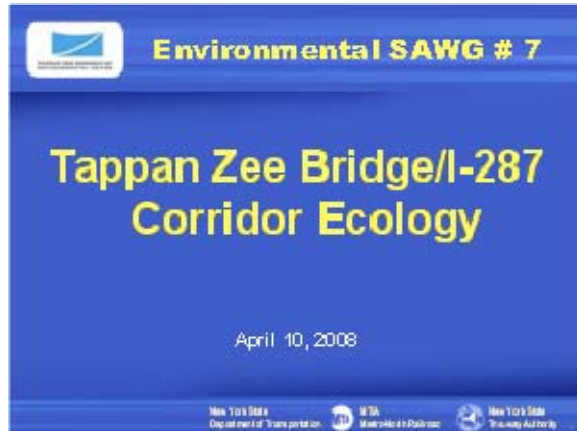
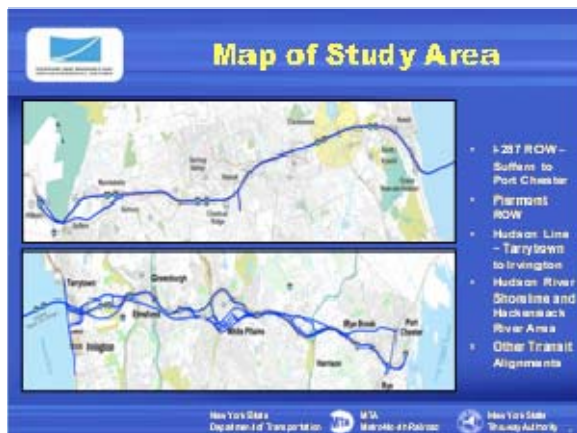


Agenda Item 2
Technical Presentation – Corridor Ecology



Slide 1

The topic of SAWG #7 is the ecology of the Corridor study area from Suffern to Port Chester, exclusive of the Hudson River, which was addressed in SAWG #5.



Slide 2

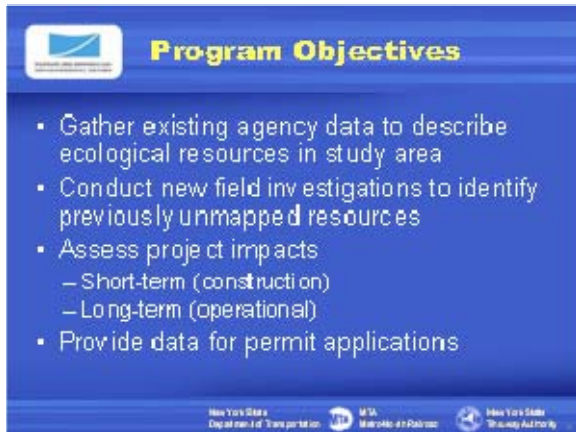
A map depicting the various alignments that comprise the Corridor Ecology study area.

- I-287 ROW, Suffern to Port Chester;
- Piermont ROW, Suffern to Airmont Rd;
- An expanded area at the Hackensack River,
- Hudson River shoreline, 500 feet north and south of I-287;
- Metro-North Hudson Line ROW from Tarrytown to Irvington; and
- Other bus & CRT alignments in Westchester County.



Slide 3

The photo illustrates the natural areas (i.e., vegetated areas) that occur in the ROWs and alignments that were investigated by the project team for ecological resources. In the I-287 ROW, the investigated area (edge of pavement to the ROW boundary) is typically 100 to 125 feet, but can range from approximately 20 to 200+ feet.



Program Objectives

- Gather existing agency data to describe ecological resources in study area
- Conduct new field investigations to identify previously unmapped resources
- Assess project impacts
 - Short-term (construction)
 - Long-term (operational)
- Provide data for permit applications

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Slide 4

Description of the Program Objectives.

- Quantifying ecological resources,
- Assessing project alternatives for short term construction and long term operational impacts, and
- Providing data for permit applications.



Federal Agency Data Utilized

- National Oceanic & Atmospheric Administration
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Forest Service
- US Geologic Service

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Slide 5

A listing of federal agencies from which ecological data for the project area was collected was presented.



State & Local Agency Data Utilized

- NYS Dept. of Environmental Conservation
 - Water quality classification
 - Freshwater wetlands
 - Regulated habitats
 - Trout stocking program
 - Other flora and fauna information
- NY Natural Heritage Program
 - Threatened and endangered species
- County Information
 - Critical environmental areas

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Slide 6

A listing of state agencies from which ecological data for the project area was collected was also presented.



Slide 7

Regulatory Agency Mapped Resources
title slide



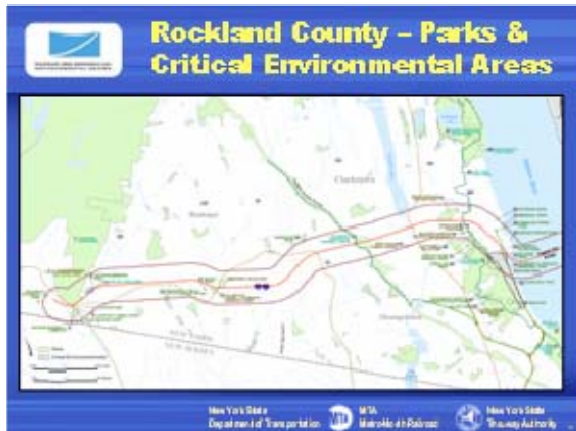
Slide 8

A map showing all National Wetland Inventory and NYSDEC-regulated wetlands in Rockland County. NYSDEC wetland program classifies wetlands (Classes I through IV) based on their ecological resources. Class I wetlands receive the highest regulatory protection.



Slide 9

NWI and Wetland Maps in Westchester
County.



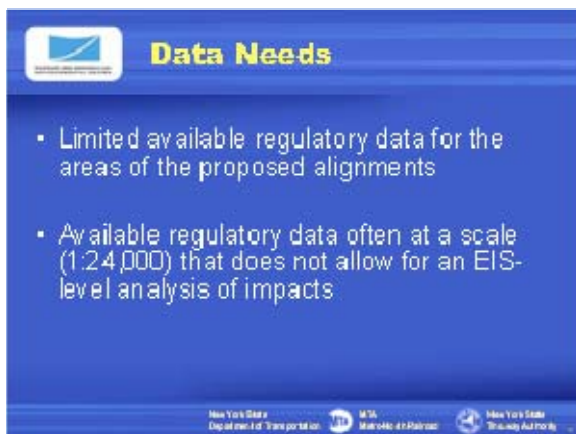
Slide 10

A map showing the locations of parkland and Critical Environmental Areas (CEAs) in Rockland County. Due to the high level of anthropogenic development, most large vegetated parcels within and adjacent to the study area are parks and CEAs. The red line in the slide represents the footprint of the I-287 ROW.



Slide 11

Parks and Critical Environmental Areas – Westchester County



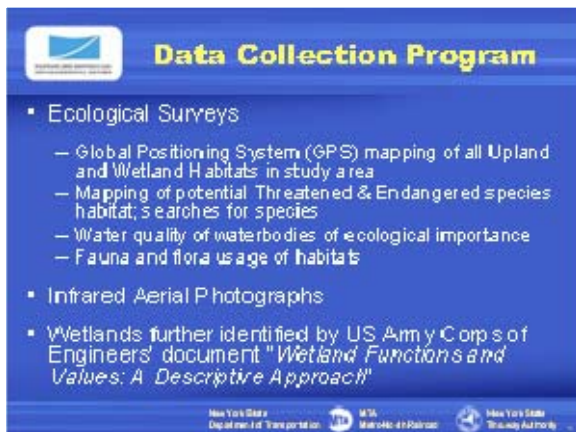
Slide 12

A slide identifying the remaining data needs (after gathering agency data). Specific shortcomings of the agency data include the threshold below which resources are not mapped, and also that the accuracy of those resources that are mapped is insufficient (e.g., too large of a scale) for the purpose of conducting an EIS-level investigation.



Slide 13

Data Collection Program title slide



Slide 14

Identification of the data collection program. The activities include:

- GPS mapping of all habitats within the project alternatives;
- Identifying and mapping threatened and endangered species habitats (if present) and searches for organisms;
- Water quality sampling program;
- Use of infra red aerial photographs;
- Collection of wetland data, wetland functions and values.



Slide 15

The Data Collection Program was reviewed and approved by several agencies: including US Environmental Protection Agency, Fish and Wildlife Service, Army Corps of Engineers, and the New York State Department of Environmental Conservation.

Methodologies

- Boundaries of each terrestrial and wetland habitat mapped with GPS
- Habitats mapped with +/- 1 meter accuracy
- Habitats identified per the New York State Natural Heritage Program's *Ecological Communities of New York State*
- Each habitat's dominant plant species identified and recorded

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Slide 16

The methodologies for the field efforts, specifically habitat mapping. All upland and wetland habitats are mapped by Global Positioning System (GPS) with +/- 1 meter accuracy. Every habitat is identified per the NY Natural Heritage Program's (NY NHP's) document *Ecological Communities of New York State*.

Mapping Results

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Slide 17

Mapping Results

Mapping Results (to date)

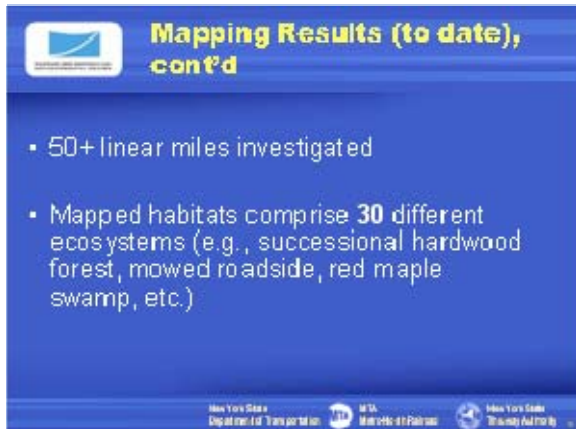
Areas highlighted in light blue have been investigated

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Slide 18

The areas which have already been investigated are identified in slide by a lighter shade of blue. These areas include:

- I-287 ROW,
- Metro North Hudson Line ROW,
- Hackensack River Area, and
- Hudson River Shoreline



**Mapping Results (to date),
cont'd**

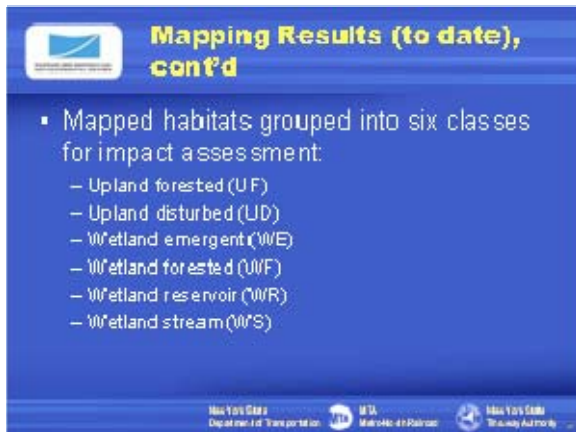
- 50+ linear miles investigated
- Mapped habitats comprise **30** different ecosystems (e.g., successional hardwood forest, mowed roadside, red maple swamp, etc.)

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Slide 19

Summary statistics of the data collection program to date.

Over 50 miles of alignments have been mapped, and 30 different ecosystems have been identified, based on the NYNHP 's document, *Ecological Communities of New York State*.



**Mapping Results (to date),
cont'd**

- Mapped habitats grouped into six classes for impact assessment:
 - Upland forested (UF)
 - Upland disturbed (UD)
 - Wetland emergent (WE)
 - Wetland forested (WF)
 - Wetland reservoir (WR)
 - Wetland stream (WS)

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Slide 20

Because of the sheer number of ecosystems recognized using the identified criteria, analysis of impacts by specific type of ecosystem would be tedious and of limited value. Instead, the 30 different ecosystems identified were further grouped into six broader categories, as presented on this slide.



Examples of Upland Habitats

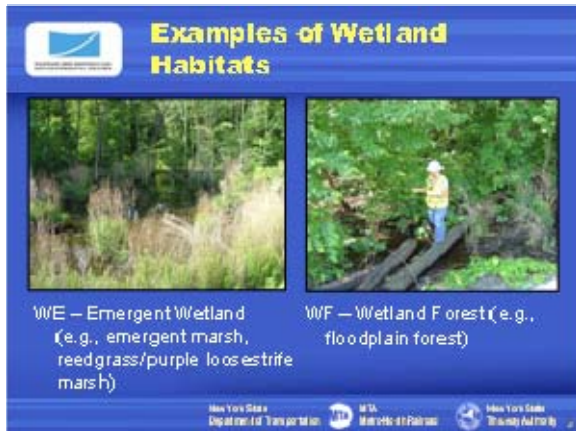
UD — upland disturbed (e.g., mowed roadside)

UF — upland forest (e.g., successional hardwood forest)

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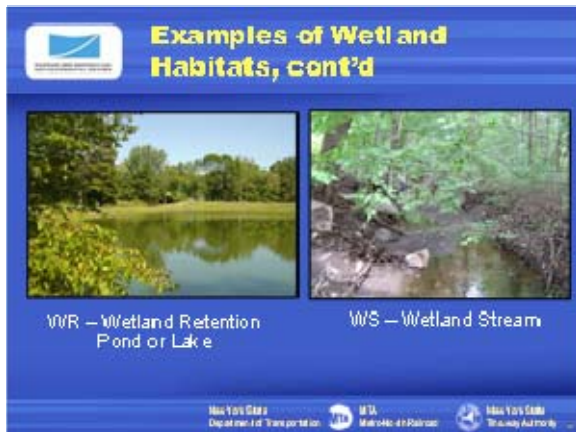
Slide 21

Examples of upland disturbed and upland forested habitats



Slide 22

Examples of wetland emergent and wetland forested habitats



Slide 23

The examples of pond, lakes, and retention areas and wetland streams.



Slide 24

Example of individual mapped upland and wetland habitats around the Hackensack River.



Slide 26

Example of the individual habitats (see previous slide) grouped into the six broad mapping categories UD, UF, WE, WF, WR, and WS.



Slide 26

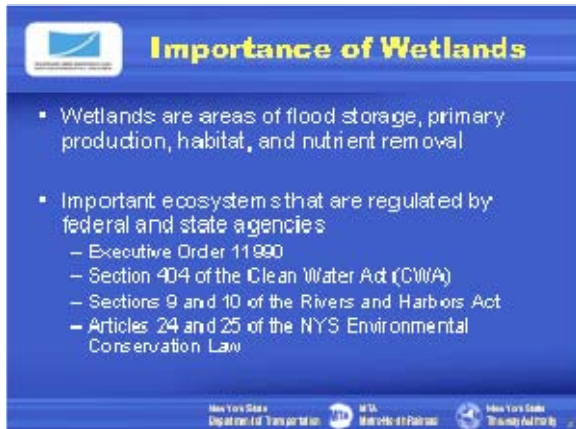
Example of the aerial photo analysis.

The use of infrared photography to expand habitat mapping beyond the edge of the field-mapping was illustrated.



Slide 27

Wetlands



Importance of Wetlands

- Wetlands are areas of flood storage, primary production, habitat, and nutrient removal
- Important ecosystems that are regulated by federal and state agencies
 - Executive Order 11990
 - Section 404 of the Clean Water Act (CWA)
 - Sections 9 and 10 of the Rivers and Harbors Act
 - Articles 24 and 25 of the NYS Environmental Conservation Law

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Slide 28

Wetlands are important ecosystems that provide ecological functions and values (e.g., flood storage, habitat, etc.). Due to their importance there are numerous laws that protect them.



Upland/Wetland Boundary



Pink flags on either side of ditch demarcate the upland/wetland boundary

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Slide 29

An example photograph of a wetland flagging exercise to define the wetland/upland boundary (see pink flags in photo). Wetland are identified as those areas having hydric plants, hydric soils, and wetland hydrology.



US Army Corps of Engineers' "Wetland Functions and Values: A Descriptive Approach"

- Provides guidance on how to identify and display wetland functions and values
- Data can be collected quickly in the field
- Used for highway projects and integrated management projects
- Characterization of wetland resources are necessary for Section 404 permit application requirements

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Slide 30

All mapped wetlands were further identified by noting their functions and values, using the methodology described in the US Army Corps of Engineers manual "*Wetland Functions and Values: A Descriptive Approach*"

Data Collection Program - Wetland Functions

- Groundwater Recharge/Discharge
- Floodflow Alteration
- Fish and Shellfish Habitat
- Sediment/Toxicant Removal
- Nutrient Removal/Retention/Transformation
- Production Export (Nutrient)
- Sediment/Shoreline Stabilization
- Wildlife Habitat

Slide 31

Wetland Functions, as identified per *Wetland Functions and Values: A Descriptive Approach*” document.

Data Collection Program - Wetland Values

- Recreation
- Educational/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics
- Threatened or Endangered Species Habitat

Slide 32

Wetland Values, as identified per *Wetland Functions and Values: A Descriptive Approach*” document.

Wetland Function-Value Evaluation Form

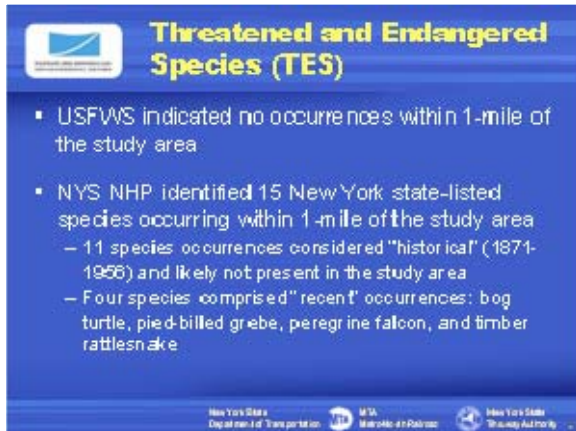
Slide 33

An example of the data sheet used to collect information on each mapped wetland’s functions and values.



Slide 34

- The threatened and endangered species (TES) program was described.



Slide 35

No occurrences of federal TES were identified in the study area. Fifteen state-listed TES were identified; however, 11 of these are “historic” (i.e., pre-1956) observations; these observations are given considerably less weight in the analysis. The four remaining species that have been “recently” observed were identified.



Slide 36

A description and photos of the Peregrine Falcon and Pied-billed grebe. Both species are listed by New York State as threatened and endangered species.

Threatened and Endangered Species, cont'd

- Timber rattlesnake, *Crotalus horridus*, utilizes various habitats, including forests, floodplains, talus slopes, and rock outcrops.
- Bog turtle, *Clemmys muhlenbergii*, prefers habitat with cool, shallow, slow-moving water, deep soft muck soils, and tussock-forming herbaceous vegetation.

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Slide 37

A description of the timber rattlesnake and the bog turtle. Both species are listed by New York State as threatened and endangered species.

Mapped TES Habitat

- To date, no potential threatened and endangered species habitats identified
- Preferred habitat is unlikely to exist in remaining unmapped areas

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Slide 38

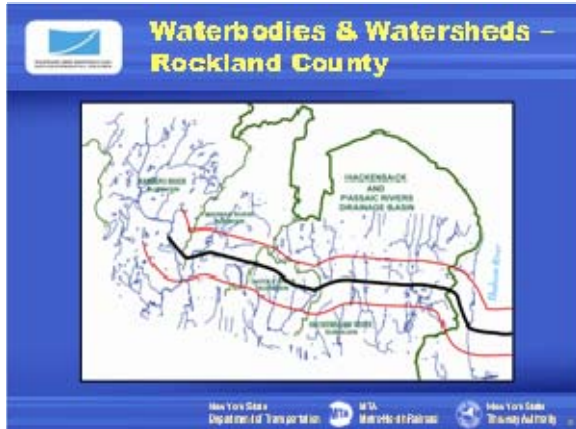
No threatened and endangered species habitat has been found within the project alignments during the habitat mapping activities.

Waterbodies

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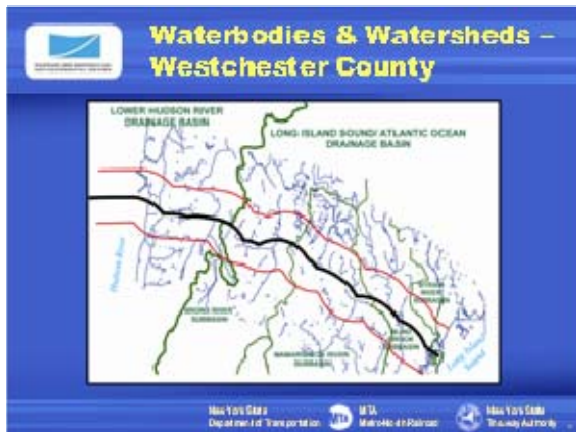
Slide 39

Waterbodies



Slide 40

A map identifying the drainage basins and waterbodies that occur within the Rockland County portion of the study area.



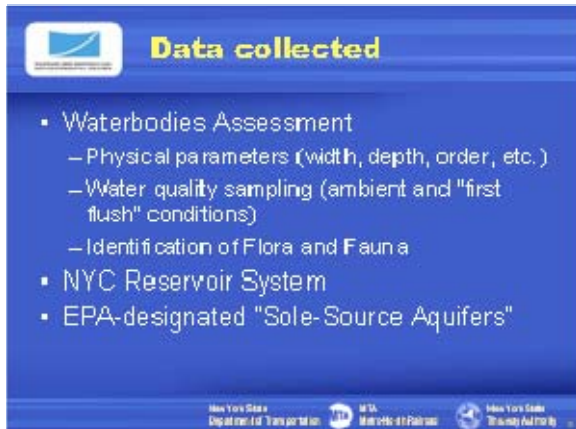
Slide 41

A map identifying the drainage basins and waterbodies that occur within the Westchester County portion of the study area.



Slide 42

The photographs show the highway crossing over two class A waterbodies in Rockland County – Ramapo River and Hackensack River



Data collected

- Waterbodies Assessment
 - Physical parameters (width, depth, order, etc.)
 - Water quality sampling (ambient and "first flush" conditions)
 - Identification of Flora and Fauna
- NYC Reservoir System
- EPA-designated "Sole-Source Aquifers"

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Slide 43

The data collected for all waterbodies is identified. This includes the following:

- Physical parameters
- Water quality data
- Identification of flora & fauna
- Location of NYC watershed
- EPA-designated sole-source aquifers



Reservoirs and Aquifers

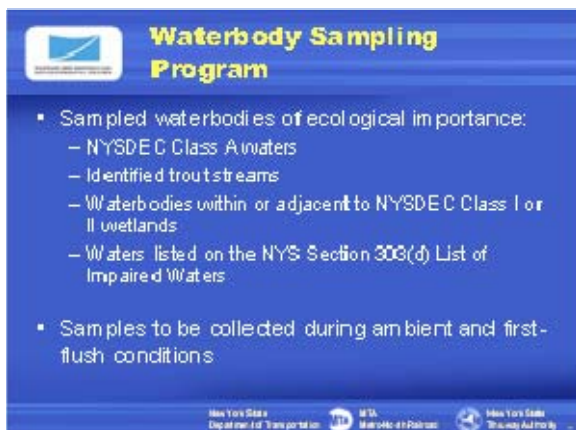
- New York City Reservoir System
 - Croton Watershed located approximately 1.75 miles north of I-287 in Westchester County
 - West of the Hudson River, the Catskill/Delaware watershed is located over 45 miles north of the study area.
- Sole Source Aquifers (SSA)
 - Ramapo SSA includes portions of N. New Jersey and Rockland & Orange Counties
 - Ridgewood Area SSA includes portions of N. New Jersey and Rockland County

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Slide 44

Reservoirs & Aquifers – no NYC reservoirs are within the study area, but two SSAs (Ridgewood and Ramapo) are located in the western portion of the study area.

NYC watershed also supplies drinking water to much of Westchester.



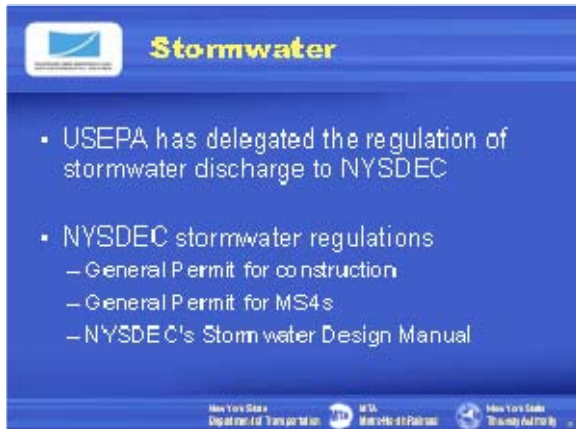
Waterbody Sampling Program

- Sampled waterbodies of ecological importance:
 - NYSDEC Class A waters
 - Identified trout streams
 - Waterbodies within or adjacent to NYSDEC Class I or II wetlands
 - Waters listed on the NYS Section 303(d) List of Impaired Waters
- Samples to be collected during ambient and first-flush conditions

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Slide 45

The waterbody sampling program was described. Water samples are being collected during normal-flow, or “ambient” and “first-flush” conditions for all Class A waterbodies, trout streams, waterbodies in and/or adjacent to NYSDEC Class I & Class II wetlands, and 303(d)-listed waters.



Stormwater

- USEPA has delegated the regulation of stormwater discharge to NYSDEC
- NYSDEC stormwater regulations
 - General Permit for construction
 - General Permit for MS4s
 - NYSDEC's Stormwater Design Manual

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Slide 46

A brief overview of stormwater management, including regulatory background.



Stormwater – Water Quality Controls

- Improve water quality through mechanical and/or biological treatment



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Slide 47

Photographs illustrating the mechanical or biologic treatments that are currently available.



Stormwater – Water Quantity Controls

- Prevents flooding by storing runoff for later discharge



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Slide 48

Photo of a stormwater storage unit.

Wrap-Up

- Extensive habitat mapping and wetlands functions and values assessment will provide a comprehensive impact assessment
- Compliance with storm water regulations will reduce impacts through quality and quantity management requirements

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Slide 49

End slide.