

# Resilience Planning and Actions in Support of NWS Earle

## 2024 Climate and Coastal Resilience Conference

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March 13, 2024



# Our Speakers

*Nicholas Ginther*, Community Planning and Liaison Officer, NWS Earle  
*Harriet Honigfeld*, Supervising Planner, Monmouth Co. Division of Planning  
*Amber Mallm*, Environmental Specialist, Monmouth Co. Division of Planning  
*Karen Keene*, Director of Development and Communications, Monmouth Conservation Foundation  
*Bridget Neary*, Senior Planner, Monmouth Co. Division of Planning

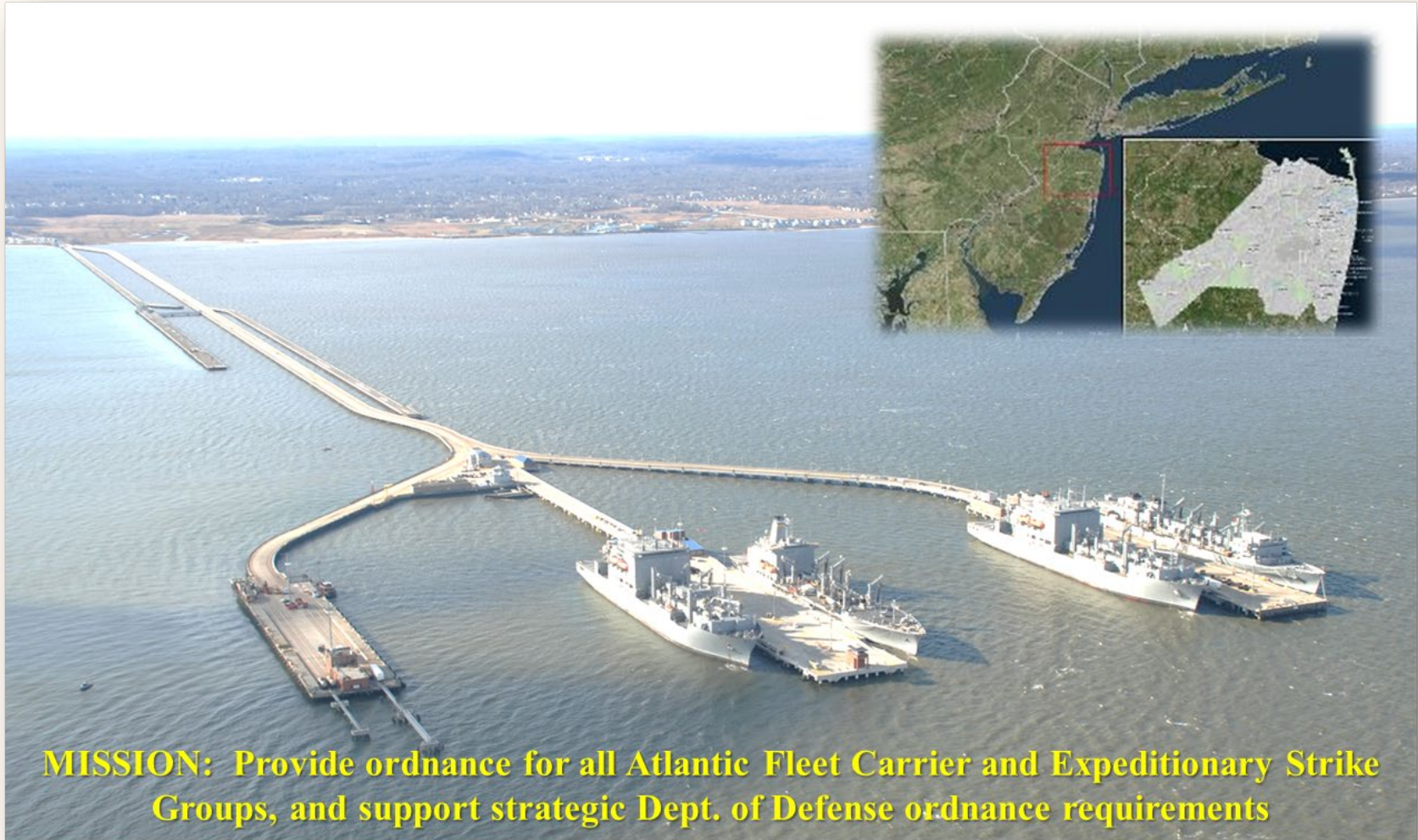
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**March 13, 2024**





# Naval Weapons Station Earle



**MISSION:** Provide ordnance for all Atlantic Fleet Carrier and Expeditionary Strike Groups, and support strategic Dept. of Defense ordnance requirements





# Navy Mission Under Pressure



Another local base, Fort Monmouth, closed in 2011 due to BRAC process.

Encroachment is the term used in the DoD to describe the types of external pressures military missions and operations face that can impact success.

Encroachment planning review and community engagement helps to prevent incompatible development in surrounding communities & protect Navy mission.

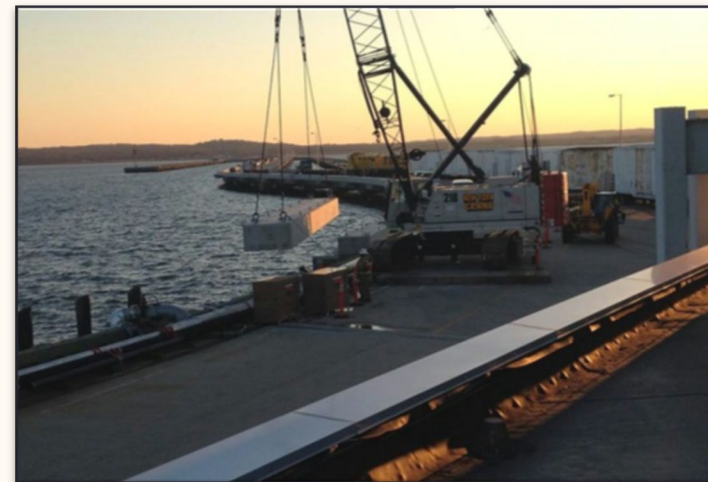
Climate change threats pose a major encroachment to the mission at NWS Earle:

- Sea Level Rise & Coastal Erosion
- Storm Surge & Flood Vulnerability
- Stormwater Storage Capacity
- Wildfire Risk on 11,851 Acres
- Energy Infrastructure & Water Supply
- Strategic Road & Rail Transportation Corridor Access (STRAHNET)





# Superstorm Sandy - \$50M in Damage





# Community Planning Efforts



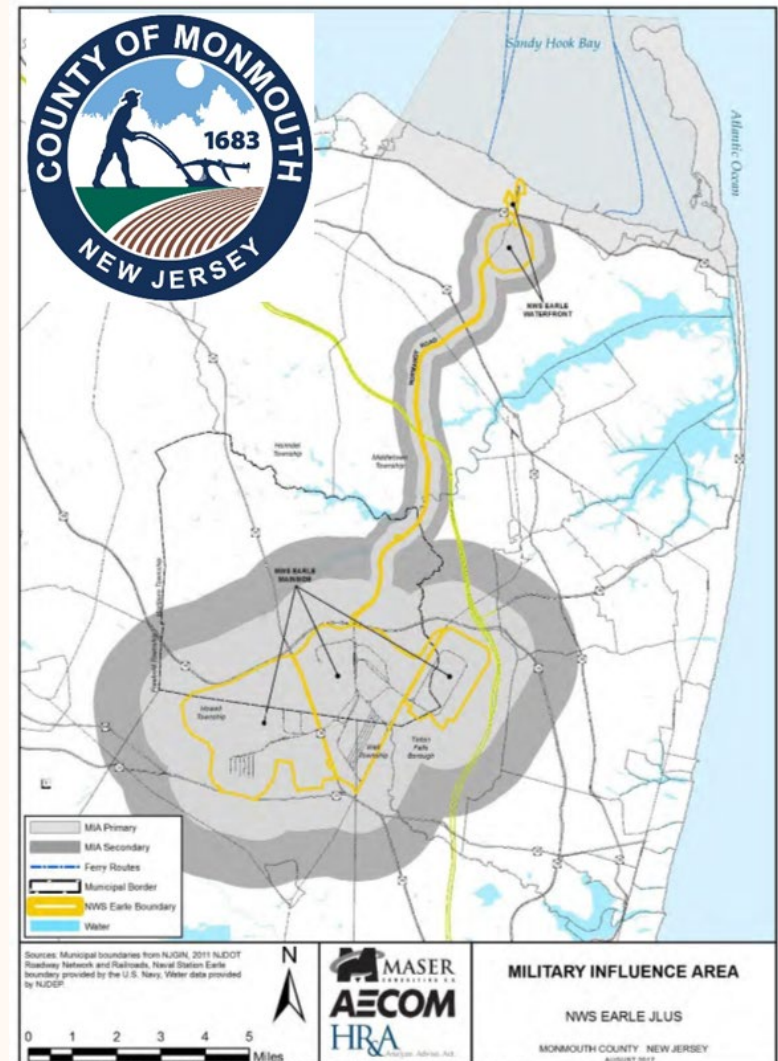
11,851 acres of land in 5 different municipalities in Monmouth County. Operates over 85 miles of rail and 2.9-mile pier complex.

Employs a total combined workforce of over 1,150 persons, with 280 full-time residents.

Our primary and secondary Military Influence Areas (MIA) around the installation, including the operational waters and shipping channels in Sandy Hook Bay established via the JLUS.

Workforce commutes to the site from across the state, including New York and Pennsylvania.

Wide-ranging mission and economic impacts due to the effects of climate change and development pressure.



# Overview of Monmouth County's NWS Earle-related Resilience Efforts

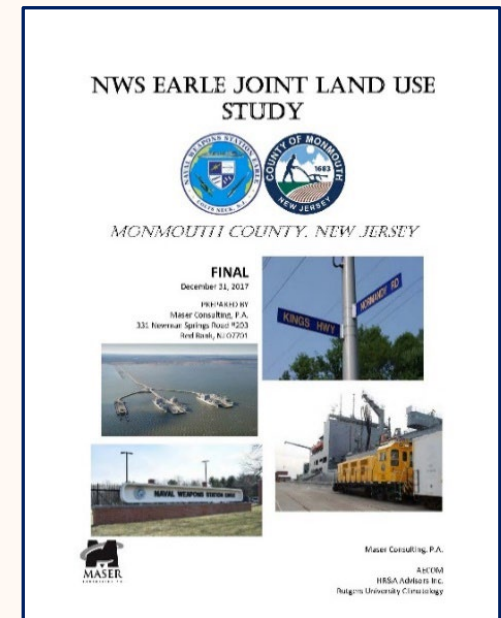
- Joint Land Use Studies
- Coordination with Other Climate and Coastal Resilience Projects
- Land Preservation
- Grants



# JLUS I - 2017 NWS Earle Joint Land Use Study

- Identified threats to the sustainable operation of the military base
- Described tactics to improve post-storm resiliency
- Analyzed compatible and incompatible land uses in 13 municipalities
- Sought input from 3 public/professional advisory groups

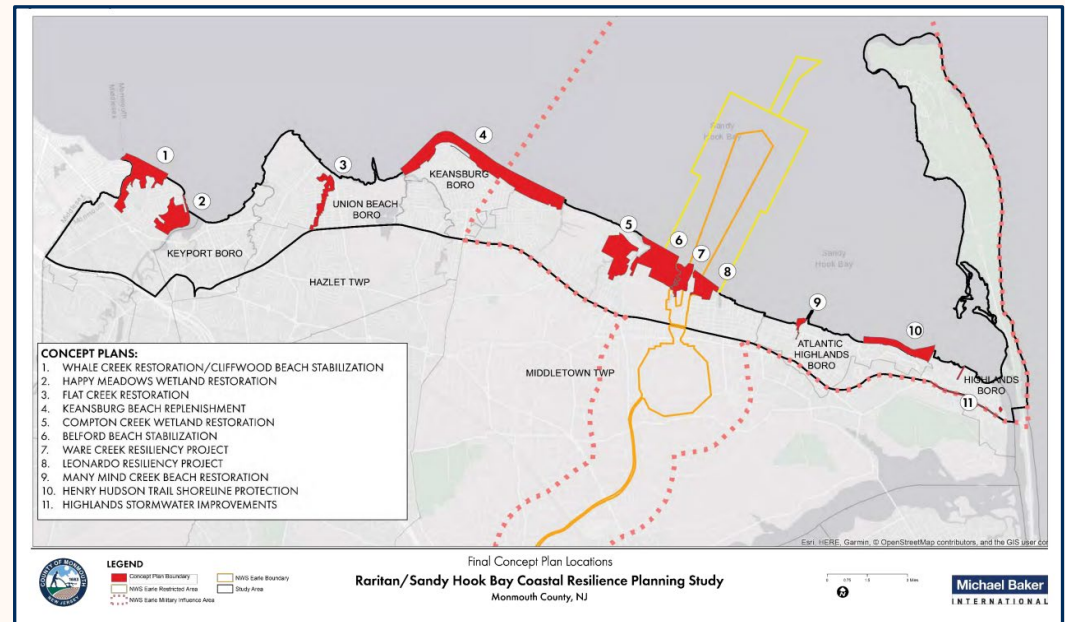
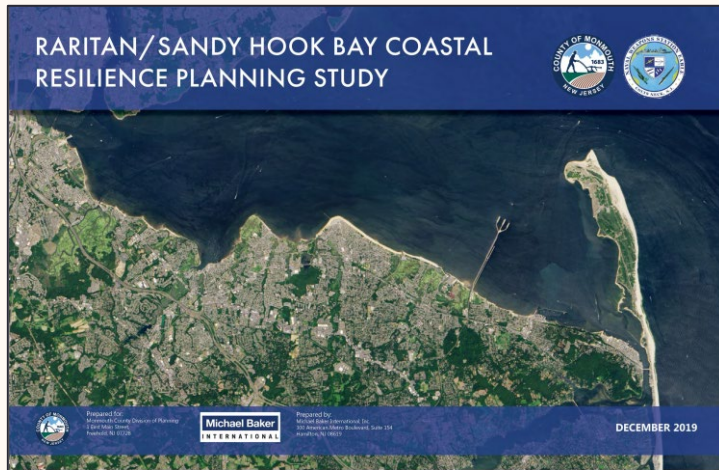
LC/OS	Land Conservation/Open Space	More Compatible
MHP	Mobile Home Park Residential	Less Compatible
ML7	Moderate and Low Income Housing	Less Compatible
ML8	Moderate and Low Income Housing	Less Compatible
NC	Neighborhood Commercial	Conditionally Compatible*



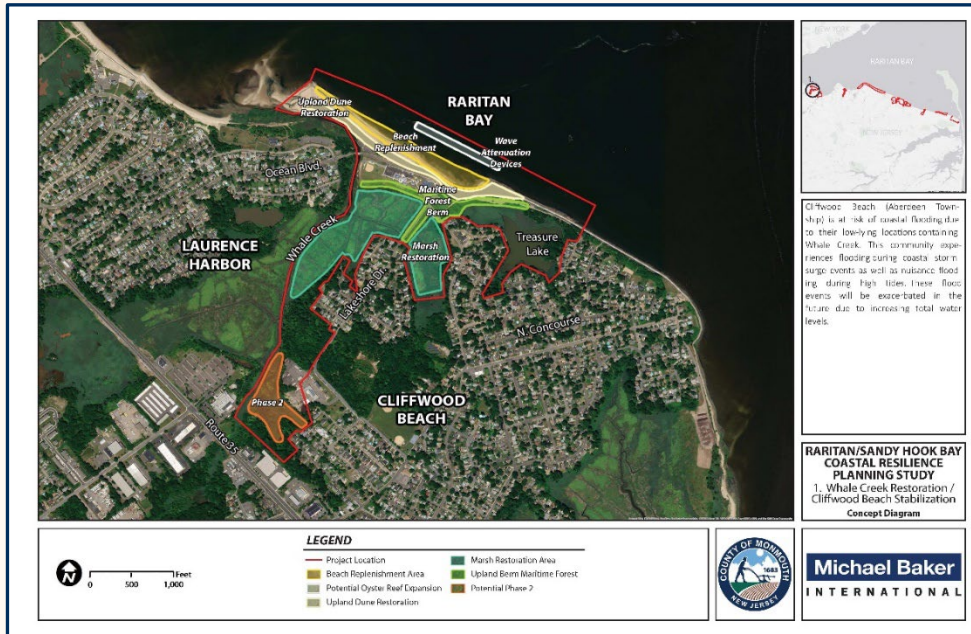


# JLUS II - 2019 Raritan/Sandy Hook Bay Coastal Resilience Design Study

- Identified 11 sites along the Bayshore for ecological restoration and natural solution implementation
- Evaluated suggested sites using a weighted GIS model
- Included general concept plans and proposed plantings



# JLUS II Continued



## RARITAN/SANDY HOOK BAY COASTAL RESILIENCE PLANNING STUDY PROJECT OVERVIEW

### Planning For Resilience in the NWS Earle Community

The Raritan/Sandy Hook Bay Coastal Resilience Planning Study (Study) continues the work of the 2017 Joint Land Use Study for Naval Weapons Station (NWS) Earle. The purpose of this Study was to select coastal resilience projects that could improve sustainability and resiliency from current and future coastal hazards and impacts of sea level rise for NWS Earle facilities, navigational channels and military local US Army Corps of Engineers (USACE) projects, and the surrounding Bayshore municipalities.

The Study Area includes the entire Monmouth County southern Raritan/Sandy Hook Bayshore, north of NJ Route 36, between the western county boundary at Cliffwood Beach and Gateway National Seashore-Sandy Hook Unit. The Study Area crosses eight municipalities: Aberdeen Township, Keyport Borough, Union Beach Borough, Hazlet Township, Keansburg Borough, Middletown Township, Atlantic Highlands Borough and Hook Bayshore, north of NJ Route 36, between the western county boundary at Cliffwood Beach and Earle maintained navigational channels; and a number of proposed and existing USACE shore protection project sites are located within the Study Area.

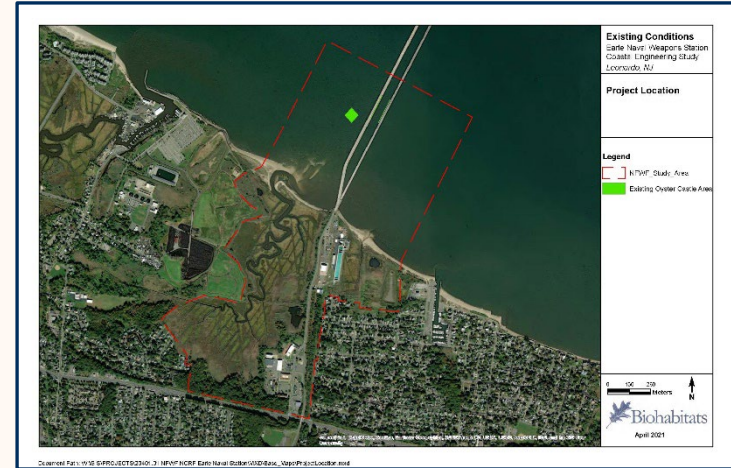
The Study Project Team consisted of staff from the Monmouth County Division of Planning and the consulting firm of Michael Baker International, Inc. The study was funded through a grant from the Department of Defense, Office of Economic Adjustment.

### Study Area



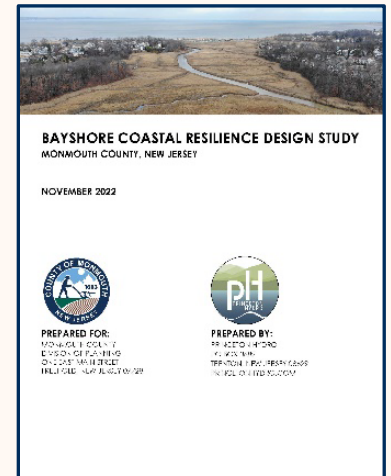
# JLUS II Implementation

- Many organizations are advancing the projects including NY/NJ Baykeeper, the Urban Coast Institute, NJ DEP, and Aberdeen Twp



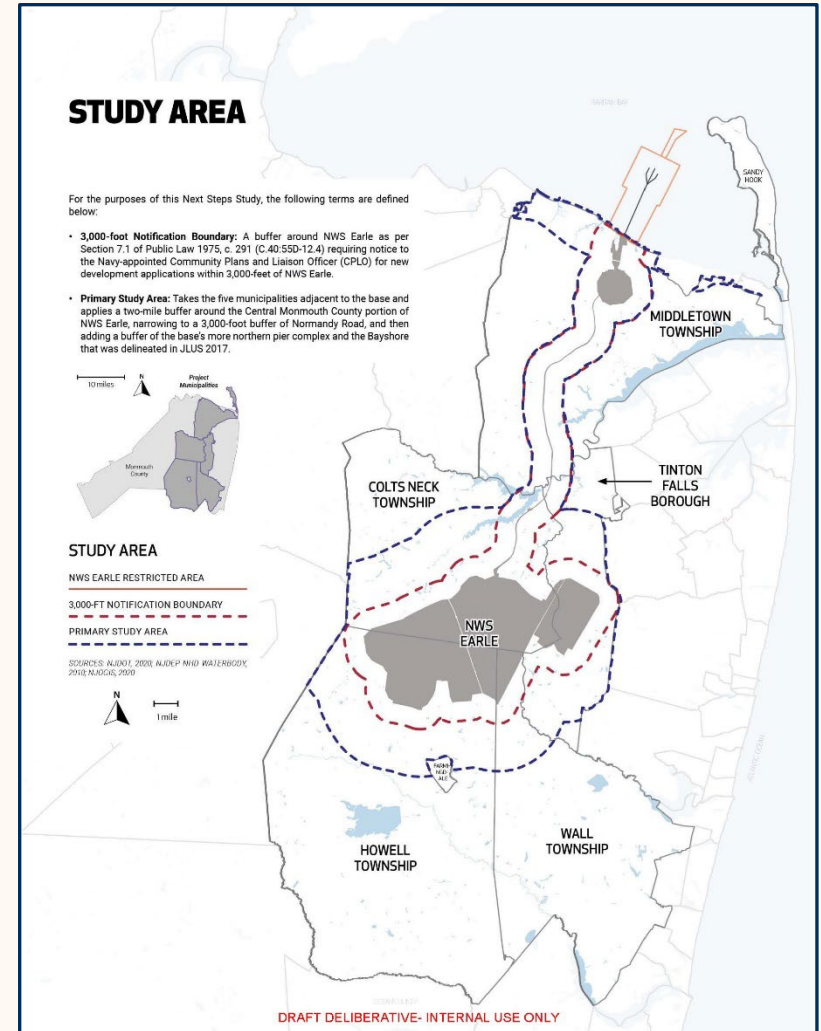
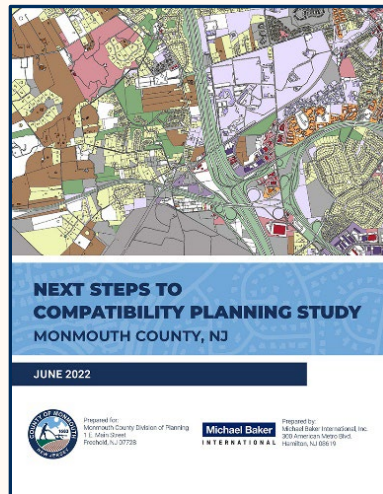
# JLUS III - 2022 Bayshore Coastal Resilience Design Study

- More in-depth field research, installed temporary tidal monitoring equipment
- More detailed designs for 2 of the 11 sites in JLUS II
- Focused on public parks, complementing ongoing projects
- Amber Mallm will discuss the study in greater detail after my presentation



# JLUS III - 2022 Next Steps to Compatibility Planning Study

- Further analysis of 5 municipalities immediately surrounding NWS Earle
- Paid particular attention to high-density development and land uses that draw large numbers of people close to the base
- Assembled toolbox of planning measures



# JLUS III Continued

- Warehouses and affordable housing biggest changes
- Toolbox Categories
  - Policy and Planning
  - Regulatory
  - Outreach, Coordination, Technical Assistance
- Appendices
  - Implementation Tracking Sheet
  - Model Ordinances
  - Sample REPI Deed of Easement
  - Meeting Materials
  - Municipal Zoning Maps
  - References

5.0 LAND USE SOLUTIONS MATRIX

5.0 LAND USE SOLUTIONS MATRIX

Land Use Solution	Feasibility	Applicable Area	Responsible Party	Timeline	Potential Partner(s)
POLICY AND PLANNING					
Master Plan integration	High	Municipal-wide	Municipal Planning Department, Municipal Planning Board	Immediate (1 year)	NWS Earle, Monmouth County
Wildfire and resilience integration	High	Municipal-wide	Municipal Planning Department	Immediate (1 year)	NWS Earle, Monmouth County, DoD Navy Region Mid-Atlantic, U.S. National Park Service, New Jersey State Park Service/New Jersey Forest Fire Service, DEP
Open space and farmland preservation integration	High	Municipal-wide	Municipal Planning Department, Municipal Planning Board	Immediate (1 year)	DoD Navy Region Mid-Atlantic, NWS Earle, Monmouth County, Monmouth Conservation Foundation, State of New Jersey Department of Agriculture's State Agriculture Development Committee, DEP, Municipal Agricultural Advisory Committees, Municipal Open Space Committees
Expand the analysis in this study to the other municipalities in JLUS 2017's delineated Military Influence Area	Medium	Other municipalities within JLUS 2017's delineated Military Influence Area	Monmouth County	Short Term (1 – 3 years) – depending on DoD funding	NWS Earle, DoD Navy Region Mid-Atlantic
Partner with Monmouth County, Monmouth Conservation Foundation, and the DoD on land preservation projects	Medium	Municipal-wide	Municipal Planning Department	Immediate (1 year)	DoD Navy Region Mid-Atlantic, Monmouth County, Monmouth Conservation Foundation, NWS Earle
Develop a corridor safety plan	Medium	Municipal-wide	Municipal Planning and Engineering Department	Short Term (1 – 3 years)	NWS Earle, Monmouth County, DOT, DoD Navy Region Mid-Atlantic, NJTPA
Adopt policies that support sound attenuation	Low	Municipal-wide	Municipal Planning Department, Municipal Planning Board	Long Term (3 - 5 years)	NWS Earle, Monmouth County
REGULATORY					
Update municipal subdivision regulations to enhance disclosure	High	Municipal-wide	Municipal Planning Department, Municipal Council	Immediate (1 year)	NWS Earle, Monmouth County

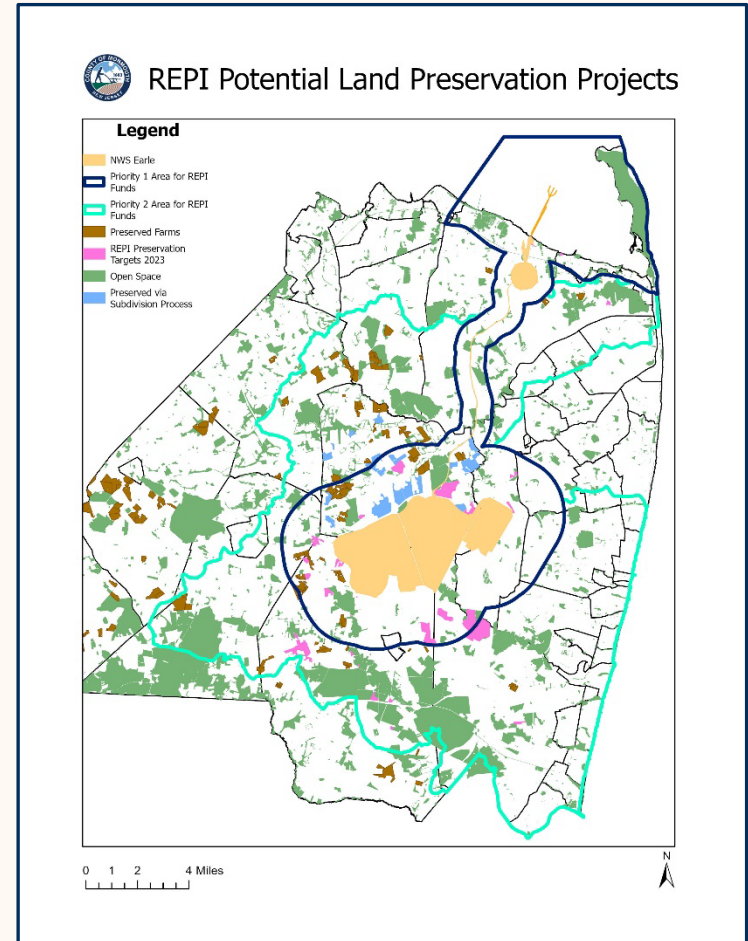
NEXT STEPS TO COMPATIBILITY PLANNING STUDY  
MONMOUTH COUNTY, NEW JERSEY

DRAFT DELIBERATIVE- INTERNAL USE ONLY



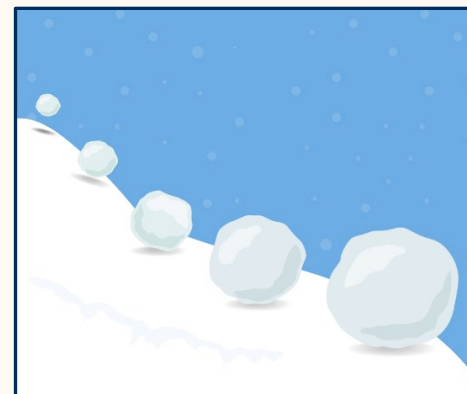
# REPI Land Preservation Grant

- Multi-year Agreement between Monmouth County, Monmouth Conservation Foundation and Navy
- Completed first two closings in the Fall of 2023
- Karen Keene will describe this program in greater detail later in the session
- Complementary farmland and open space preservation also occurring in project area



# Leveraging Grants

- \$592,500 in OLDCC grants awarded to Monmouth County for planning & design studies (10% in-kind match required)
- Implementation grants to county & partners include those from:
  - US Navy/REPI Land Preservation Program (\$3.2 million)
  - 2024 Carbon Sequestration Funds (\$666k)
  - 2022 REPI Challenge Program (\$1 million)
  - Office of Naval Research (\$2.95 million via 2 grants)
  - National Fish and Wildlife Foundation (\$776k)
  - National Defense Authorization Act (\$2.9 million)
  - Shared Services Agreement (\$1 million)
  - Municipal cost share funds (\$792k)





# What's Next and Lessons Learned

- Extend REPI Multi-year Agreement & add more \$
- Continue to support partners implementing JLUS studies
- Reapply to become a Sentinel Landscape
- Strengthen bridge between JLUS work and Community Rating System support program



# 2022 Bayshore Coastal Resilience Design Study



## BAYSHORE COASTAL RESILIENCE DESIGN STUDY MONMOUTH COUNTY, NEW JERSEY

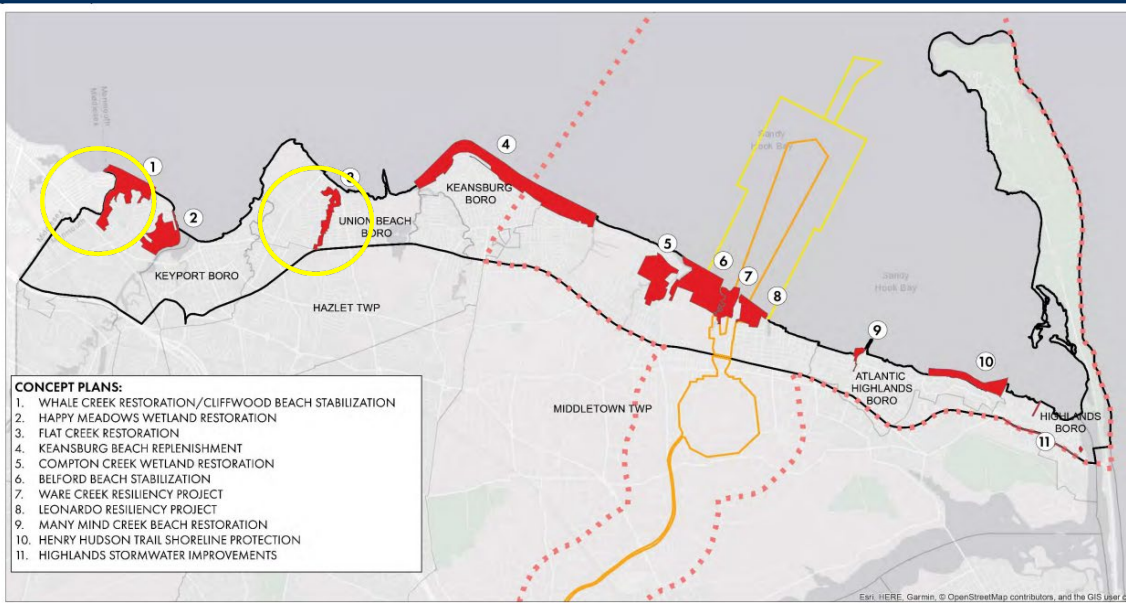
NOVEMBER 2022



**PREPARED FOR:**  
MONMOUTH COUNTY  
DIVISION OF PLANNING  
ONE EAST MAIN STREET  
FREEHOLD, NEW JERSEY 07728



**PREPARED BY:**  
PRINCETON HYDRO  
PO BOX 3689  
TRENTON, NEW JERSEY 08629  
PRINCETONHYDRO.COM



Final Concept Plan Locations  
**Raritan/Sandy Hook Bay Coastal Resilience Planning Study**  
Monmouth County, NJ

Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS User community

**Michael Baker INTERNATIONAL**



# Whale Creek, Aberdeen



Figure 1. Whale Creek aerial overview map.



# Flat Creek, Union Beach

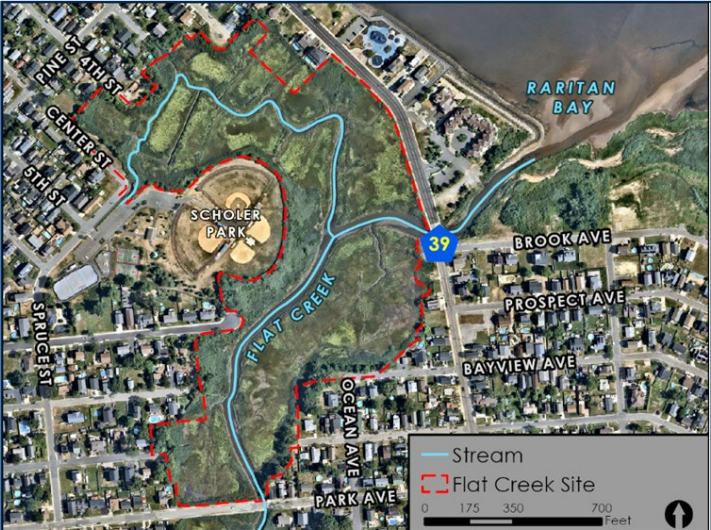


Figure 2. Flat Creek aerial overview map.



# Biological Benchmarks

- Plants identified
- Elevation recorded
- Plant community zones then categorized as low marsh, high marsh, or marsh border

Photograph 44: Bio-benchmark No.: BB-44



Photograph 45: Bio-benchmark No.: BB-45



# Hydrologic Data Collection

- Measured water levels throughout tide cycles
- Data reveals potential constriction at Whale Creek



Figure 5. Whale Creek monitoring well locations.

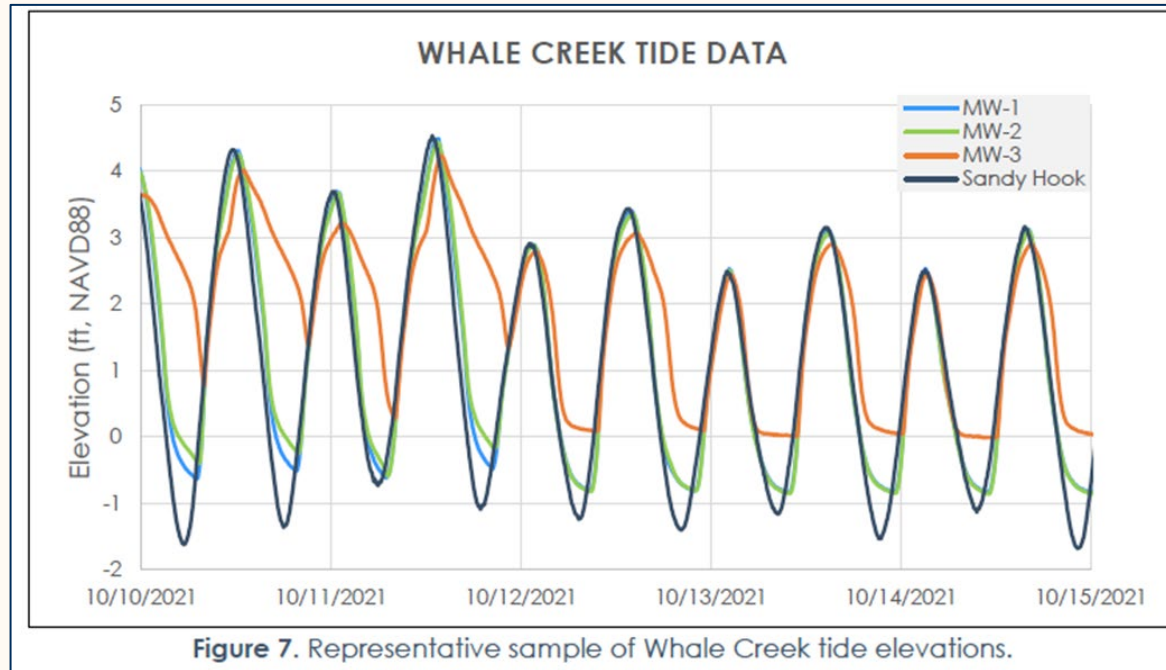
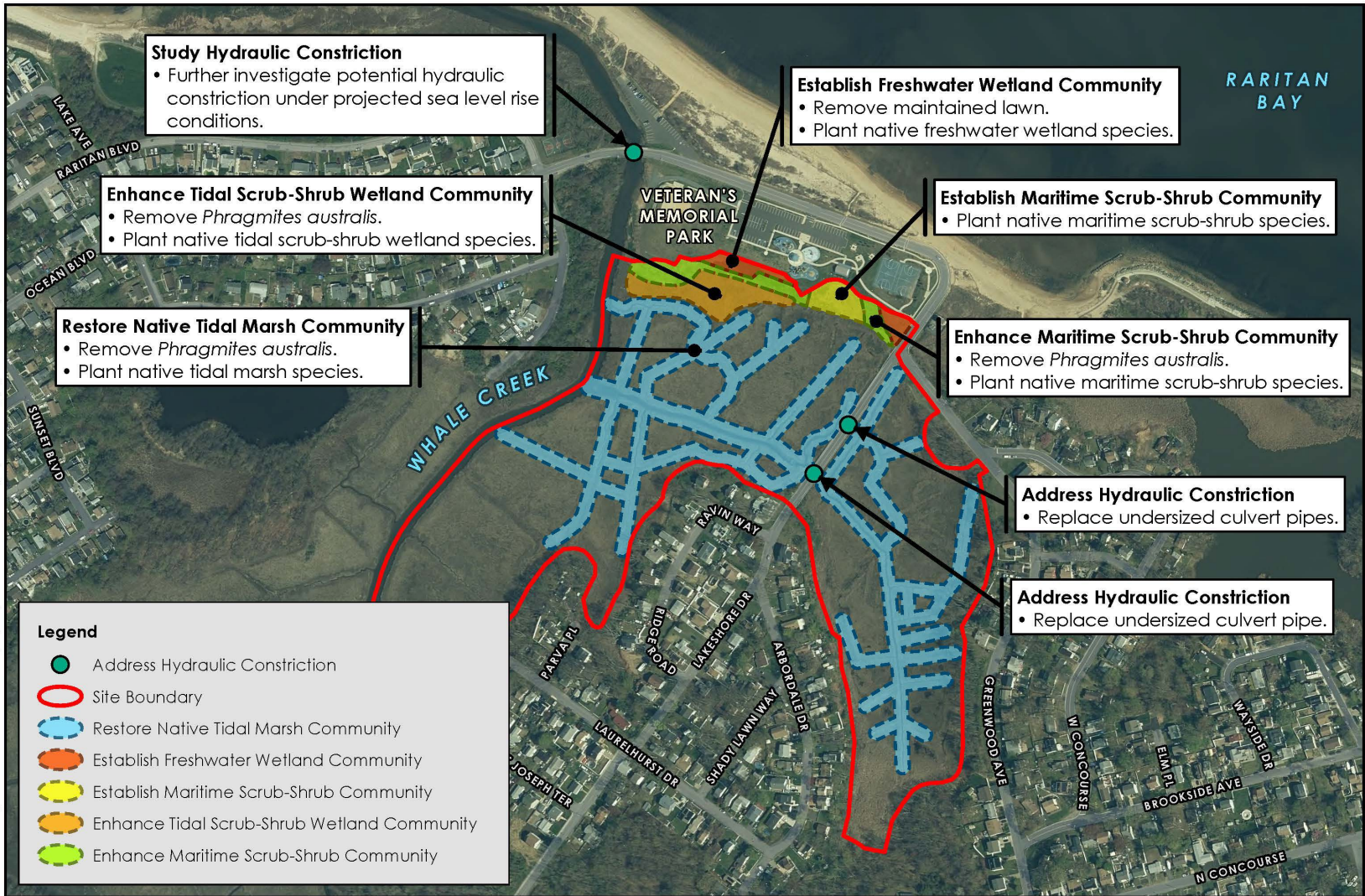


Figure 7. Representative sample of Whale Creek tide elevations.

File: F:\2022\Projects\2022001\GIS\APRX\All\_Maps.aprx: 7/28/2022, Drawn by cpollack, Copyright Princeton Hydro, LLC.



**Study Hydraulic Constriction**  
 • Further investigate potential hydraulic constriction under projected sea level rise conditions.

**Establish Freshwater Wetland Community**  
 • Remove maintained lawn.  
 • Plant native freshwater wetland species.

**Enhance Tidal Scrub-Shrub Wetland Community**  
 • Remove *Phragmites australis*.  
 • Plant native tidal scrub-shrub wetland species.

**Establish Maritime Scrub-Shrub Community**  
 • Plant native maritime scrub-shrub species.

**Restore Native Tidal Marsh Community**  
 • Remove *Phragmites australis*.  
 • Plant native tidal marsh species.

**Enhance Maritime Scrub-Shrub Community**  
 • Remove *Phragmites australis*.  
 • Plant native maritime scrub-shrub species.

**Address Hydraulic Constriction**  
 • Replace undersized culvert pipes.

**Address Hydraulic Constriction**  
 • Replace undersized culvert pipe.

**Legend**

- Address Hydraulic Constriction
- Site Boundary
- Restore Native Tidal Marsh Community
- Establish Freshwater Wetland Community
- Establish Maritime Scrub-Shrub Community
- Enhance Tidal Scrub-Shrub Wetland Community
- Enhance Maritime Scrub-Shrub Community

NOTES:  
 1. Concept design and site boundaries are approximate.  
 2. 2020 orthoimagery and roads obtained from the NJ Geographic Information Network (NJGIN) Open Data portal: <https://nigin.nj.gov/>



Map Projection: NAD 1983 2011 StatePlane New Jersey FIPS 2900 FT US

## WHALE CREEK CONCEPTUAL DESIGN

BAYSHORE COASTAL RESILIENCE DESIGN STUDY  
 ABERDEEN TOWNSHIP  
 MONMOUTH COUNTY, NEW JERSEY

**PRINCETON HYDRO**  
 SCIENCE DESIGN ENGINEERING  
[www.PrincetonHydro.com](http://www.PrincetonHydro.com)

File: P:\2022\Project\20220101\GIS\APRA\_All\_Maps.aprx, 9/23/2022, Drawn by: bshivasan, Copyright Princeton Hydro, LLC.



**Establish Native Plant Communities**

- Remove *Phragmites australis* and root mat.
- Recontour grades to establish a gentle slope.
- Place one foot of sandy substrate.
- Plant native maritime scrub-shrub and tidal marsh species.

**Restore Native Tidal Marsh Community**

- Remove *Phragmites australis*.
- Plant native tidal marsh species.

**Study Hydraulic Constriction**

- Further investigate potential hydraulic constriction under projected sea level rise conditions.
- Impacts associated with the proposed pump station and sluice gate by the U.S. Army Corps of Engineers should be evaluated.

**Legend**

- Study Hydraulic Constriction
- Site Boundary
- Establish Native Plant Communities
- Restore Native Tidal Marsh Community

- NOTES
1. Concept design and site boundaries are approximate.
  2. Pump station and sluice gate proposed by the United States Army Corps of Engineers, "Hurricane Sandy Limited Reevaluation Report", June 2017.
  3. Roads obtained from the N.J. Geographic Information Network (NJGIN) Open Data portal: <https://njgin.nj.gov/>
  4. 2022 aerial imagery obtained from Nearmap.



## FLAT CREEK CONCEPTUAL DESIGN

BAYSHORE COASTAL RESILIENCE DESIGN STUDY  
UNION BEACH BOROUGH  
MONMOUTH COUNTY, NEW JERSEY

**PRINCETON HYDRO**  
SCIENCE DESIGN ENGINEERING

[www.PrincetonHydro.com](http://www.PrincetonHydro.com)

# Where are They Now?

## Aberdeen

- DPW considering installing tide valves to improve drainage
- Seeking permits for nature-based restoration
  - Rock sills to break wave energy
  - Beach replenishment
  - Potential dune expansion and planting

## Union Beach

- Continuing USACE project





# Who is Monmouth Conservation Foundation?



- Founded in 1977
- Acquires and preserves open space and farmland and conserves natural habitats throughout Monmouth County in support of outdoor recreation, agriculture, clean water, and wildlife for long-term sustainability
- An independent nonprofit organization that works with Monmouth County and its 53 municipalities
- MCF's vision is to lead conservation and education efforts to preserve and protect our natural environment, so all individuals and communities have access to and can benefit from open space and nature for generations to come



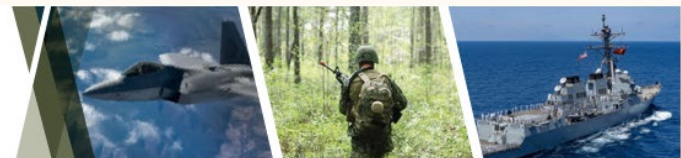
# REPI Land Preservation Grant

- Multi-year Agreement (MYA) between Monmouth County, Monmouth Conservation Foundation, and Navy
- Objectives:
  - Protect the safety, security, and resiliency of NWS Earle
  - Limit incompatible land uses around NWS Earle
  - Address climate change hazards
  - Preserve farms, open spaces, and natural habitats
- How to obtain these objectives?
  - Through the purchase of development rights via conservation easements



UNITED STATES DEPARTMENT OF DEFENSE

**REPI** READINESS AND ENVIRONMENTAL  
PROTECTION INTEGRATION PROGRAM

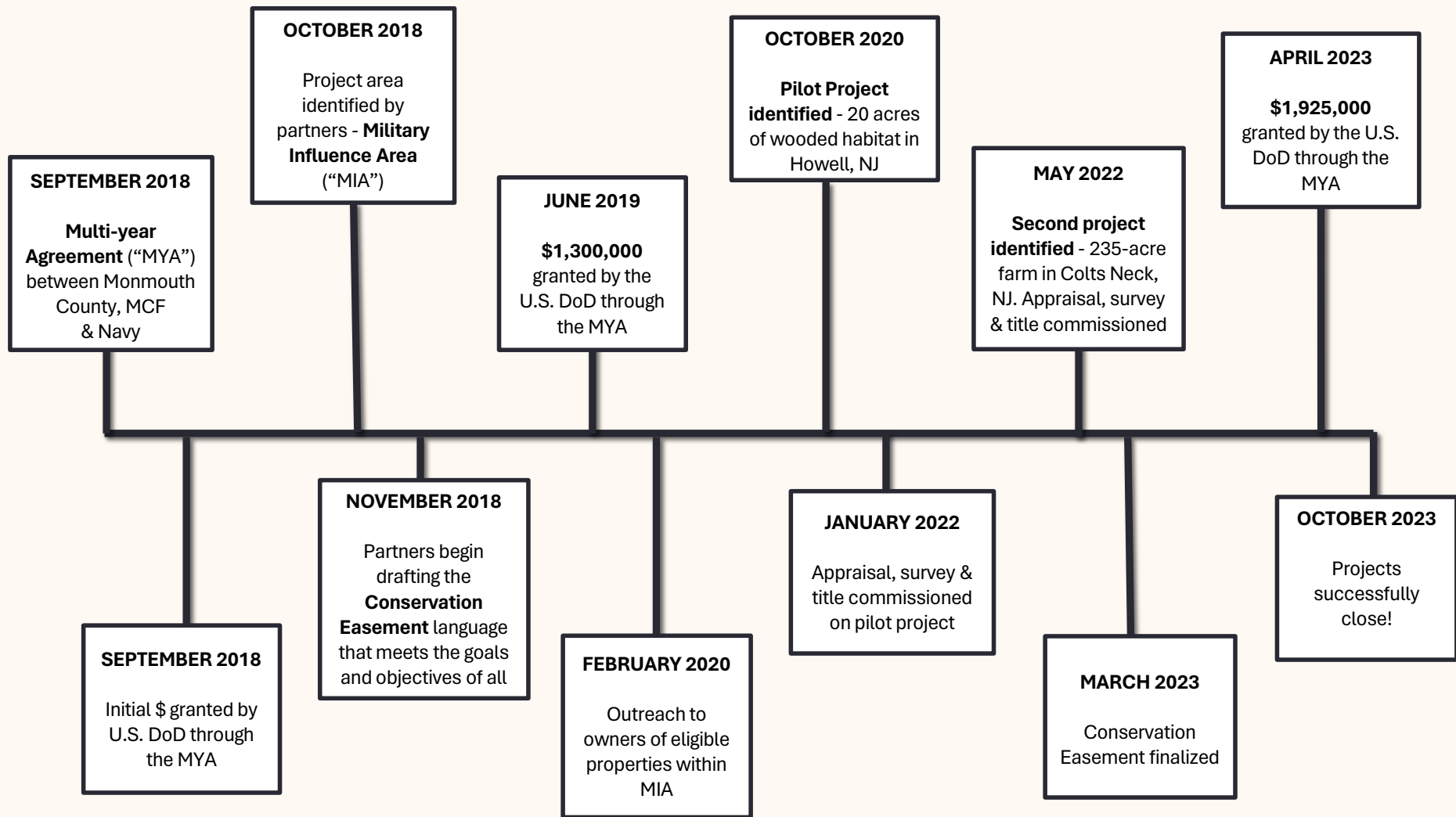


# What is a Conservation Easement?

- A voluntary land protection agreement between a private landowner and a land trust or a government agency
- Restricts certain land development, such as subdivision for residential or commercial activities
- A monetary value is associated with the sale/extinguishment of these development rights
- Permanently protects unique resources and conservation values found on a property – i.e., scenic, wildlife, agricultural, ecological, or recreational qualities
- Allows private landowners to retain ownership of their property
- Guarantees the land's conservation values will be protected forever

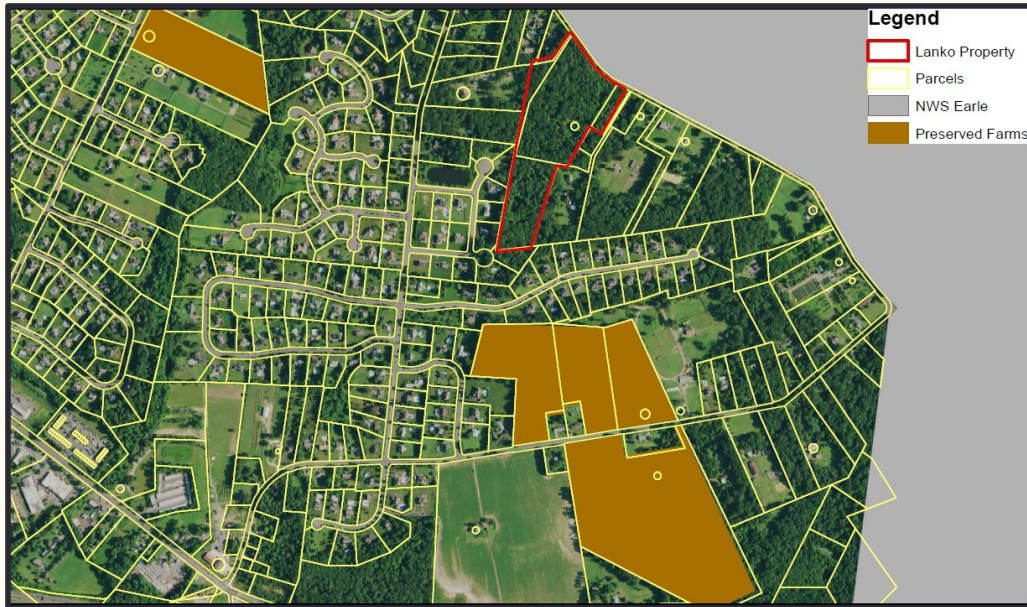


# REPI Land Preservation Grant Timeline



# REPI Land Preservation Grant Pilot Project Howell, Monmouth County, NJ

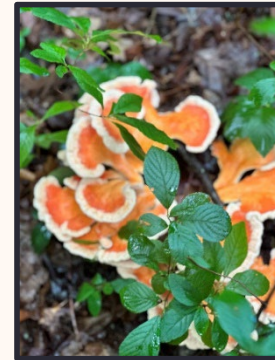
- 20-acre wooded property in densely developed area
- Contiguous to NWS Earle
- Located within 2-acre zone – opportunity for 10 residential lots
- Partners: MCF, Navy, Monmouth County, Howell



# REPI Land Preservation Grant Pilot Project Howell, Monmouth County, NJ



- Biologically diverse forest habitat with varied species composition
- Stands of century forest and groves of American Holly
- Wetland habitat
- Offers groundwater recharge and aquifer protection
- Significant wildlife habitat including threatened and endangered species habitat
- Connecting Habitat Across New Jersey (CHANJ) core wildlife habitat and wildlife corridor



# REPI Land Preservation Grant Colts Neck, Monmouth County, NJ

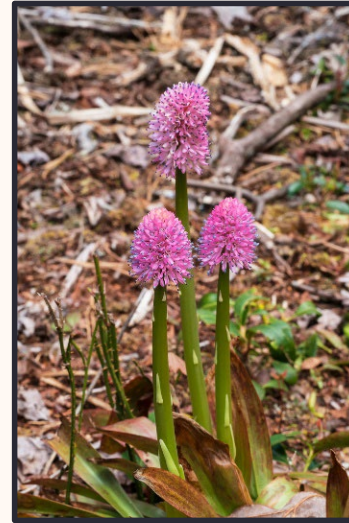
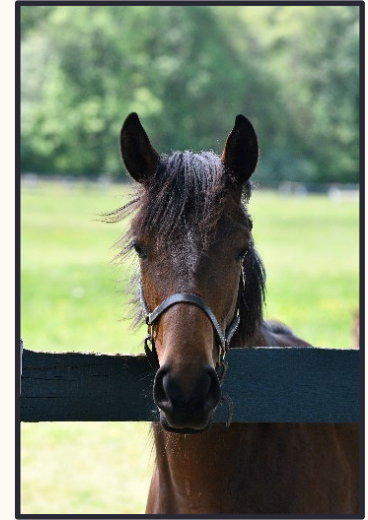
- 235-acre thoroughbred horse breeding, raising, and training farm
- Contiguous to 520-acre Monmouth County Park and NWS Earle
- Located within 10-acre zone, preliminary approvals for 30 conforming residential lots
- Partners: MCF, Navy, Monmouth County, Colts Neck



# REPI Land Preservation Grant

## Colts Neck, Monmouth County, NJ

- Diverse forest and wetland habitat
- Pasture and hay fields
- Abuts Iron and Obre's brooks - trout maintenance streams, tributaries of Hockhockson Brook (C1 stream) that flows into the Navesink and Swimming rivers
- Vernal pools
- Important groundwater recharge
- Prime agricultural soils
- Threatened and endangered species habitat
- Connecting Habitat Across New Jersey (CHANJ) core wildlife habitat and wildlife corridor





# REPI Land Preservation Grant

## Next Steps

- Properties within the MIA are being analyzed and ranked to determine if they meet the project criteria
- Landowner outreach will be conducted on high-ranking targets
- Additional funding will be requested from the Navy for cost share





# Climate Resilience Map Application

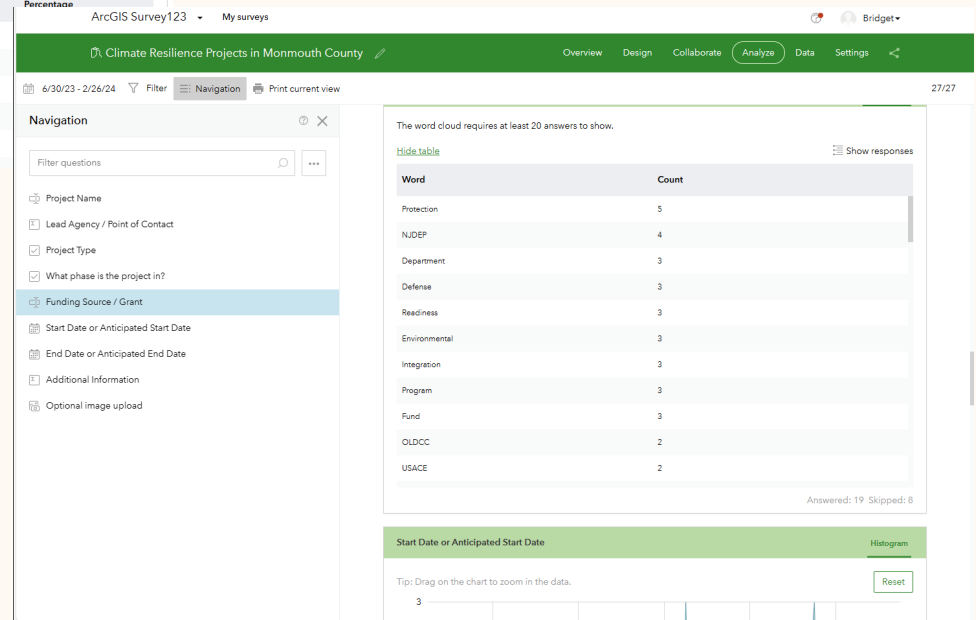
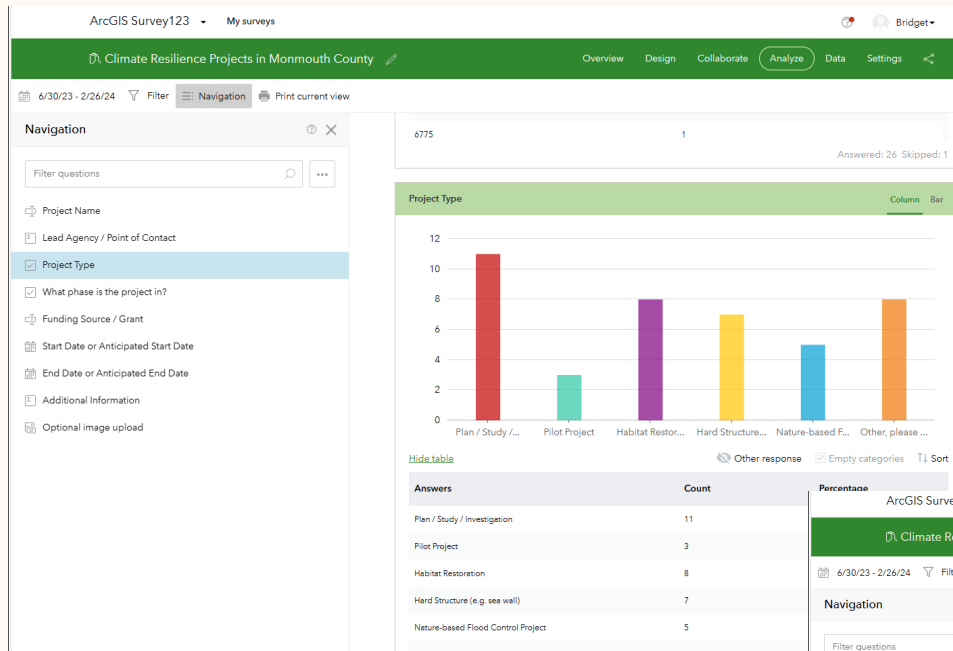
- Realized there was a lot of overlap in resilience projects and no centralized source for what and where projects are happening
- Created crowdsourced WebApp/Map using ESRI products (WebMap and Survey 123)
- In July 2023 hosted special in-person CRS Users Group meeting
- Invited BAs/OEM from all 53 municipalities; Federal, State, & County agencies; NGOs, nonprofits, & academic institutions; and consultants



# Climate Resilience Map Application

- Released the WebApp/Map for the CRS Users Group meeting in July 2023
  - Attendees had opportunity to add points ahead of time or at the meeting in real time (in Survey 123)
  - Could be done from phone, tablet, or laptops set up around the room
  - Results were displayed on screen as points were added
  - Attendees were encouraged to discuss their projects with the audience
  - Also acted as networking event and opportunity to reconnect, as many of the attendees had only ever met via virtual meetings or had not been together in person since before the pandemic
  - Survey and WebApp are live for anyone to add points

# Climate Resilience Map Application



<https://arcg.is/ryej9>



# Climate Resilience Map Application

ArcGIS Survey123 My surveys Bridget

Climate Resilience Projects in Monmouth County Overview Design Collaborate Analyze Data Settings

6/30/23 - 2/26/24 Filter Report Export Open in Map Viewer Form view 27/27

Esri, CGIAR, USGS | Monmouth County NJ GIS, New Jersey Office of GIS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS Powered by Esri

**Climate Resilience Project...**

EditDate	Project Name	Lead Agency / Point of ...	Point of Contact Email ...	What phase is the proje...	Other - What phase is t...	Funding Source / Grant	Start Date or Anticipate...	End Date or Anticipate...	Addit...
2/9/2024, 11:39 AM	This is a Webhook Test	County of Monmouth GIS ...	monmouthnjgis@co.mon...	Design_Phase			March 1, 2024	December 1, 2030	
2/9/2024, 10:38 AM	Shark River (S. Riverside D...	American Littoral Society	zack@littoralsociety.org	Implementation		FEMA and Neptune Town...	November 1, 2022		View
2/9/2024, 10:38 AM	Flat Creek Conceptual De...	Monmouth County Divisio...	amber.mallm@co.monmo...	Completed		OLDCC	July 1, 2020	November 1, 2022	View
2/9/2024, 10:38 AM	Whale Creek Conceptual ...	Monmouth County	Amber.mallm@co.Monmo...	Completed		OLDCC	July 1, 2020	November 1, 2022	
2/9/2024, 10:38 AM	2100 Projected Sea Level ...	GIS/Peter Nikitin	peter.nikitin@co.monmout...	Design_Phase		NA	June 1, 2023		I downl...
2/9/2024, 10:38 AM	Cliffwood Beach Shoreline...	Monmouth University Urb...	therring@monmouth.edu	Design_Phase		Department of Defense R...	July 1, 2023	June 1, 2024	Project
2/9/2024, 10:38 AM	Veterans Memorial Park Li...	Monmouth University Urb...	therring@monmouth.edu	Design_Phase		Department of Defense R...	July 1, 2023	June 1, 2024	This prc
2/9/2024, 10:38 AM	Sylvan Lake Restoration Pr...	Monmouth University Urb...	therring@monmouth.edu	Design_Phase		Department of Defense R...	July 1, 2023	June 1, 2024	This prc
2/9/2024, 10:38 AM	Atlantic Highlands Living ...	Monmouth University Urb...	therring@monmouth.edu	Planning_-_Secured_Fund...		Office of Naval Research	January 1, 2023	December 1, 2025	Project
2/9/2024, 10:38 AM	Naval Weapons Station Ea...	Meredith Comi, Urban Co...	meredith.comi@gmail.com	Pre-planning_"Goal"_Proj...		NFWF NCRF, NJDEP,			
2/9/2024, 10:38 AM	Monmouth/Northern Ocea...	Paul Dietrich	Pdietrich416@comcast.net	Pre-planning_"Goal"_Project			June 1, 2023		
2/9/2024, 10:38 AM	RLA Analysis	Middletown- Stacy Krause	Skrause@middletownnj.org	Pre-planning_"Goal"_Project			September 1, 2023	January 1, 2024	Awaitin...

0 of 27 selected



# Climate Resilience Map Application

Climate Change and Flood Resilience Initiatives in Monmouth County - Survey Results

survey: Sylvan Lake Restoration Project

Project Name	Sylvan Lake Restoration Project
Lead Agency / Point of Contact	Monmouth University Urban Coast Institute Tom Herrington
Point of Contact Email Address	therring@monmouth.edu
What phase is the project in?	Design_Phase
Other - What phase is the project in?	
Funding Source / Grant	Department of Defense Readiness and Environmental Protection Integration Program
Start Date or Anticipated Start Date	7/1/2023, 12:00 PM
End Date or Anticipated End Date	6/1/2024, 12:00 PM
Additional Information	This project is being conducted through a Cooperative Agreement between Naval Weapons Station (NWS) Earle and Monmouth University to improve the resilience of NWS Earle facilities and the local communities within the NWSE Military Influence Area. Design and permitting is being conducted by the American Littoral Society in partnership with McHugh Environmental Associates and Matrix New World Engineering.
Project Type	Habitat_Restoration

Earthstar Geographics | Delaware Geological Survey - New Jersey/Delaware boundary data New Jersey Department of Agriculture, State Agricultural Development Committee, Farmland Preservation Program - preserved farmland boundary data fr... Powered by Esri

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# Climate Resilience Map Application

To access the survey and add points:



# Climate Resilience Map Application

To access the map:





# THANK YOU

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*Questions & Answers*