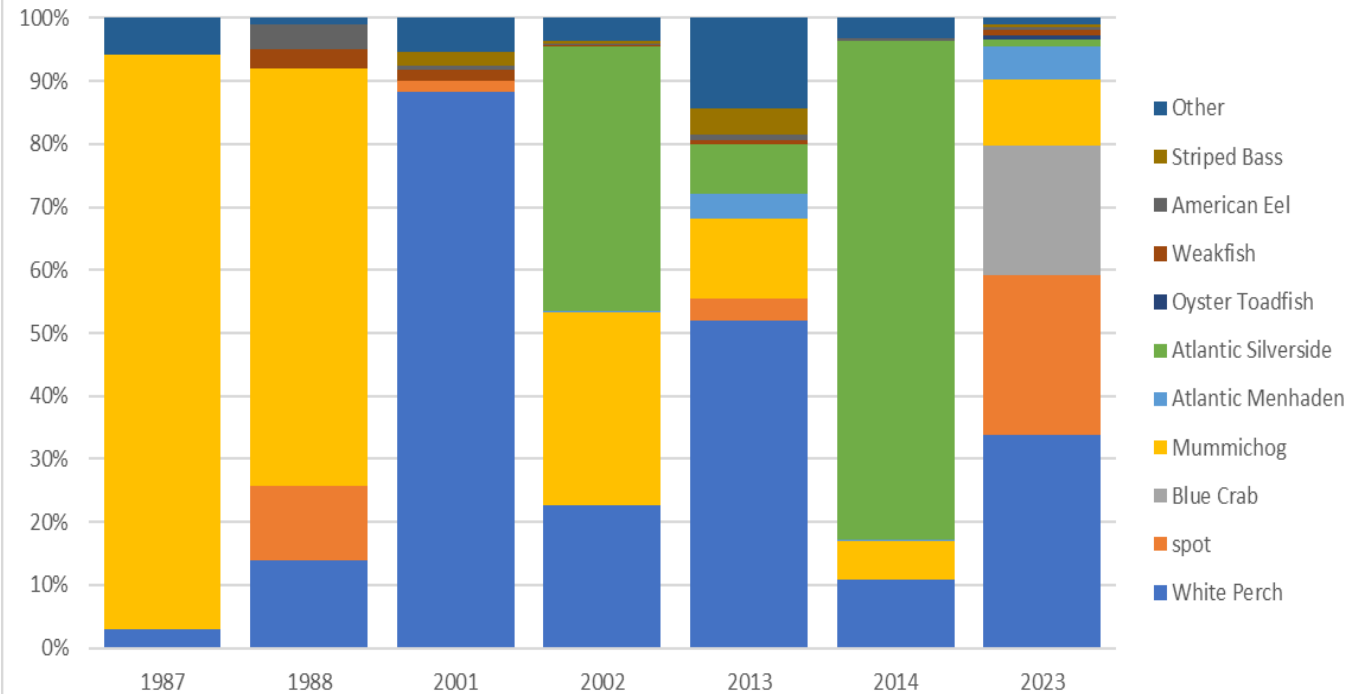> Secretive Marsh Birds
> Bats
> Atlantic Coast Leopard Frogs

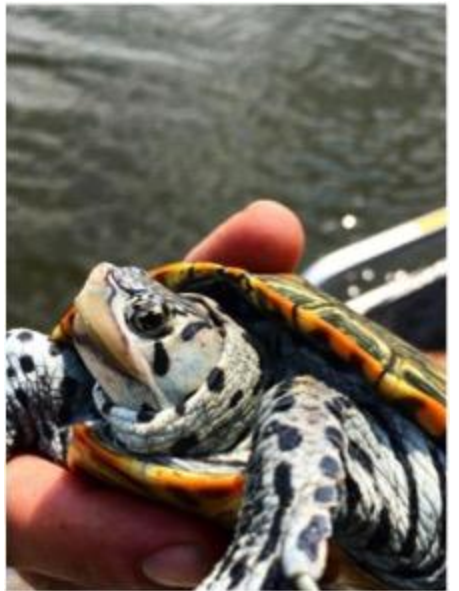# Meadowlands Fisheries Survey
4th Iteration, Summer Collection

Diamondback Terrapin Mark-and-Recapture Study

Date	Total # Terrapins	# Re-Captures	Total # Tagged
2009	128	1	127
2010	247	40	192
2011	432	73	357
2012	277	54	223
2013	166	41	125
2014	NO TRAPPING		
2015	NO TRAPPING		
2016	91	8	0
2017	22	4	0
2018	NO TRAPPING		
2019	57	6	0
2020	32	0	0
2021	508	35	184
TOTALS	**1960**	**262**	**1208**

Tag Number	Original Capture	Latest Capture	YAL
50188	7/30/2009	6/12/2023	13.88
84069	7/30/2009	6/12/2023	13.88
27545	7/20/2010	8/3/2023	13.05
14556	7/20/2010	6/22/2023	12.93
10234	8/17/2010	7/13/2023	12.91
70261	6/8/2011	9/14/2023	12.28
31951	7/20/2011	9/14/2023	12.16
33390	7/6/2011	8/31/2023	12.16
33333	7/6/2011	8/17/2023	12.12
34016	7/20/2011	8/31/2023	12.12
70272	8/11/2011	9/14/2023	12.10
46156	8/24/2011	8/31/2023	12.03
69806	8/24/2011	8/31/2023	12.03
34065	8/11/2011	8/17/2023	12.02
69320	8/11/2011	8/3/2023	11.99
33366	7/30/2009	7/2/2021	11.93
69336	8/11/2011	7/13/2023	11.93
69367	8/24/2011	7/20/2023	11.91
69399	8/24/2011	7/13/2023	11.89
35580	8/25/2009	7/2/2021	11.86
39270	7/30/2009	6/4/2021	11.85
69326	6/12/2012	8/3/2023	11.15
70204	6/26/2012	8/17/2023	11.15

Meadowlands Bird Banding Recaptures

Band Number	Species	Encounter						Total Encounters	Max Y.A.L
		1	2	3	4	5	6		
1352-22858	Northern Mockingbird	10/13/2019	9/25/2020	4/10/2023	5/22/2023	10/18/2023		5	4.02
2210-67602	Yellow Warbler	5/6/2020	7/8/2021	5/13/2022	8/2/2023			4	3.24
2891-46422	Gray Catbird	5/21/2020	9/1/2020	7/25/2023				3	3.18
2831-47518	Song Sparrow	5/13/2020	6/1/2021	6/25/2021	7/15/2021	5/1/2022	6/20/2023	6	3.10
2891-31891	Redwing Blackbird	6/9/2020	5/22/2023	7/7/2023				3	3.08
2891-46455	Gray Catbird	6/17/2020	5/3/2021	7/7/2023				3	3.05
1412-72941	Northern Mockingbird	9/29/2020	10/11/2023					2	3.03
2891-46498	Gray Catbird	7/23/2020	5/25/2021	7/25/2023				3	3.01
2880-62097	Yellow Warbler	5/25/2020	6/29/2020	6/12/2021	5/22/2023			4	2.99
2891-46441	Gray Catbird	6/9/2020	5/13/2021	6/17/2022	5/31/2023			4	2.98

Motus Tower
(Motus – Latin for movement)

"One of the central objectives of Motus is to enable conservation and ecological research by providing a way to track the movement of animals." – Motus.org

Deployed 19 nanotags

       7 Gray Catbird (GRCA)
       12 Song Sparrow (SOSP)

7 GRCA and 5 SOSP detected

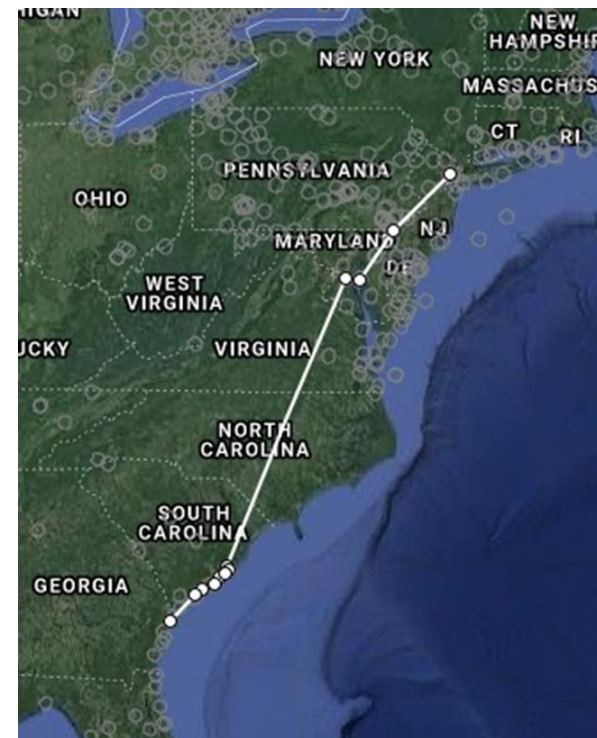80 nanotags in 2022
    American Robin
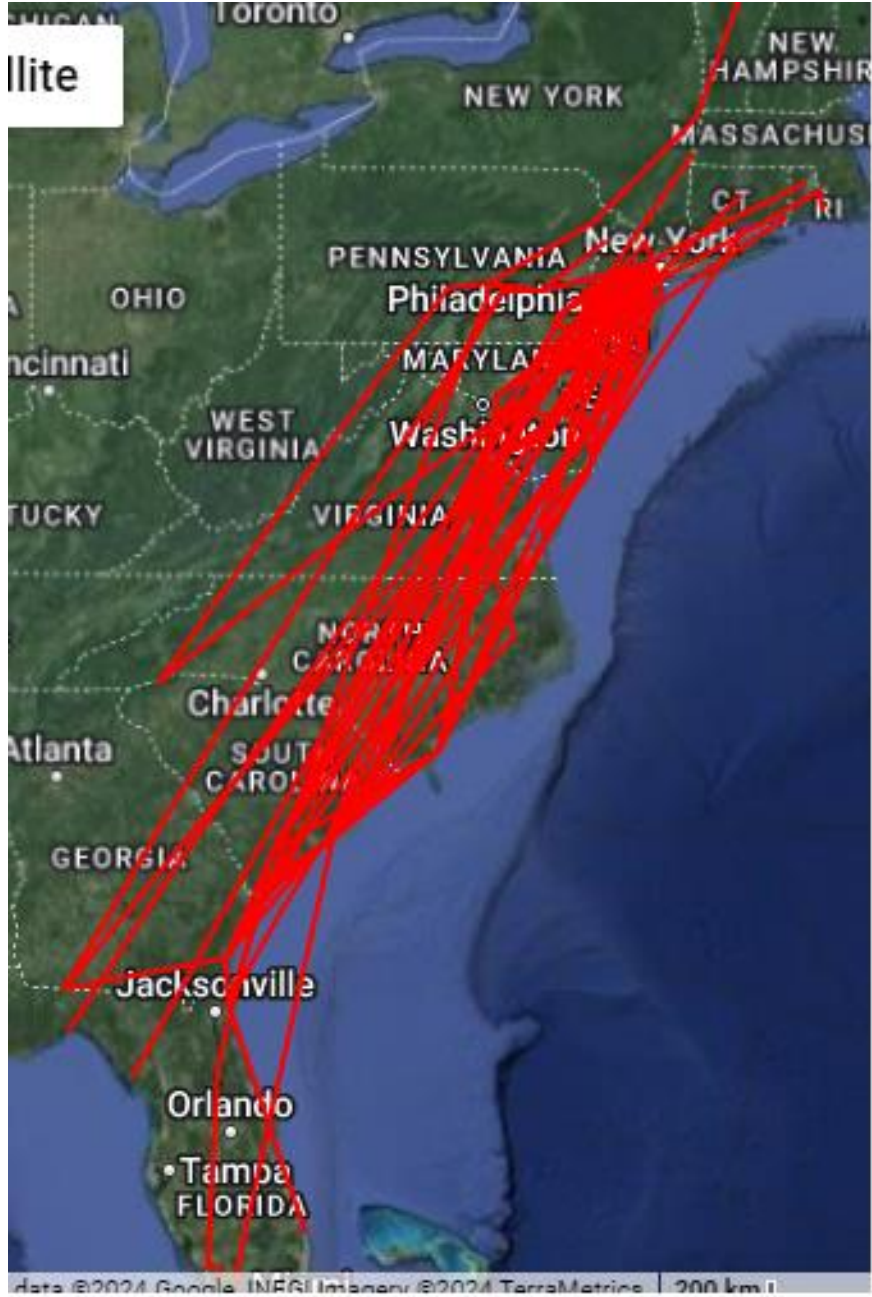   Gray Catbird
    Song Sparrow
    Savannah Sparrow
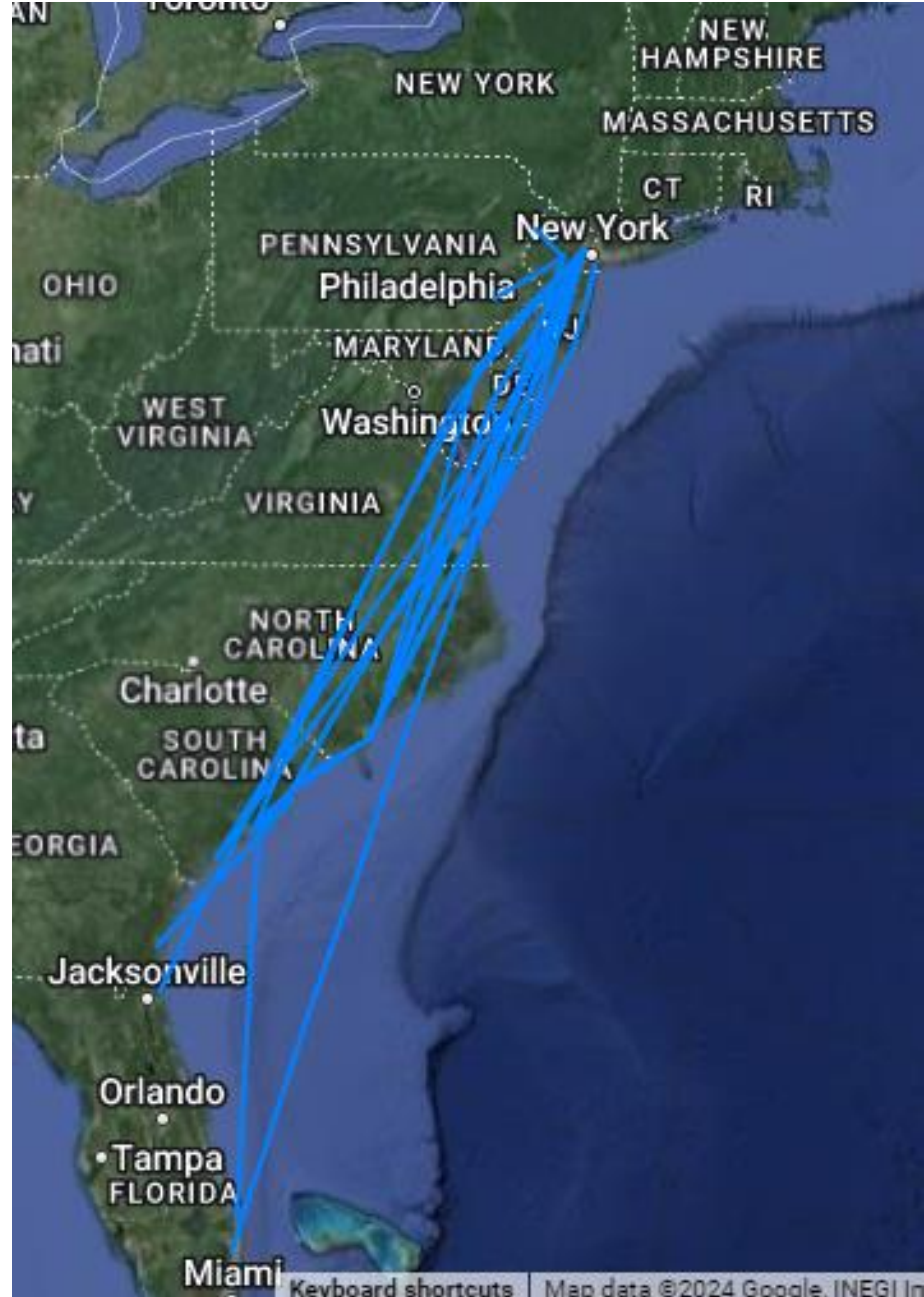   Northern Waterthrush
    Yellow-rumped Warbler
    Palm Warbler

GRAY CATBIRD

YELLOW WATER THRUSH

Acoustic Recording Units

Target

Rare or species of concern (~ 20 secondary targets)
- Atlantic Coast Leopard Frog
- Eastern Black Rail and other secretive marsh birds
- Tricolored Bat
- Saltmarsh Sparrow

2023

6 ARUs to assess presence/absence of cryptic, nocturnal and other hard-to-find wildlife

2024

21 ARUs to build robust wildlife dataset, with estimate of site-specific abundances to assist in making land use, management, and conservation decisions

THE BAD

Lack of understanding of site conditions: hydrology, soil substrate

Construction practices: over excavation, no herbivory protection, planting out of season, use of water control structures

Need for near-perpetual maintenance and management

Heavy reliance on maximizing functional uplift related to chosen assessment method rather than looking to assist recovery

THE UGLY

Development pressures continue

Highly engineered flood management protections are affecting viability of the wetlands

Control of invasive species unsuccessful – constant use of herbicide to "garden" sites

Wetlands are eroding; amount of open water continues to increase

Affect of 2023 Sackett v EPA Supreme Court decision

THE FUTURE

Meet challenges set forth in NJ's climate and coastal resiliency strategies: Protect areas threatened by climate change and continued human impact.

Incorporate stormwater as part of ecological system: not a waste product.

Nourish wetlands: build up rather than excavate out invasives and contaminated soils. Vegetated marshes are carbon sinks versus mudflats which are carbon sources.

Improve regulatory coordination: work with federal and other state agencies to stop issuing wetland fill permits.

Restore habitat for species of concern: create more sandy habitat for coastal species.

Use nature-based designs: avoid creating more infrastructure and maintenance needs.

Highlight 20 years of scientific studies: despite Superfund status, the Meadowlands is not an ecological trap/attractive nuisance. There is little to no risk of recontamination to wildlife after restoration.

THE FUTURE

**Brackish Marsh/
Sandy Habitat Nourishment**

Freshwater Marsh Restoration

**Forested Wetland Enhancement
and Preservation**

**Landfill/Grassland Remediation
and Reclamation**

Losen Slote

Kane Natural Area

Harrier Meadow and Erie Landfill

Kingsland Impoundment

Anderson Creek Marsh

Saw Mill Creek WMA

Kearny Freshwater Marsh

Legend

☐ District

▮ Site

Brackish Marsh Restoration

Renourish marshes, increase blue carbon storage, create sandy habitats for T&E and species of concern
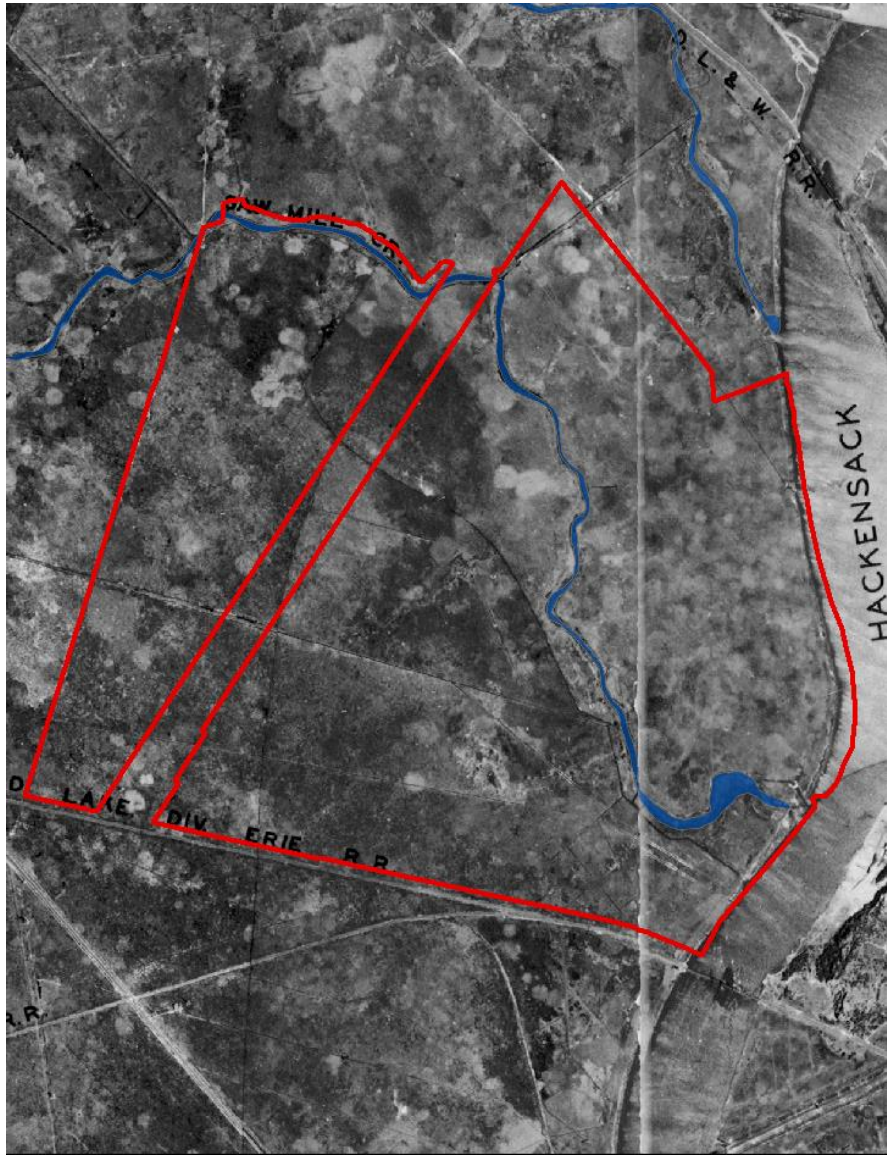
1930

2024

Marsh Nourishment

Living Shoreline

Large Woody Debris

Freshwater Marsh Restoration

Renourish marshes, create sandy and woody debris habitat, improve public access

Floating Islands

Closed Landfills

Create coastal marshes and grasslands
Increase blue and terrestrial carbon sequestration
Preserve and improve T&E habitat
Create better public access

OBSERVATION DECK

MARSH VIEWING ACCESS/KAYAK/ CANOE LAUNCH

PAVED WALKING BIKING PATH

FOOTBRIDGE

PAVED WALKING BIKING PATH

WILDLIFE PRESERVATION AREA

HIGHEST POINT/ OBSERVATION POINT PAVILION WITH BENCHES & EDUCATION KIOSK

FUTURE POND AREA

PARKING/ VISTA & EDUCATION KIOSK

OBSERVATION DECK

GRAVEL TRAIL

PAVILION WITH BENCHES

PASSIVE RECREATION
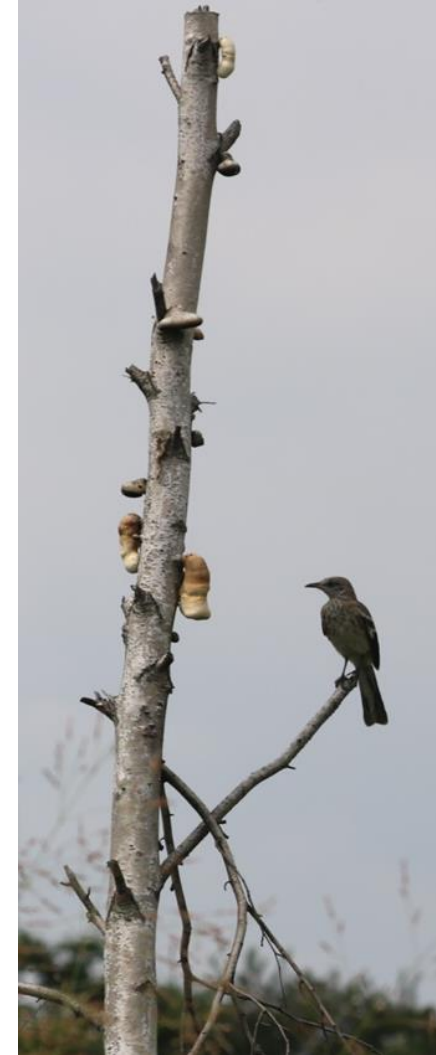
MARSH VIEWING ACCESS/PIER

RAIN GARDENS

PAVED WALKING BIKING PATH

ACTIVE RECREATION

PARKING

Forest Restoration

Increase terrestrial carbon sequestration & reduce flooding in neighboring areas, provide better public access

New Jersey Sports & Exposition Authority
Meadowlands Research and Restoration Institute

https://arcg.is/1KKTqG0

https://www.youtube.com/watch?v=dn8oVCLhi8E

https://vimeo.com/185887996

Terry Doss, tdoss@njsea.com