REBUILD BY DESIGN

M E A D O W L A N D S

CITIZEN ADVISORY GROUP (CAG) MEETING #9

NEPA Process and Ecological Resources Update

May 24, 2017

AECOM

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www.renewjerseystronger.org

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List of Acronyms

CAA	Clean Air Act
CAG	Citizen Advisory Group
CEQ	Council on Environmental Quality
CWA	Clean Water Act
EIS	Environmental Impact Statement
EPW	Evaluation of Planned Wetlands
ESA	Endangered Species Act
FCI	Functional Capacity Indicators
FCU	Functional Capacity Units
FH	Fish Habitat
HMD	Hackensack Meadowlands District
HUD	US Department of Housing and Urban Development
MERI	Meadowlands Environmental Research Institute
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
NJSA	New Jersey Statutes Annotated
NOI	Notice of Intent
NRCS	Natural Resource Conservation Service
SB	Shoreline Bank Erosion Control
SS	Sediment Stabilization
SVAP	Stream Visual Assessment Protocol
UH	Uniqueness/Heritage
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
WL	Wildlife
WQ	Water Quality

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1.0 Agenda

NEPA Process and Ecological Resources Update

6-8 PM
May 24, 2017
Learning Center Room, 4th Floor
One Bergen County Plaza
Hackensack, NJ 07601

Project Website
www.rbd-meadowlands.nj.gov
Project Email
rbd-meadowlands@dep.nj.gov

- Welcome
- Presentation
  - Opening Remarks (10 Minutes)
    - Welcoming (Linda Fisher, NJDEP)
    - Project Status Update (Chris Benosky, AECOM)
  - Review of NEPA Process and Requirements (Brian Boose, AECOM, 15 Minutes)
  - Ecological Resources Update (John Rollino and Brian Boose, AECOM, 45 Minutes)
    - Regulatory Framework and Agency Input
    - Ecological History of the Project Area
    - Ecological Surveys of the Project Area
    - Integrating Ecology into Engineering
    - Completing the Impact Analysis for the Draft EIS
  - Next Steps and Q&A/Closure (45 Minutes)
    - Next Steps (Chris Benosky, AECOM)
    - Questions and Answers

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2.0 Glossary

Active data collection - The direct participation of the collector is required in the collection process; it requires physical in-field, real-time collection operated by the collector. Researcher can directly focus on or target a specific population or species with this method. Some examples include: in-field visual observations, sweep or dip netting, seines, and sediment grabs.

Anthropogenic – Caused or produced by humans.

Assemblage – A collection or group of people or things.

Avifauna – The birds of a particular region, habitat, or geological period.

Benthic invertebrates – Organisms that live in or on the bottom sediments of rivers, streams, and lakes.

Biological resources - The living environment and organisms, such as vegetation, wildlife, fisheries, aquatic and terrestrial habitats, special status species, and species of conservation concern.

Bioswale – A vegetated landscape swale that removes silt and pollution from surface runoff water, usually with gently sloped sides.

Degradation – Decline in state to one of less value or quality.

Ecological – Relating to or concerned with the relation of living organisms to one another and their physical surroundings.

Ecological uplift – A process that can be realized through green infrastructure, including bioswales, rain gardens, and habitat restoration.

Embayment – Formation of a bay; a bay or a conformation resembling a bay

Fauna – The animals of a particular region, period, or special environment.

Flora – Vegetation; plant life characteristic of a region, period, or special environment.

Geotechnical – Relating to practical applications of geological science.

Habitat complexes – The number and diversity of habitat types and distinct ecological zones within a specified area.

Hydrologic – Dealing with the occurrence, circulation, distribution, and properties of the waters of the Earth and its atmosphere.

Intertidal marsh – An area along a shoreline that is exposed to air at low tide and submerged at high tide.

Mature forest – A forest that has attained great age without significant disturbance.

Morphologic – Relating to the form or structure of things; relating to the form of living organisms and with relationships between their structures.

Nesting survey – A survey that monitors the status and trends of bird populations.

Passive data collection - The collector does not participate directly in the collection; it entails leaving a collector on its own over time to operate without the collector's assistance. Some examples include: game cameras, cover boards, rock baskets, and traps.

Rain garden - A planted depression in a garden that absorbs rainwater runoff from impervious areas such as roofs, driveways, walkways, parking lots, and lawn areas.

Resiliency – The ability to recover readily from adversity or difficulties.

Restoration – The action of returning something to a former condition.

Riparian - Plant habitats and communities along the margins of a river, stream, or other waterbody.

Rock basket – Sampling technique used to survey benthic invertebrates.

Sediment grab – Sampling technique used to sample sediments from aquatic environments.

Sediment stabilization – The process of adding reagents to a material to produce more chemically stable constituents.

Shrubland – A plant community characterized by vegetation dominated by shrubs, often also including grasses and herbs.

Successional - The process of change in the species structure of an ecological community over time.

Topographical – Relating to the arrangement or accurate representation of the physical features of an area.

Track plates – Devices allowing scientists to obtain footprints of elusive mammals.

Transect – A straight line or narrow section through an object or natural feature along which observations are made or measurements are taken.

Vernal pool – Temporary pools of water that provide habitat for distinctive plants and animals.

Water quality - The chemical, physical, biological, and radiological characteristics of water; a measure of the condition of water.

Wetland - An area that is regularly saturated by surface or groundwater and, thus, is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include swamps, bogs, fens, marshes, and estuaries.

Wetland delineation – A process which identifies which water waterbodies within a project's boundaries meet the definition of "waters of the United States."

3.0 Power Point Presentation

REBUILDBYDESIGN

MEADOWLANDS

CITIZEN ADVISORY GROUP (CAG) MEETING #9

NEPA PROCESS AND ECOLOGICAL RESOURCES UPDATE

AGENDA

Christopher Benosky, AECOM 2

- Project Status Update and Schedule
- NEPA Process Overview
  - What is the NEPA process?
  - Where are we in the NEPA process?
  - What is "significant" and how do we define/ establish this level?
  - Applying significance thresholds
- Ecological Resources of the Project Area
  - The Regulations – defining "significance"
  - Overview of past to present
  - Ecological surveys and findings
    - Phases I and II
  - Achieving "Ecological Uplift"
- Next Steps
- Questions & Answers

REBUILD BY DESIGN MEADOWLANDS

CAG Meeting #9 // May 24, 2017 AECOM

PROJECT STATUS UPDATE

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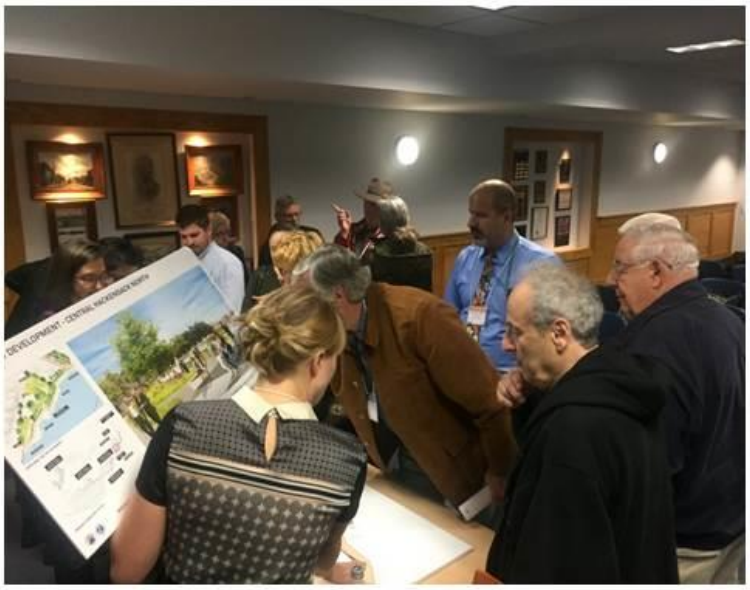

- Further refining working draft Concept Screening Criteria
- Completed and published to Project Website:
  - Meeting Minutes from CAG Meeting #8
  - March and April 2017 Newsletters
- Developing estimated cost and the hybrid alternative
- Fieldwork ongoing
  - Biological resource surveys
  - Topographical and drainage surveys
  - Geotechnical investigations
- Action Plan Amendment

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PROCESS

BRIAN W. BOOSE, AECOM

LAW AND REGULATIONS

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1. The National Environmental Policy Act of 1969
   - Public Law 91-190, 42 USC 4321-4347, as amended (1 January 1970)
2. Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act
   - 40 CFR Parts 1500-1508 (29 November 1978)
3. Agency-specific NEPA regulations and guidance
   - 24 CFR Part 58 (HUD)
4. Case law / precedents / emerging guidance on streamlining, modernizing, and reinvigorating the NEPA process

NEPA PROCESS & REQUIREMENTS

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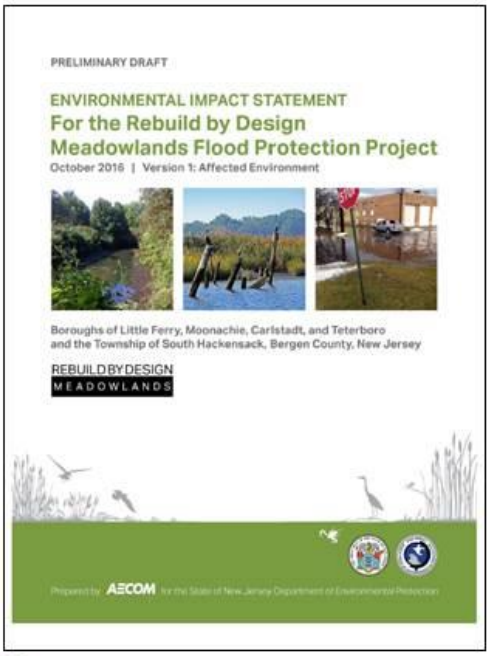

National Environmental Policy Act (NEPA)

- Purpose: Ensures the Federal government considers the environmental effects of all projects, prior to implementation
- Applies to all projects with a Federal connection (e.g., funding)
- Requires an Environmental Impact Statement (EIS) for "*major Federal actions significantly affecting the quality of the environment*"
- EIS process has several procedural steps to ensure public input is obtained and considered

THE BOTTOM LINE UP FRONT

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- Applies only to Federal actions
- Consider environmental values in agency decision-making
- Solicit, obtain, and consider information from the public
- Provide data to the public and decision-maker
- Supports improved, informed Federal decision-making

NEPA IS A PROCEDURAL LAW

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- NEPA regulates decision-making procedures — it does not regulate the types of decisions that agencies make. NEPA is a process.
- An agency can make decisions using whatever factors the decision-maker feels are pertinent to the particular decisions as long as environmental information is also considered.
- An agency can fulfill its mission despite environmental costs — if it has fully complied with NEPA procedures and requirements and violates no other environmental law.

THE PURPOSE OF NEPA

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- Inform the public and the decision-maker, before the decision is made
- Provide accurate scientific analysis with a focus on issues that are "*significant to the action*"
- Provide the opportunity for expert agency comments and public scrutiny
- Do not generate excessive paperwork
- Foster excellent action

NEPA DIRECTS FEDERAL AGENCIES TO:

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- Include and institutionalize environmental values in planning and decision-making
- Consider alternative courses of action
- Document their consideration of environmental effects
- Involve the public in agency decision-making
- Involve the regulatory community (and the public), as appropriate, for sound environmental data
- Make decisions informed by potential environmental effects

WHERE ARE WE IN THE NEPA PROCESS?

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WHAT IS "SIGNIFICANT"?

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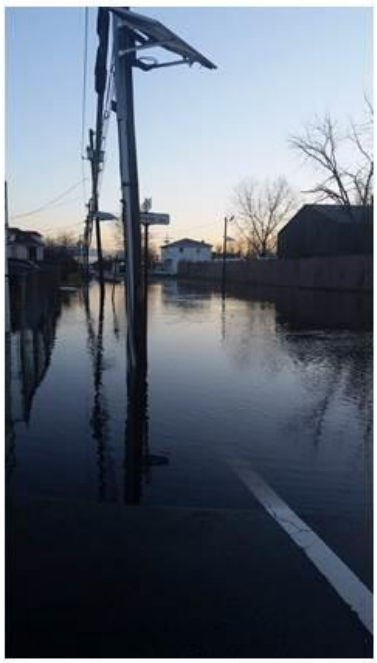

So what is a "Major Federal action **significantly** affecting the quality of the human environment"?

REBUILD BY DESIGN MEADOWLANDS

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MAJOR FEDERAL ACTION SIGNIFICANTLY AFFECTING THE QUALITY OF THE HUMAN ENVIRONMENT

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CEQ Regulations (40 CFR Part 1508.18) direct agencies to define and examine "significance" in terms of:

- **Context** – how far is the impact felt?
- **Intensity** – how strong is impact in that context?

MAJOR FEDERAL ACTION SIGNIFICANTLY AFFECTING THE QUALITY OF THE HUMAN ENVIRONMENT

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Intensity (severity) of an impact may be based on:

- Beneficial effects outweigh adverse effects (whole picture)
- Degree action affects public health or safety
- Unique characteristics of geographic area/Region of Influence
- Degree of controversy
- Degree effects are highly uncertain or of unique/unknown risk
- Precedent-setting for future actions
- Individually insignificant effects may be cumulatively significant (e.g., wetlands loss, traffic impacts)
- Degree of effects on cultural or historic resources
- Degree of effects on species of concern or habitat
- Threat of violation of environmental law or regulation

MAJOR FEDERAL ACTION SIGNIFICANTLY AFFECTING THE QUALITY OF THE HUMAN ENVIRONMENT

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- "Significantly" typically defined by thresholds:
  - Policy or laws (CWA, CAA, ESA, NHPA)
  - Scientific levels (USEPA thresholds)
  - Decision-maker's opinion
  - The agency's definition
- Significance is determined often times on a case-by-case basis

ECOLOGICAL RESOURCES UPDATE

JOHN ROLLINO, AECOM
&
BRIAN W. BOOSE, AECOM

ECOLOGICAL RESOURCES UPDATE

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- Regulatory Framework – *so what is significant?*
- Early Regulatory Agency Input
- Development and Land Use Trends - *Ecological History of the Project Area*
- AECOM Ecological Project Team
- Ecological Surveys of the Project Area
- Restoration Efforts, Integrating Ecology into Engineering, and Ecological Uplift

REGULATORY FRAMEWORK

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- Significant ecological resources are protected under Federal, state, and/or local laws. These laws include, but are not limited to:
  - Endangered Species Act (16 USC §§ 1531 *et seq.*)
  - Migratory Bird Treaty Act (16 USC §§ 703-712)
  - Bald and Golden Eagle Protection Act (16 USC §§ 668 – 668c)
  - Clean Water Act (33 USC §§ 1251 *et seq.*)
  - Executive Order 11990 (Protection of Wetlands)
  - New Jersey Endangered and Nongame Species Conservation Act of 1973 (NJSA 23:2A *et seq.*)
  - New Jersey Endangered Plant Species List Act (NJSA 13:1B-15.151 *et seq.*)
  - New Jersey Freshwater Wetlands Protection Act (NJSA 13:9B-1 *et seq.*)
- The studies performed as part of this project, in combination with existing data, provide the basis for the NEPA analysis and in determining the potential for significant effects.

EARLY REGULATORY AGENCY INPUT

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- NJDEP corresponded with key agencies early in the NEPA process:
  - United States Fish and Wildlife Service
  - National Marine Fisheries Service
  - NJDEP Natural Heritage Program
- These agencies identified:
  - Project Area is not known to support Federal ESA-listed species or critical habitats
  - NJDEP identified the following State-listed species with the potential to occur in the Project Area

Common Name	*Scientific Name*	Component	Listing
Bald Eagle	*Haliaeetus leucocephalus*	Foraging and Nesting	State Endangered
Northern Harrier	*Circus cyaneus*	Breeding Sighting	State Endangered
Peregrine Falcon	*Falco peregrinus*	Urban Nest	State Endangered
Cattle Egret	*Bubulcus ibis*	Foraging	State Threatened
Yellow-crowned Night-heron	*Nyctanassa violacea*	Foraging	State Threatened
Barn Owl	*Tyto alba*	Non-breeding Sighting	Special Concern
Glossy Ibis	*Plegadis falcinellus*	Foraging	Special Concern
Little Blue Heron	*Egretta caerulea*	Foraging	Special Concern
Northern Harrier	*Circus cyaneus*	Non-breeding	Special Concern
Snowy Egret	*Egretta thula*	Foraging	Special Concern

DEVELOPMENT & LAND USE TRENDS

1800 - 1875 UPLAND AGRICULTURE & NATIVE WETLAND

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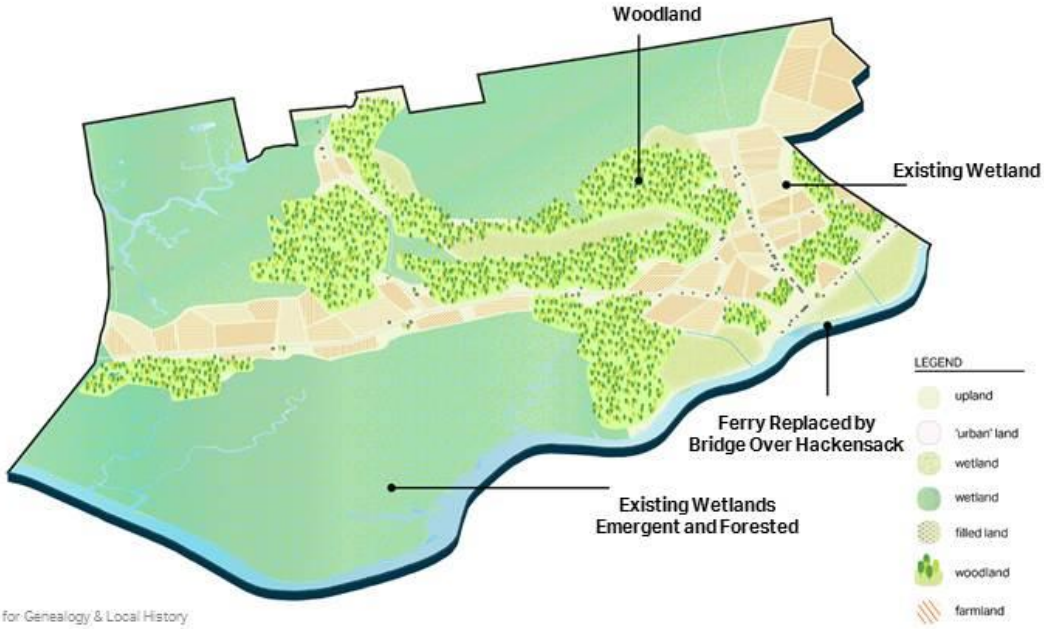
Much of The Meadowlands consists of vegetated land and wetland cover types, such as tidal marsh, hardwood forest, and Atlantic cedar swamp.

Agriculture is the primary land use.

Land improvement practices such as diking and ditching to drain marshland for additional farmland begin in the 1820s.



TYPICAL REPRESENTATION OF 1800s-1875
Source: 1867 Map of Bergen County - Bolger Heritage Center for Genealogy & Local History

DEVELOPMENT & LAND USE TRENDS

1875 – 1930 LAND DEVELOPMENT & INDUSTRIAL GROWTH

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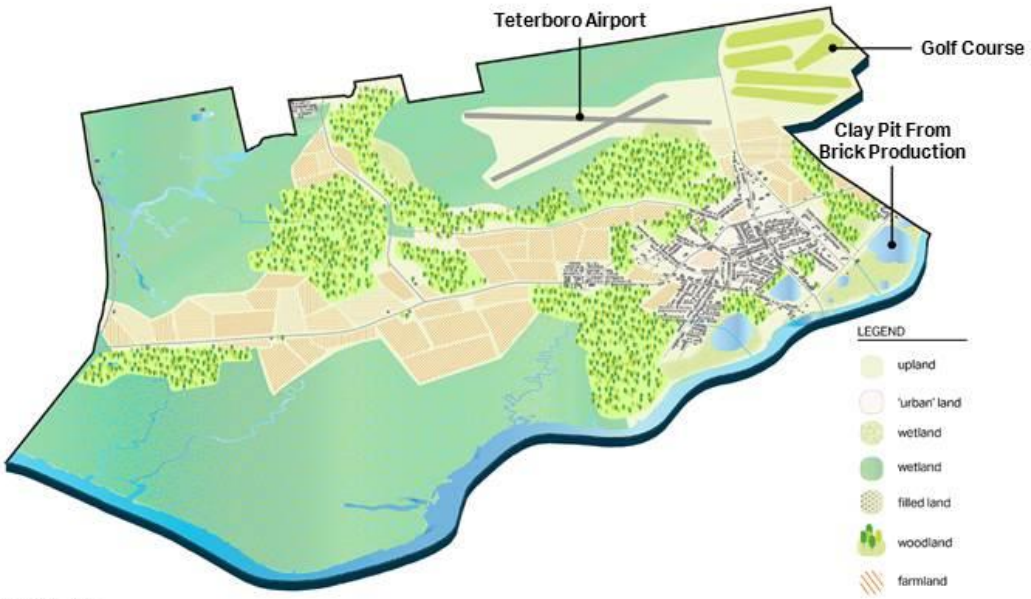
The Hackensack River is dredged in the late 1800s for wetland filling.

Industry booms in Little Ferry with brick production reaching its peak in 1895.

The first aircraft takes flight in 1919 at Teterboro Airport.

In 1921 the Oradell Reservoir Dam is built to expand reservoir capacity.



TYPICAL REPRESENTATION OF 1875-1930
Source: 1931 aerial photography - Nationwide Environmental Title Research

DEVELOPMENT & LAND USE TRENDS

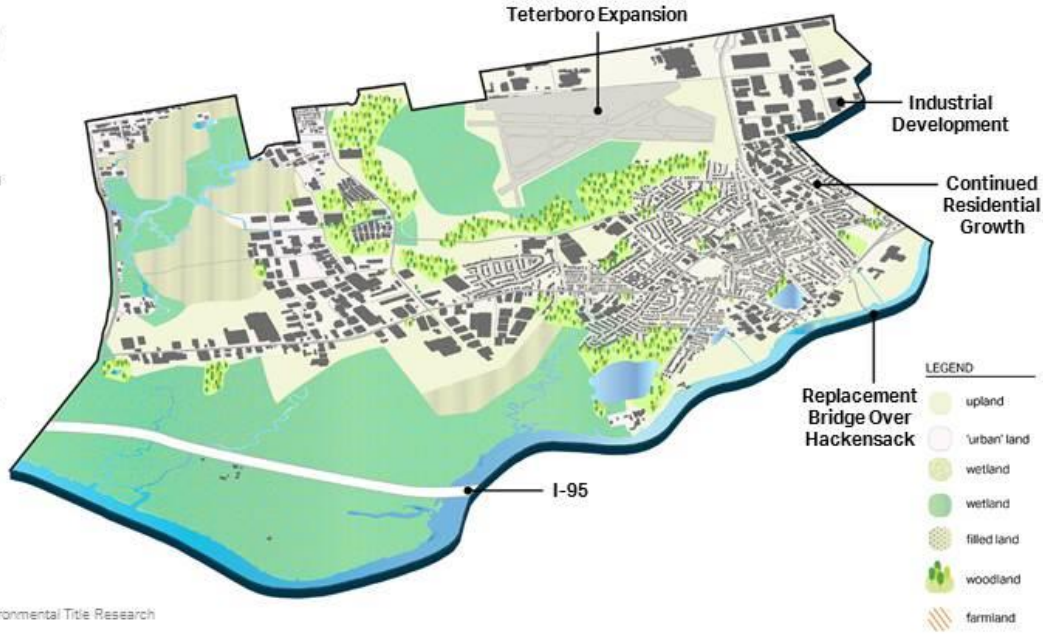
1930 – 1970 ENVIRONMENTAL DEGRADATION

22

The Bergen County Mosquito Control Division is founded in 1914, and drives extensive ditching, diking, and filling.

The Meadowlands is used as a dumping ground for municipal and industrial waste.

During the 1950s and 60s, 10,000 tons of waste is dumped daily in The Meadowlands (USFWS 2007).



TYPICAL REPRESENTATION OF 1930-1970
Source: 1966 & 1970 aerial photography - Nationwide Environmental Title Research

DEVELOPMENT & LAND USE TRENDS

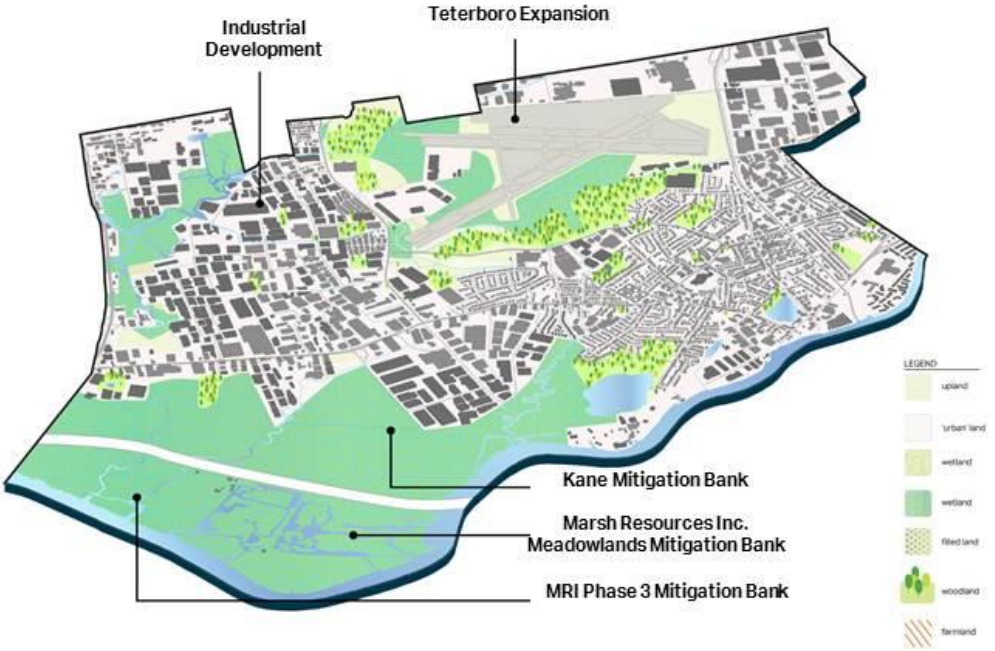
1970 – PRESENT ECOLOGICAL RECOVERY & RESILIENCY

23

The environmental movement gains momentum with the creation of the NEPA (1969), EPA (1970), Clean Water Act (1972), and Superfund (1980).

In 1969, uncontrolled dumping and wetland filling is stopped by the Hackensack Meadowlands Development Commission.

Beginning in 2001, mitigation banks are implemented in The Meadowlands, including: MRI Phase 3, Marsh Resources Inc. (MRI), MRI Phase 3, and Kane mitigation banks.



TYPICAL REPRESENTATION OF 1970-TODAY
Source: 2017 satellite aerial - Google Map Data

AECOM ECOLOGICAL PROJECT TEAM

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- **John Rollino – Team Leader**
  - 20+ years of experience in designing and conducting ecological studies, impact analysis, and restoration and mitigation design
  - Certified Ecologist, Certified Arborist, Certified Wetland Delineator, and Licensed NJ Wildlife Trapper

- **Team Members**
  - 12 ecologists from the NYC and NJ offices
  - Support from AECOM worldwide offices
  - Professional Wetland Scientists, Certified Ecologists, Certified Arborists, and Licensed NJ Wildlife Trappers
  - Former NJDEP Fisheries and NJDEP Wildlife personnel
  - Former Brooklyn Botanical Garden Botanist
  - 160 years of combined experience

ECOLOGICAL SURVEYS OF THE PROJECT AREA

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Existing Ecological Data for the Project Area

- Data from relevant existing studies (e.g., HMD, MERI, USEPA, USACE, Independent Research, etc.)
- Most existing studies focus on the river and large marshes in southern portion of the Project Area
- A large portion of the Project Area is poorly studied = "Data Gap"
- AECOM is filling these "Data Gaps" through site-specific surveys:

- Habitat Mapping
- Vegetation Surveys
- Wetland Evaluations
- Stream Assessments
- Benthic Invertebrates
- Fish
- Amphibians and Reptiles
- Avifauna
- Mammals
- Protected Species

ECOLOGICAL SURVEYS - DATA AQUISITION

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- **Phase I**
  - September 2016 – February 2017
  - Investigated entire Project Area (~5,405 acres)
  - Data used in concept/alternative design to avoid ecologically sensitive areas

- **Phase II**
  - March 2017 – August 2017
  - Refining surveys
  - Focusing on areas potentially affected
    - New sampling/observation locations
    - Additional surveys (e.g., nesting surveys) conducted

ECOLOGICAL SURVEYS - DATA AQUISITION

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- Approximately 2,900+ field hours have been dedicated to field data collection since August 2017
- Fauna studies occur seasonally
- Avifauna surveys occur weekly during migratory periods
- Data collection is both active and passive
- Data collection occurs both day and night
- Flora surveys occur in late spring and late summer

ECOLOGICAL SURVEYS - HABITAT MAPPING

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PRELIMINARY DATA

- 19 habitat types
- 405 individual habitats (2,074 acres, or 39% of Project Area)
  - ~1,200 acres comprised of large marshes/mitigation banks/preserves in southern portion
  - ~933 acres of other habitats
  - Large habitat complexes (i.e., > 200 acres) of mature woodlands, fields, shrublands, and/or open waters identified within the lower Losen Slote drainage and Teterboro Airport/Redneck Avenue
  - 5,405 acres = Project Area
- Collected (and historic) data allow:
  - Avoidance of sensitive areas through careful siting and design
  - Assessment of potential impacts

ECOLOGICAL SURVEYS - HABITAT MAPPING

PRELIMINARY DATA

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Example: Habitat E7-H007 – Red maple-hardwood forest (variant)

- Scientists mapped the boundaries of the habitat with GPS
- Scientists identified dominant vegetation:
  - Trees – red maple, pin oak, sweetgum
  - Shrubs – sweet pepperbush, multiflora rose
  - Vines – Virginia creeper, greenbrier
  - Herbaceous – sensitive fern, New York fern, Japanese stilt grass
- Scientists also performed:
  - Wetland mapping
  - Vernal pool identification
  - Fauna surveys

ECOLOGICAL SURVEYS - HABITAT MAPPING

PRELIMINARY DATA

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Habitat	Acres	Habitat	Acres
Shallow emergent marsh (tidal)	692	Open water & impoundments	18
Common reed (*Phragmites* spp.) marsh	474	Upland fill	14
Mowed lawn & lawn w/ tree	336	Mid-reach stream	11
Successional shrubland	124	Young field	11
Red maple (*Acer rubrum*) – sweetgum (*Liquidambar styraciflua*) forest (variant)	110	Shallow emergent marsh	10
		Ditch/intermittent stream	6
Urban woodlot	86	Landfill	5
Red maple-hardwood forest (variant)	83	Urban structure	2
Floodplain/riparian forest remnant	44	Rich mesophytic forest	<1
Successional old field	27		
Red maple-blackgum (*Nyssa sylvatica*) swamp (variant)	20		

Total Acres = 2,074

HABITAT EVALUATIONS - WETLANDS

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- Used the Evaluation of Planned Wetlands (EPW) technique
  - Data collected for EPW can be used for other evaluation models
  - EPW evaluates a site on six (6) major Functional Capacity Indicators (FCIs):
    - Shoreline Bank Erosion Control (SB)
    - Sediment Stabilization (SS)
    - Water Quality (WQ)
    - Wildlife (WL)
    - Fish Habitat (FH)
    - Uniqueness/Heritage (UH)
  - FCI is a dimensionless number ranging from 0.0 to 1.0 that describes a wetland's relative capacity to perform a function
  - By multiplying FCI x area, Functional Capacity Units (FCUs) are determined
  - Through the comparison of FCUs before and after impact or restoration, ecological degradation or uplift can be determined

Example Scores:

SB	0.9
SS	1.0
WQ	0.6
WL	0.2
FS	0.4

HABITAT EVALUATIONS - WATERBODIES

PRELIMINARY DATA

32

- Used the Natural Resource Conservation Service (NRCS) Stream Visual Assessment Protocol (SVAP)
  - Assessed hydrologic and morphologic stream conditions
  - Up to 15 assessment categories, such as channel, bank stability, riparian zone conditions, and in-stream fish cover, may be scored in a range from 1 to 10
  - Assessment score under 6 is poor and any score over 9 is excellent.
  - Numerical score can be used as a general determination of the overall quality of the stream condition

HABITAT EVALUATIONS - SUMMARY

33

- Based on the EPW technique, wetland habitat quality is highly variable in the Project Area:
  - 35 wetland polygons investigated
  - Many wetlands have been altered through previous anthropogenic activities
  - Higher value wetland habitat complexes are present in wooded areas in Teterboro Airport and Losen Slote drainage
  - Mitigation banks in southern portion of Project Area have high ecological value

Poor Habitat (above); Higher Value Habitat (below)

HABITAT EVALUATIONS – SUMMARY

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PRELIMINARY DATA

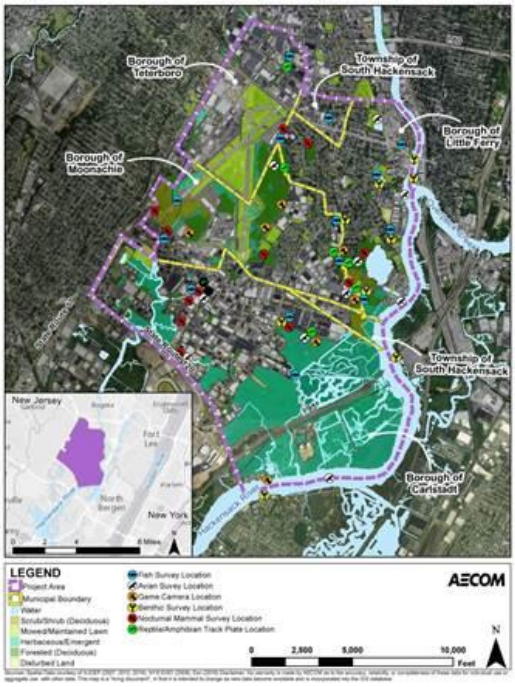
- Using SVAP evaluations, major waterbodies in the Project Area are classified as poor
  - West Riser Ditch – 2.8
  - East Riser Ditch – 3.8
  - Losen Slote – 5.6
- Restoration efforts could substantially increase scoring
- For many waterbodies, underground piping, channel straightening, outfalls, and limited riparian zones contributed to stream degradation

East Riser Ditch. Note steep-sided, channelized banks and limited riparian zone

ECOLOGICAL SURVEYS – SAMPLING LOCATIONS

35

- Flora Surveys
- Fauna Surveys
  - Birds
  - Fish and Benthic Invertebrates
  - Mammals
  - Amphibians and Reptiles



ECOLOGICAL SURVEYS – VEGETATION

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- In each habitat, dominant plant species were identified per vegetative layer (Phase I)
- Habitats within potential alignments subjected to additional data collection (Phase II)
  - Botanists identified all plant species along transects in September 2016 and early April 2017
  - Additional investigations to occur in June 2017
- 301 plant species identified in the Project Area to date
- Two state-endangered species observed:
  - Eastern redbud, *Cercis canadensis* (planted, likely cultivar)
  - Floating marshpennywort, *Hydrocotyle ranunculoides* (outside Project Area in West Riser Ditch tributary [Berry's Creek Headwaters])

ECOLOGICAL SURVEYS - BIRDS

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- Avian surveys techniques include:
  - Fixed-point counts (13 locations chosen as representative habitats and/or within specific alignments)
  - Transects
  - Nesting surveys
- Data collected from both land and boat
- Surveys conducted during Phases I and II
- Purpose
  - Characterize typical avian usage of habitats within the Project Area
  - Identify protected species presence/use

ECOLOGICAL SURVEYS - BIRDS

SURVEY SITES

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Site	Description
AA-1	Amor Ave; dense industrial/commercial Area adjacent to small stream with engineered banks.
BC-1	Marsh/upland interface of Berry's Creek **(Phase II)**
BC-2	Berry's Creek marsh **(Phase II)**
CM-1	Commerce Avenue; road separates dense commercial/industrial area (north side) from a large common reed marsh (south side).
CM-2	Transco Road; large marshes and mitigation banks **(Phase II)**
HR-1	Hackensack River; developed shoreline
HR-2	Hackensack River; developed shoreline/open marshes **(Phase I only)**
HR-3	Hackensack River; open marshes **(Phase I only)**
IL-1	Indian Lake Park; suburban park
LS-1	Successional shrubland/young riparian floodplain forest near dense industrial/commercial area
LS-2	Mature forest adjacent to residential neighborhoods
LS-3*	Dense common reed habitat **(Phase II)**
PC-1	Berry's Creek marshes adjacent to heavy development **(Phase I only)**
Tet-1	Dense forested area on Teterboro Airport property

ECOLOGICAL SURVEYS - BIRDS

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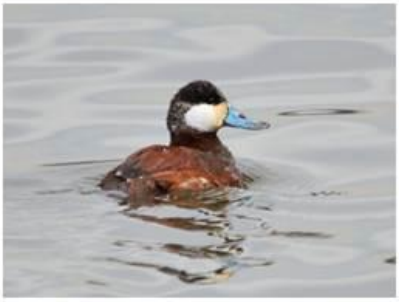
Phase I:

- Late Summer and Fall
  - September 2016 – mid-November 2016
  - Up to 5 locations weekly (AA-1, CM-1, HR sites, IL-1, and LS-1)
  - Summer seasonal and fall seasonal surveys: each included a two-week period with 8 locations sampled (AA-1, CM-1, HR sites, IL-1 LS-1, LS-2, PC-1, and Tet-1)
- Winter
  - Mid-November 2016 – March 2017
  - Up to 5 locations bi-weekly (AA-1, CM-1, HR sites, IL-1, and LS-1)
  - Winter seasonal survey: 8 locations sampled (AA-1, CM-1, HR sites, IL-1, LS-1, LS-2, PC-1, and Tet-1)



Ruddy duck (above), red-tailed hawk (below), photographed during avian survey

ECOLOGICAL SURVEYS - BIRDS

40

Phase II:

- Spring
  - March 2017 - mid-June 2017
  - 8 locations weekly (AA-1, BC-1, CM-1, CM-2, HR1, IL-1, LS-1, and LS-3)
  - Spring seasonal monitoring includes 10 locations for two consecutive weeks (AA-1, BC-1, BC-2, CM-1, CM-2, HR1, IL-1 LS-1, LS-3, Tet-1)
- Summer
  - Mid-June 2017 to September 2017
  - 8 locations sampled bi- or tri-weekly (AA-1, BC-1, CM-1, CM-2, HR1, IL-1, LS-1, and LS-3)
  - Summer seasonal monitoring includes 10 locations for two consecutive weeks (AA-1, BC-1, BC-2, CM-1, CM-2, HR1, IL-1 LS-1, LS-2, LS-3, Tet-1)

Great Cormorant (above) flying over Hackensack River. Yellow-rumped warbler (below) along Commerce Blvd

ECOLOGICAL SURVEYS - BIRDS

41

- Nesting surveys occurred for one to two days in January, February, and early and mid-April 2017
- Scientists traversed potential concept/ alternative footprints and identified nests, nesting structures, and nesting activity
- Figure shows locations subjected to nesting surveys

ECOLOGICAL SURVEYS - BIRDS

PRELIMINARY DATA

42

- 123 species and 44,000+ individuals sighted
  - Top 10 species sighted: European Starling (24%); Ring-billed Gull (15%); Canada Goose (10%), Common Grackle (7%), Double-crested cormorant (6%); Red-winged blackbird (6%), Rock Dove (5%), Mallard (3%), Ruddy Duck (3%), and Mourning Dove (2%)
- Passive sightings comprise approximately 20% of sightings
  - With passive sightings removed from data set, the top 10 species sighted were: European Starling (24%), Ring Billed Gull (12%), Common Grackle (9%), Canada Goose (9%), Rock Dove (6%), Red-winged Blackbird (6%), Double-crested Cormorant (5%), Ruddy Duck (4%), Mallard (3%), and Mourning Dove (2%)

ECOLOGICAL SURVEYS - BIRDS

PRELIMINARY DATA

43

- 33 species sighted 2 times or less
- Bald eagles, Northern Harriers, Ospreys, and Peregrine Falcons
  - Sighted in multiple locations
  - But only along river and in southern marshes of Project Area
- Red-tailed hawk most commonly observed raptor observed throughout Project Area
- Ruddy Ducks, Teals (blue- and green-winged) and other waterfowl overwinter in Project Area.
  - Often sighted in Hackensack River and Kane Tract mitigation area
- No protected species observed nesting
- No heron rookeries or least tern nesting habitat observed

Peregrine falcon (above) perched on a pile in the Hackensack River. Killdeer nest (below) observed at Teterboro Airport during nest survey

ECOLOGICAL SURVEYS - FISH AND BENTHIC INVERTEBRATES

44

- Purpose: seasonal studies to identify species presence, usage, and habitat quality
- Fish studies conducted at 14 locations throughout the Project Area
- Fish captured using non-lethal techniques
- Trapping occurs each season for 2-4 consecutive nights
- Benthic invertebrates identified through sediment grabs at 5 locations within freshwater bodies
- Benthic invertebrates identified at 4 locations on the Hackensack River using rock baskets

ECOLOGICAL SURVEYS - FISH

45

Species	West Riser	East Riser	Moonachie Creek	Losen Slote
Atlantic silverside *(Menidia menidia)*	X			
Banded killifish *(Fundulus diaphanus)*	X	X	X	X
Bluegill *(Lepomis macrochirus)*	X	X	X	X
Brown bullhead *(Ameiurus nebulosus)*	X			
Bullhead catfish *(Ameiurus sp.)*			X	X
Common carp *(Cyprinus carpio)*	X		X	X
Goldfish *(Carassius auratus)*			X	X
Green sunfish *(Lepomis cyanellus)*	X	X	X	X
Hybrid sunfish (*Lepomis* sp.)	X		X	X
Mosquitofish *(Gambusia sp.)*		X	X	X
Mummichog *(Fundulus heteroclitus)*	X	X	X	X
Pumpkinseed *(Lepomis gibbosus)*	X	X	X	X
Yellow bullhead *(Ameiurus natalis)*			X	X

ECOLOGICAL SURVEYS - FISH AND BENTHIC INVERTEBRATES

PRELIMINARY DATA

46

- Observed fish species are those common to urban freshwater streams
- Benthic invertebrate species numbers are low and assemblages indicative of stressed habitats
- Rock baskets along Hackensack River shoreline populated by species common to the estuary (e.g., mud crabs)

Scientists preparing to deploy fish traps (above); Pumpkinseed (below)

ECOLOGICAL SURVEYS - MAMMALS

47

- Mammal surveys conducted seasonally
- Observations (passive and active) occur at 26 locations
- Active daytime searches, snow tracking, and nocturnal searches with night vision
  - In summer and fall, 6 locations investigated for 4-5 nights each season
  - Snow tracking performed at 7 sites on two occasions
- Passive techniques employed game cameras, track plates/cover boards, and bat meters
  - Over 50,000 game camera images have been viewed

ECOLOGICAL SURVEYS - MAMMALS

PRELIMINARY DATA

48

Big brown bat (*Eptesicus fuscus*)	Norway Rat (*Rattus norvegicus*)
Cat (*Felis silvestris catus*)	Opossum (*Didelphis virginiana*)
Chipmunk (*Tamias striatus*)	Rabbit (*Sylvilagus floridanus*)
Dog, domestic (*Canus familaris*)	Raccoon (*Procyon lotor*)
Eastern Red Bat (*Lasiurus cinereus*)*	Rat (unknown species)
Grey Squirrel (*Sciurus carolinensis*)	Red fox (*Vulpes vulpes*)
Groundhog (*Marmota monax*)	Silver-haired Bat (*Lasionycteris noctivagans*)*
Hoary Bat (*Lasiurus cinereus*)*	Skunk (*Mephitis mephitis*)
House Mouse (*Mus musculus*)	White-tailed deer (*Odocoileus virginianus*)
Little brown bat (*Myotis lucifugus*)	White-footed mouse (*Peromyscus leucopus*)
Muskrat (*Ondatra zibethicus*)	* = migrants

Red fox in Berry's Creek Marsh (above); White-tailed deer near Losen Slote (below)

ECOLOGICAL SURVEYS - MAMMALS

PRELIMINARY DATA

49

- Mammals species sighted are common to suburban environments
- No bobcats, coyotes, or wolves observed
- Red fox appear to be the largest predators (non-domesticated)
- Muskrats have only been rarely observed
- No marine mammals (e.g., seals) have been sighted during surveys

Groundhog (above);
Snow tracking (Below)

ECOLOGICAL SURVEYS - REPTILES AND AMPHIBIANS

50

- Reptile and amphibian searches conducted in conjunction with mammal nocturnal surveys
- During the late summer, basking surveys conducted on two sunny days at Indian Lake, Willow Lake, Teterboro Airport, and East and West Riser Ditches
- Weekly nocturnal searches for reptiles and amphibians will occur in spring 2017
  - For a six-week period from late April to early June, dedicated searches with lights and night vision equipment will occur in the evenings for up to four hours/evening

ECOLOGICAL SURVEYS - REPTILES AND AMPHIBIANS

51

PRELIMINARY DATA

- Reptile sightings limited to the following species:
  - Red-eared sliders (*Trachemys scripta elegans*)
  - Painted turtle (*Chrysemys picta*)
  - Snapping turtle (*Chelydra serpentine*)
  - Garter snake (*Thamnophis sirtalis*)
- Turtle sightings common
  - Snapping turtles (up to 2 feet in length) observed in upper portions of East Riser Ditch
- No amphibian sightings

Scientist checks the underneath side of a cover board for amphibian usage

ECOLOGICAL SURVEYS - UPCOMING STUDIES

52

- Complete spring and summer fauna surveys (i.e., for 1 full year of survey)
- Conduct vegetation surveys within final alternative footprints
- Finalize EPW and SVAP evaluations
- Perform wetland delineations
- Conduct ecological resource impact analysis
- Analyze collected data to determine appropriate and potential ecological restoration measures

RESTORATION AND MITIGATION OPPORTUNITIES

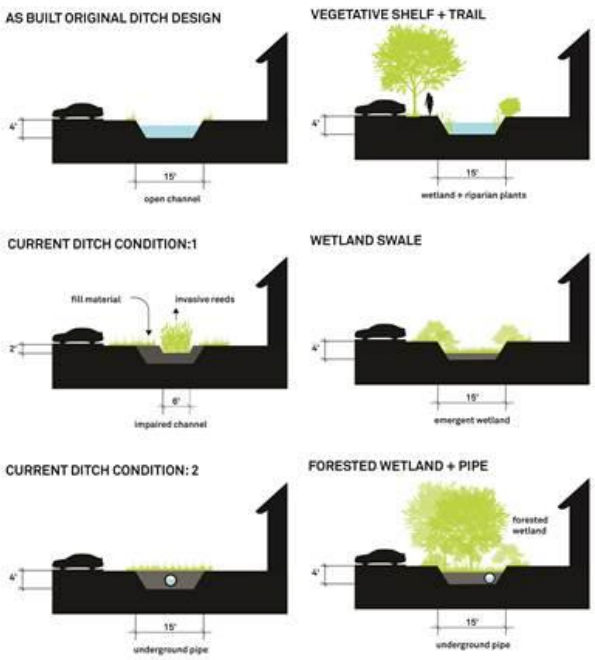
53

- Review of data indicates that there are various restoration opportunities:
  - Green Infrastructure (water quality)
  - Stream/Ditch Restoration
  - Restoration of Habitat Connections
  - Invasive Species Removal
  - Habitat Creation
- Ecological uplift can be realized through green infrastructure: bioswales, rain gardens, habitat restoration
- Mitigation for wetland impacts could include habitat creation, restoration, and/or enhancement (within and outside of the Project Area)
- The Project Area has constraints that need to be considered as part of any ecological restoration: existing mitigation banks, airport operations, and contamination

ENGINEERING-ECOLOGY INTEGRATION

54

- Identify engineering objectives
- Identify existing conditions and need / potential for restoration
- Choose restoration measures that are feasible, sustaining, and provide ecological uplift and human benefits



ENGINEERING-ECOLOGY INTEGRATION

55

- Several opportunities for ecological improvements exist in the Project Area
- Examples of potential opportunities include:
  - Fluvial Park (Little Ferry)
  - Depeyster Creek
  - Northern Kane Tract

Restoration and potential mitigation locations (discussed in upcoming slides)

FLUVIAL PARK

56

- Location: West bank of Hackensack River, north of Route 46
- Area is currently a disturbed lot with fill material and marginal vegetation
- Restoration would strive to increase habitat quality and allow for recreational public access to the river

FLUVIAL PARK CONCEPT

57

- Open water
- Intertidal marsh and mudflat
- Shallow embayment/ intertidal marsh
- Field with native grasses
- Shrub / scrub species
- Nesting structures and bat houses
- Fluvial Park Complex - Berm to be placed at the western edge of the park, a marsh with public access would be created.
- Ecological uplift: water quality improvements, habitat, flood storage

DEPEYSTER CREEK

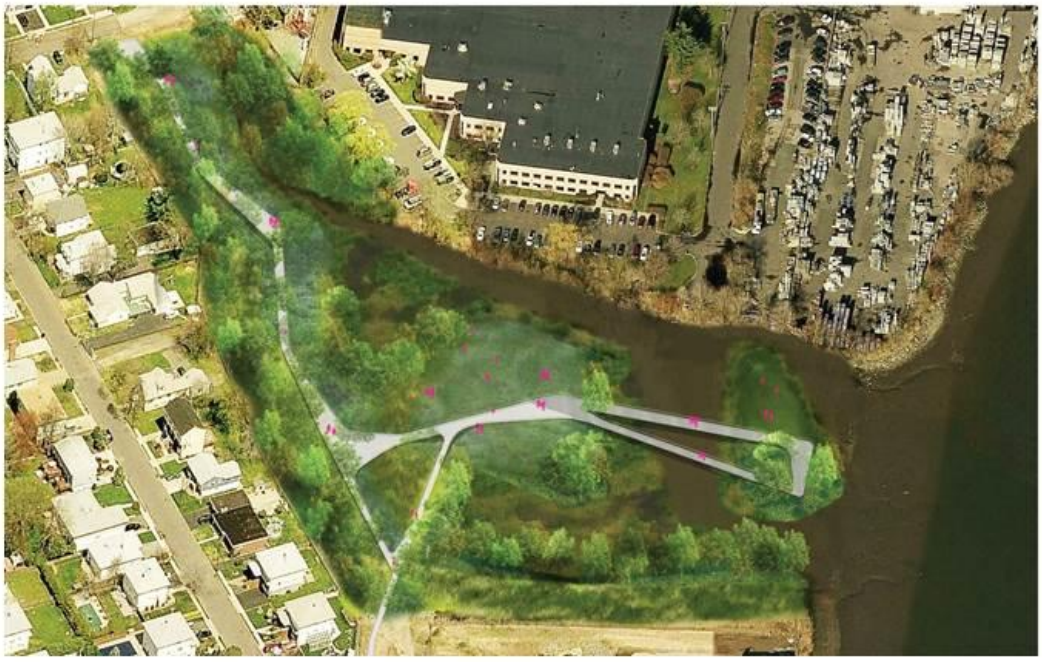
58

- Location: South bank of Depeyster Creek
- Area currently used for storage of construction materials

DEPEYSTER CREEK CONCEPT

59

- Fields with native grasses
- Shrub / scrub species
- Protected shallow embayment with intertidal marsh
- Native woodland with light breaks planted with pollinator species
- Nesting structures and bat houses
- Would provide ecological uplift, flood control, water storage
- Would provides a "green link" from the river to Losen Slote Park



NORTHERN KANE TRACT WETLAND MITIGATION CONCEPT

60

- Location: South of Commerce Boulevard
- Mitigation would seek to provide the following benefits
  - Increase in both species and habitat diversity through the increase in both species conversion of existing common reed-dominated marsh to freshwater wetland (forested and emergent) and protected open area
  - Redirection of Moonachie Creek could alleviate some flooding near Barell Avenue and allow for placement of Atlantic white cedar forest
  - Remove potential fire hazard

NORTHERN KANE TRACT WETLAND MITIGATION CONCEPT

61

- Atlantic white cedar forest
- Shallow open water with emergent marsh fringe
- Native hardwoods
- Preserve area

BACK TO NEPA: COMPLETING THE IMPACT ANALYSIS FOR THE DRAFT EIS

62

- Integrated NEPA "early" into the planning process – Phased approach
- Completing ecological investigations on an increasingly fine basis as concepts materialize
- Using environmental considerations to "screen" concepts
- Examining opportunities to integrate "ecological uplift" into alternatives
- Involving the public throughout the process
- As concepts become alternatives, complete site-specific ecological resource studies

NEXT STEPS

CHRISTOPHER BENOSKY, AECOM

NEXT STEPS

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NJDEP / AECOM UPCOMING ACTIVITIES

- Prepare Meeting Summary for CAG #9
- Continue developing:
  - Concepts, Alternatives, and Costs
- NJDEP submits APA to HUD by June 1, 2017
- CAG #10 on June 27, 2017
  - Alternative 3 – Hybrid Alternative

NEXT STEPS

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CAG: CALL TO ACTION

- Submit comments from CAG #9 meeting by **June 3, 2017**
- Share information from this meeting with friends and neighbors
- Continue to build interest in the Project
- Ensure the public knows about upcoming information (to be posted on Project website)

NEXT STEPS

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Critical Information

June 27, 2017
CAG Meeting #10: Alternative 3: Hybrid Alternative

Project Website
www.rbd-meadowlands.nj.gov

Project Email
rbd-meadowlands@dep.nj.gov

Question & Answer

THANK YOU!

4.0 Personal Notes