Public Meeting
Norwalk River Site 2 Dam

Dam Rehabilitation Project

April 19, 2018

By

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and
Paul Welle

Roles / Responsibilities

- Local Sponsor – CT Department of Energy and Environmental Protection (DEEP)
- Technical and Contracting Support – USDA, NRCS in Tolland, CT
- Technical Contractor – GSFW Joint Venture
  - GSFW = Golder Associates, Schnabel Engineering, Freese and Nichols, and Wilson and Company
  - Schnabel is taking the technical lead

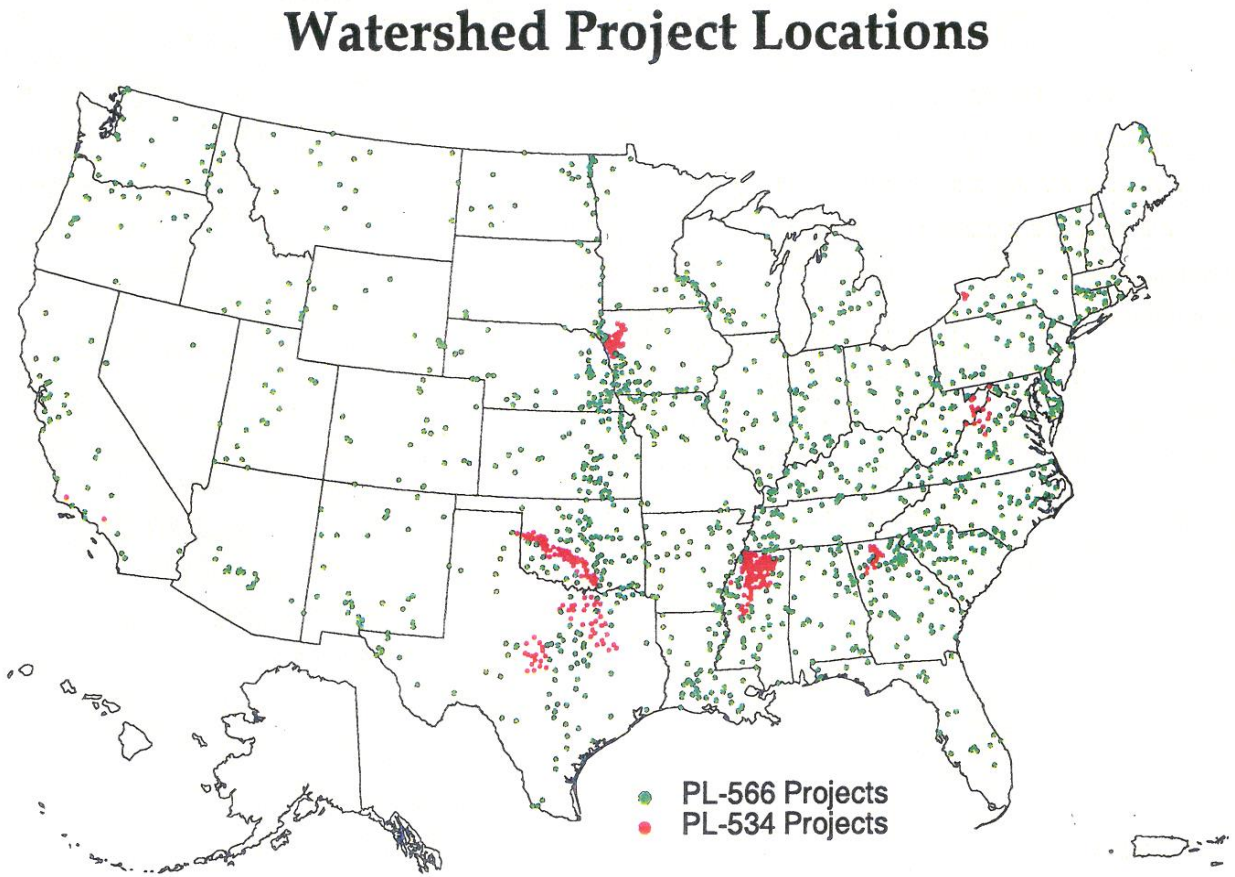
Schnabel Subcontractors

- Wade Biddix – Planning Team Leader
- James Featherston - Economist
- Anthony Russo - ASA Analysis and Communications, Inc.
  - Eugene Boesch – PhD Archaeologist

Today's Objectives

- Share Information on Norwalk River Site 2
- Discuss the Dam Rehab. Planning Process
- Review Reasons Rehabilitation is Needed
- Discuss Planning Activities to Date
- Discuss Potential Alternatives for Rehab.
- Seek Feedback and Input from Public

Small Watershed Program



NRCS has assisted communities build more than 11,000 dams since 1948

Dam Rehabilitation Legislation

"The Small Watershed Rehabilitation Amendments"

(Public Law 106 - 472; Sec. 313)

Enacted November 9, 2000

Rehabilitation Defined

- Extend service life of dams and meet applicable safety & performance standards
    - Prolong beyond original life
    - Replace deteriorating components
    - Repair after catastrophic events
    - Upgrade to meet dam safety laws
    - Decommission (removal)

The only dams eligible for rehabilitation under this program are those originally built with NRCS assistance

What NRCS Provides

- 100% of Cost to Develop a Dam Rehab. Plan
- If Funded After The Plan is Developed:
  - 100% of Design Cost
  - 65% of total project cost or 100% of actual construction cost (whichever is less)

What DEEP Provides

- Sponsorship as Owner of the Dam
- 35% of Construction Costs
  - Cash
  - In-Kind Credit
- Continue to Operate and Maintain the Dam After Rehabilitation
- Develop an Emergency Action Plan
- Support Good Floodplain Management

Dam Rehabilitation Planning and Implementation Process

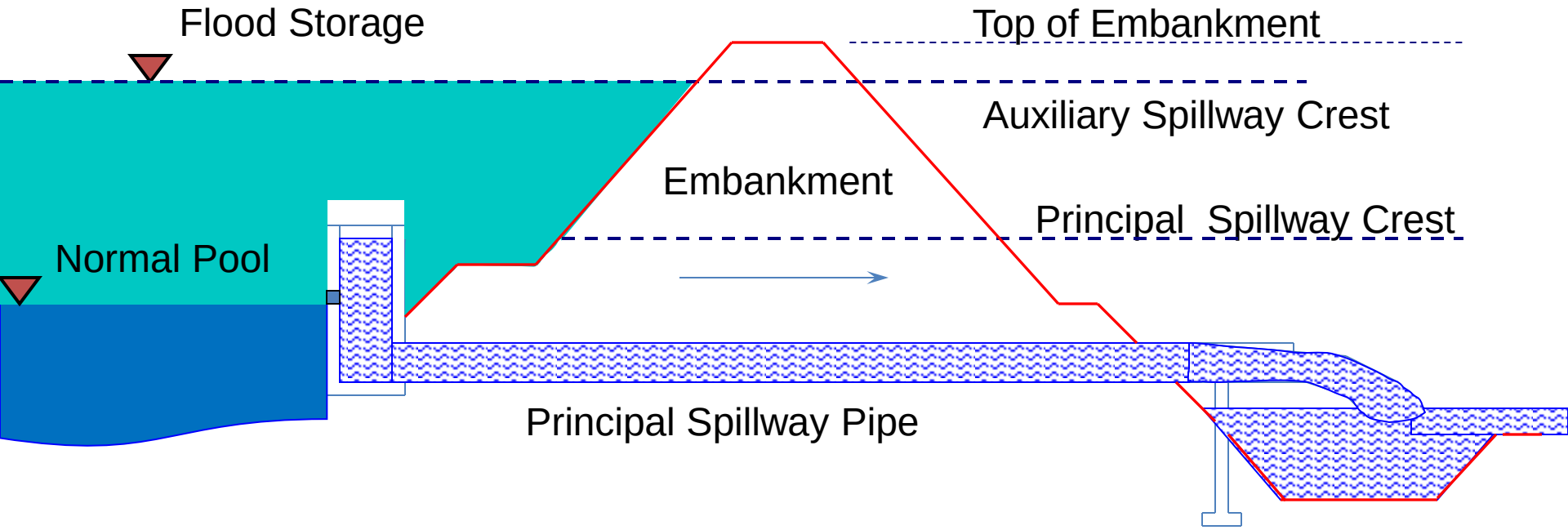
1. Sponsor application
2. Site assessment and risk analysis
3. Ranking of applications
4. Project Planning
5. Design
6. Construction

Planning Process

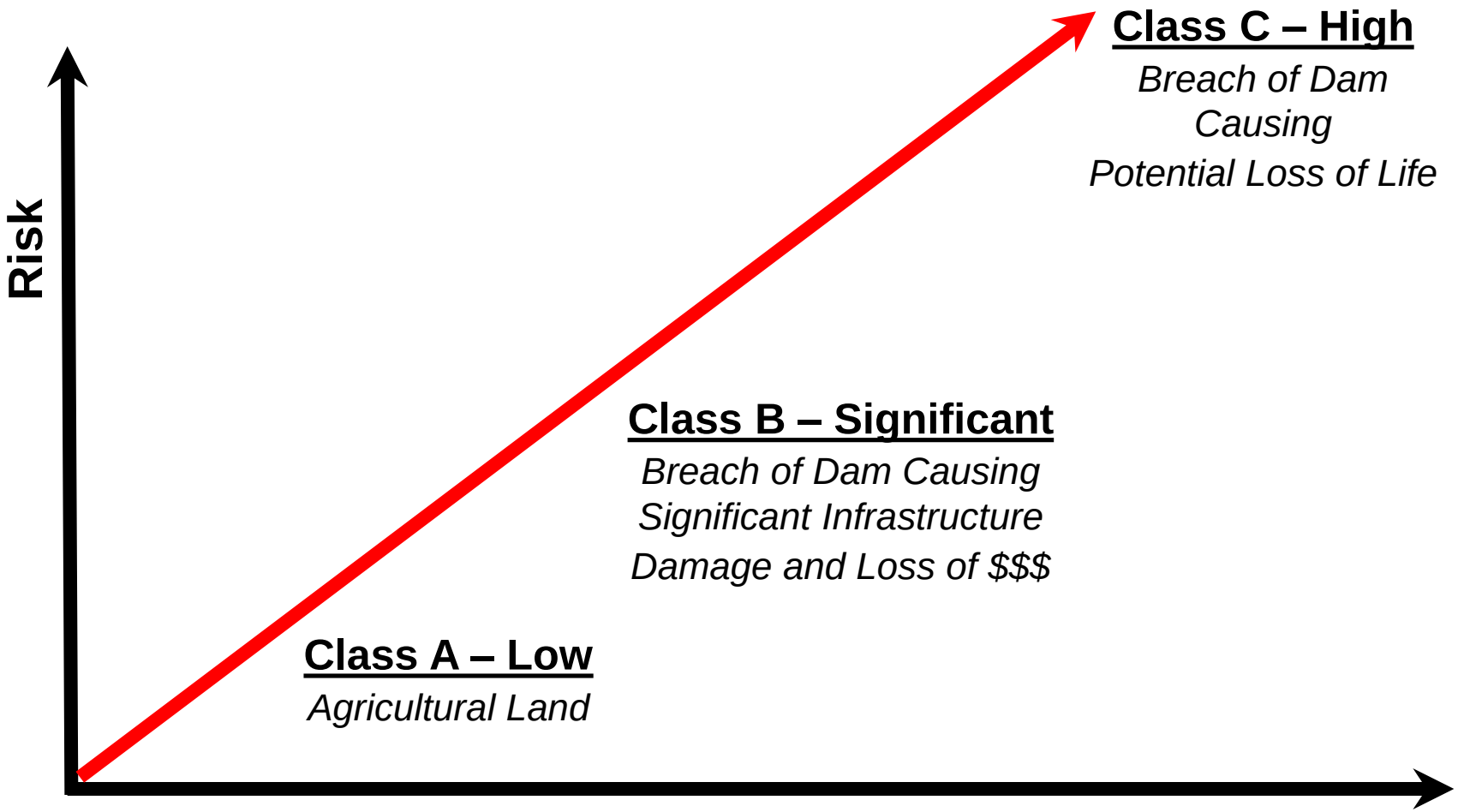
- Phase I – Data Collection and Analysis
- Phase II – Formulate and Evaluate Alternatives;
  - Sponsor makes Final Decision on what is done
- Phase III – Plan Development, Reviews, and Approvals

Usually takes 18 months – 2 years to develop a plan and get all the approvals.

Cross-Section of a Typical Floodwater Retarding Structure



Hazard Classes of Dams



Norwalk River Site 2 Dam

- **Dam needs to be upgraded to meet current safety and performance criteria -** Does not meet current design storm criteria. Dam was built in 1979 as significant hazard. It has been reclassified as high hazard.
- **High hazard dam with people at risk downstream** – Based on DRAFT breach inundation map, about 180 residences, 100 commercial properties, multiple roads and bridges, and infrastructure downstream would be impacted by breach.

DEEP

- Sole Sponsor and Owner of the Dam.
- NRCS conducted assessment of the condition of the dam in September 2011. Showed high risk index in case of dam failure.
- Requested Federal Assistance With Dam Rehabilitation Program in July 2014.
- NRCS received funding for planning in 2014.
- Planning contract awarded in November 2017.

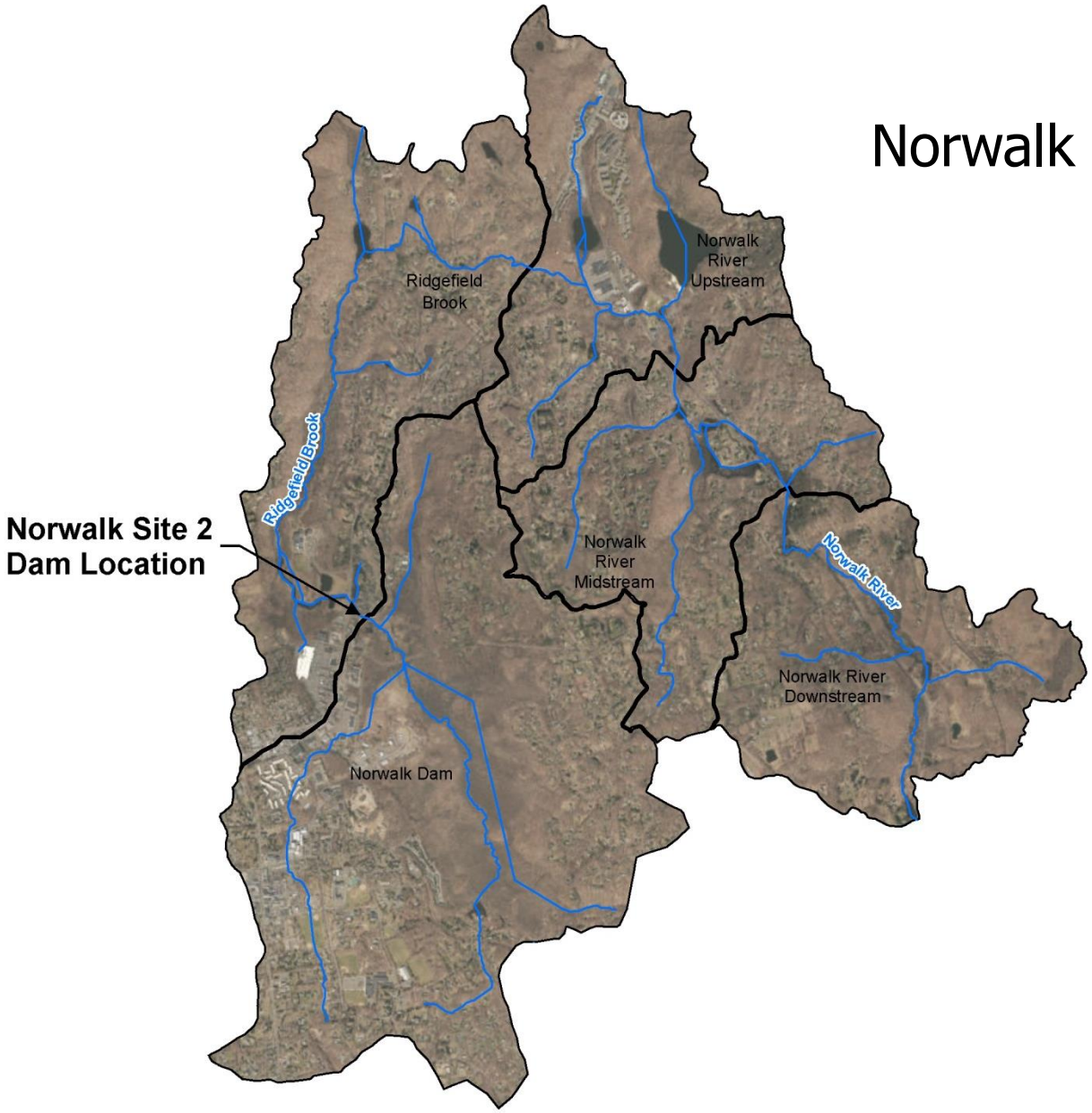
Reasons for Rehabilitation of Dam

- As owner of the dam, DEEP is responsible for meeting State Dam Safety Regulations for a high hazard dam.
- DEEP is responsible for correcting the identified deficiency by repairing or removing the dam.

Norwalk River Site 2 Information and Photos


Litchfield
Hartford
Tolland
Windham
New London
Middlesex
New Haven
Fairfield
Norwalk Site 2 Dam
Watershed Location

Norwalk River Watershed



Site 2 Statistics

- Built in 1979
- Drainage area = 1,628 acres
- Normal pool surface area = 0.8 acres @ EL 571.0
- Design high water = 267 acres
- Top of dam = 336 acres
- Wetland wildlife habitat area = 87 acres
- Length = 440 feet
- Height = 10 feet
- Constructed as a “Significant” hazard dam

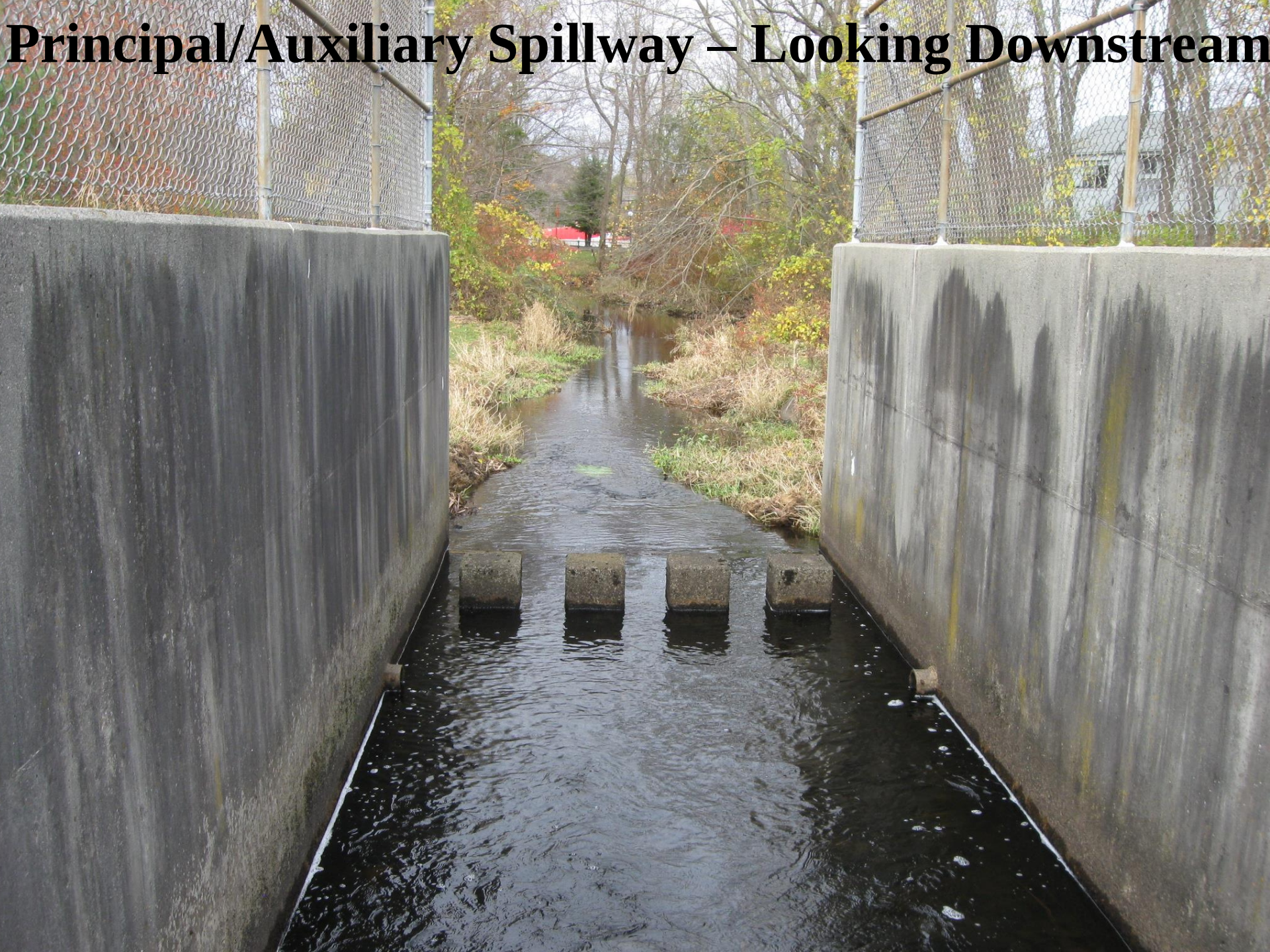

Embankment and Principal / Auxiliary Spillway

Principal/Auxiliary Spillway – Left Side


Looking East Right Abutment


Upstream Embankment-From Principal/Auxiliary Spillway

Principal/Auxiliary Spillway – Looking Downstream

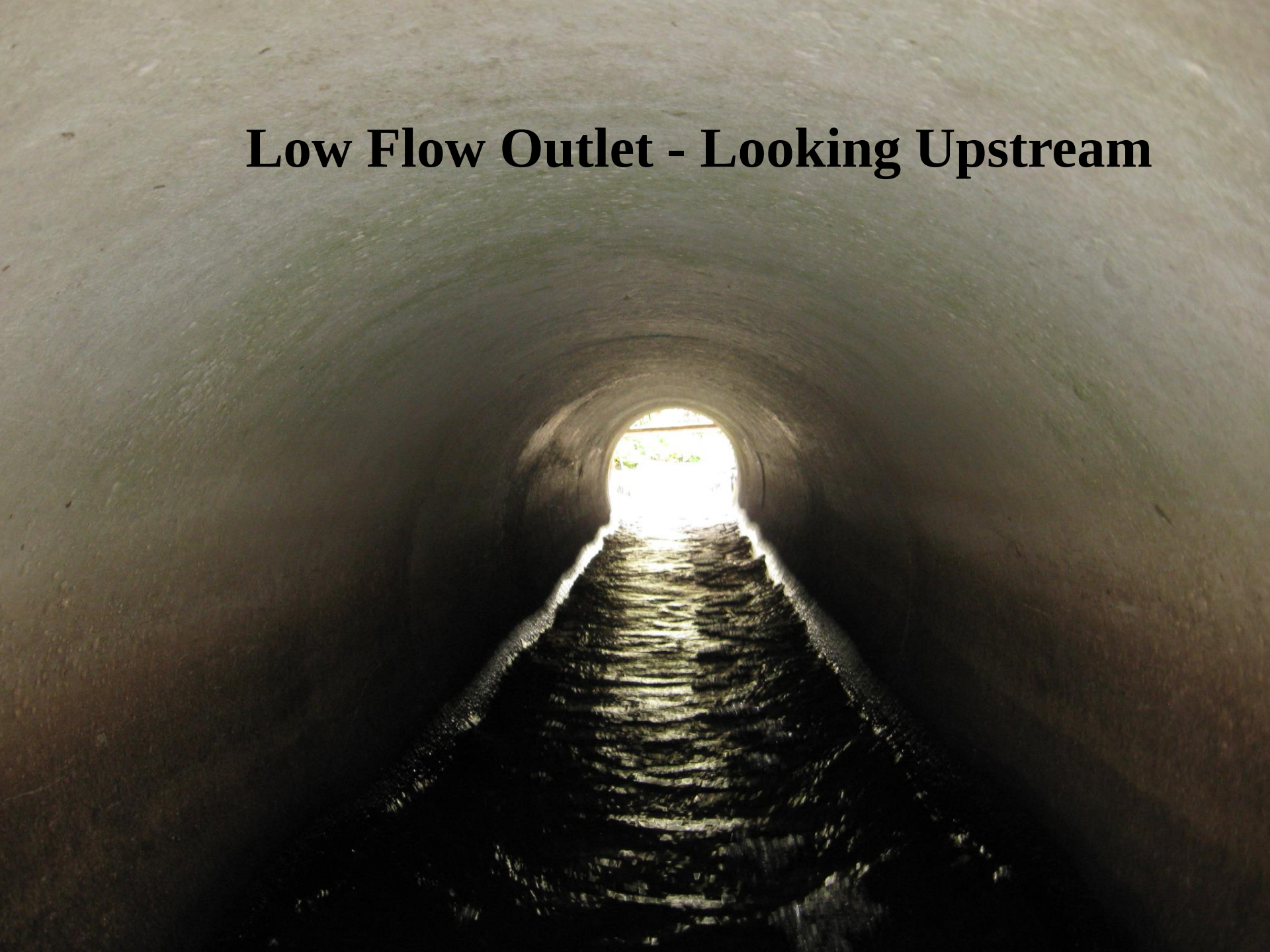


Outlet – Left Side

Outlet – Right Side

Low Flow Inlet

Low Flow Outlet - Looking Upstream



NRCS and DEEP

- As Federal Agency and Sponsor/Owner
  - Consider Potential Effects of Rehabilitation Project and all alternatives on environmental, human, social and economic resources.
  - Satisfy environmental analysis and documentation requirements of the National Environmental Policy Act of 1969 (NEPA).

Alternatives Requiring Analysis

- Future Without Federal Assistance
  (No Federal Funds)
- Decommission Dam
  (controlled breach by DEEP or NRCS)
- Nonstructural Measures
  (floodproof downstream properties)
- Rehabilitation of the existing Dam

Three Types of NEPA Documents

- Environmental Evaluation (EE)
- Environmental Assessment (EA)
- Environmental Impact Statement (EIS)

NRCS-CPA-52 Form

- Document ***Existing*** conditions for all natural resources
- Document conditions of natural resources with various ***Rehabilitation Alternatives***

- This form provides concise, comprehensive documentation of compliance with NEPA and all other environmental laws, regulations, Executive Orders, and planning policies.

Some Planning Activities To Date

- Develop Plan of Work and Schedule
- Define Purpose and Need for Project
  - Determine Problems and Opportunities
- Develop Public Participation Plan
- Inventory of Existing Resources (Baseline)
  - Environmental Resources
  - Cultural Resources
  - Engineering Models
  - Socio-Economics Data

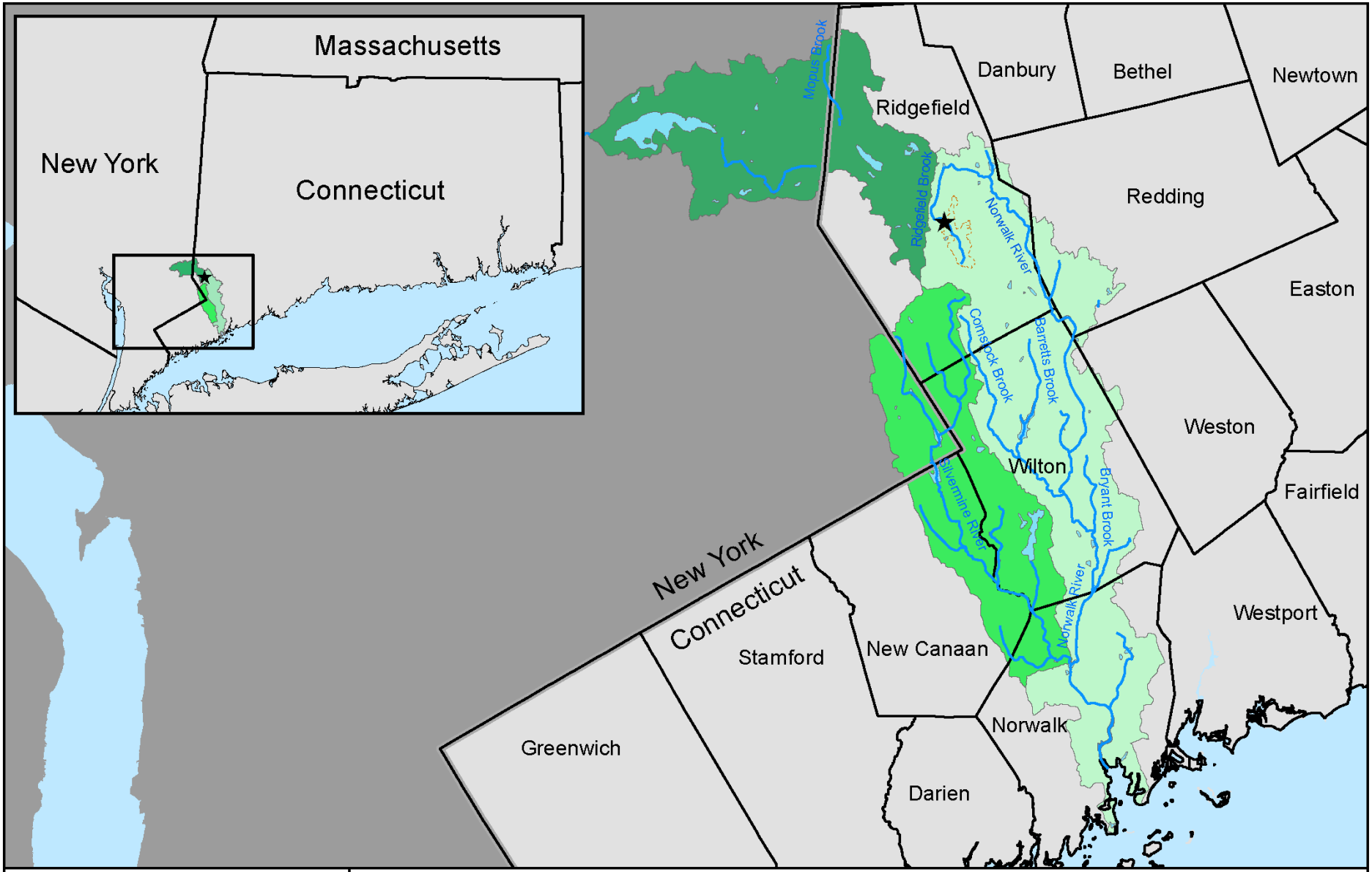
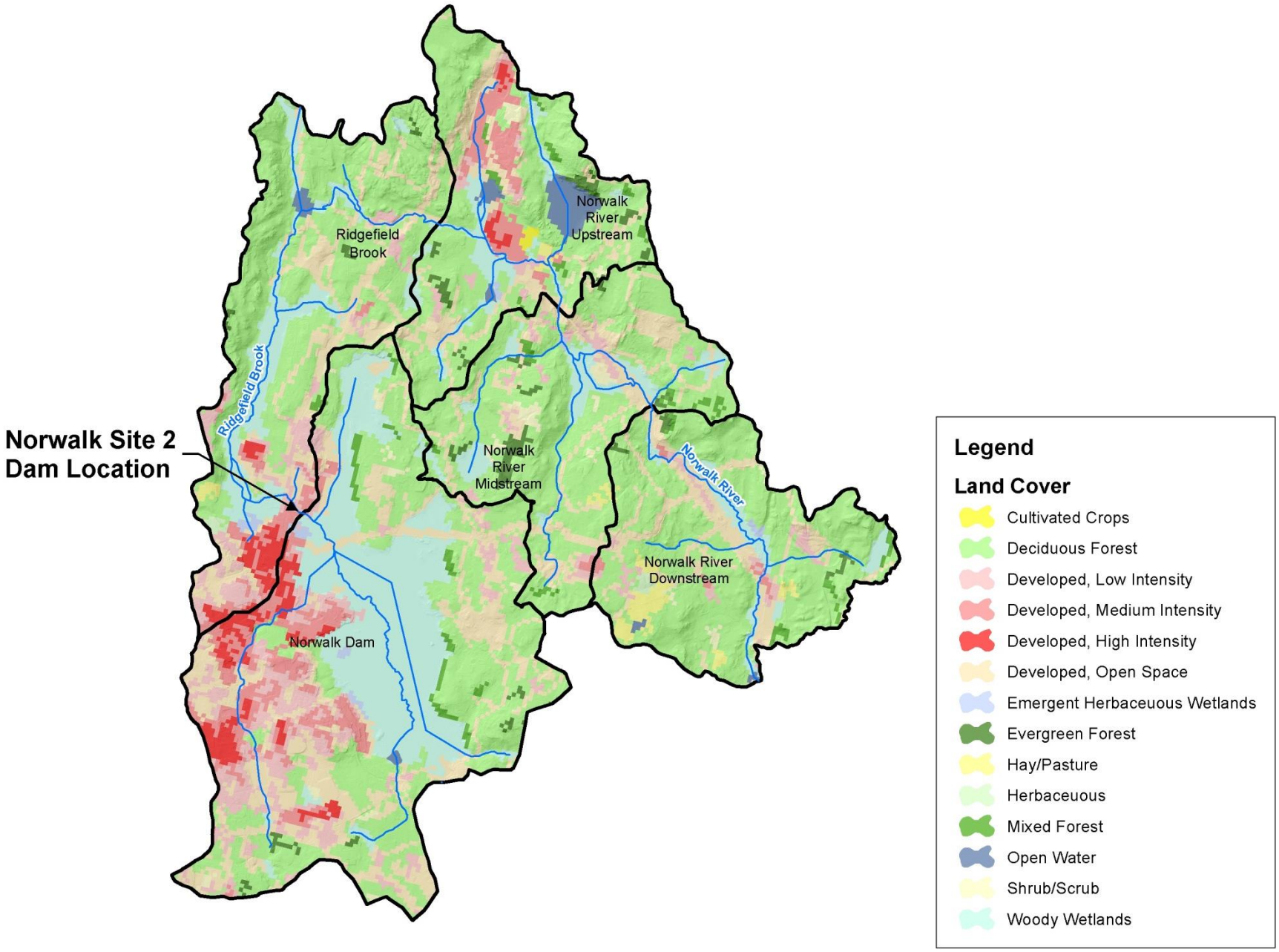


Figure 1-1

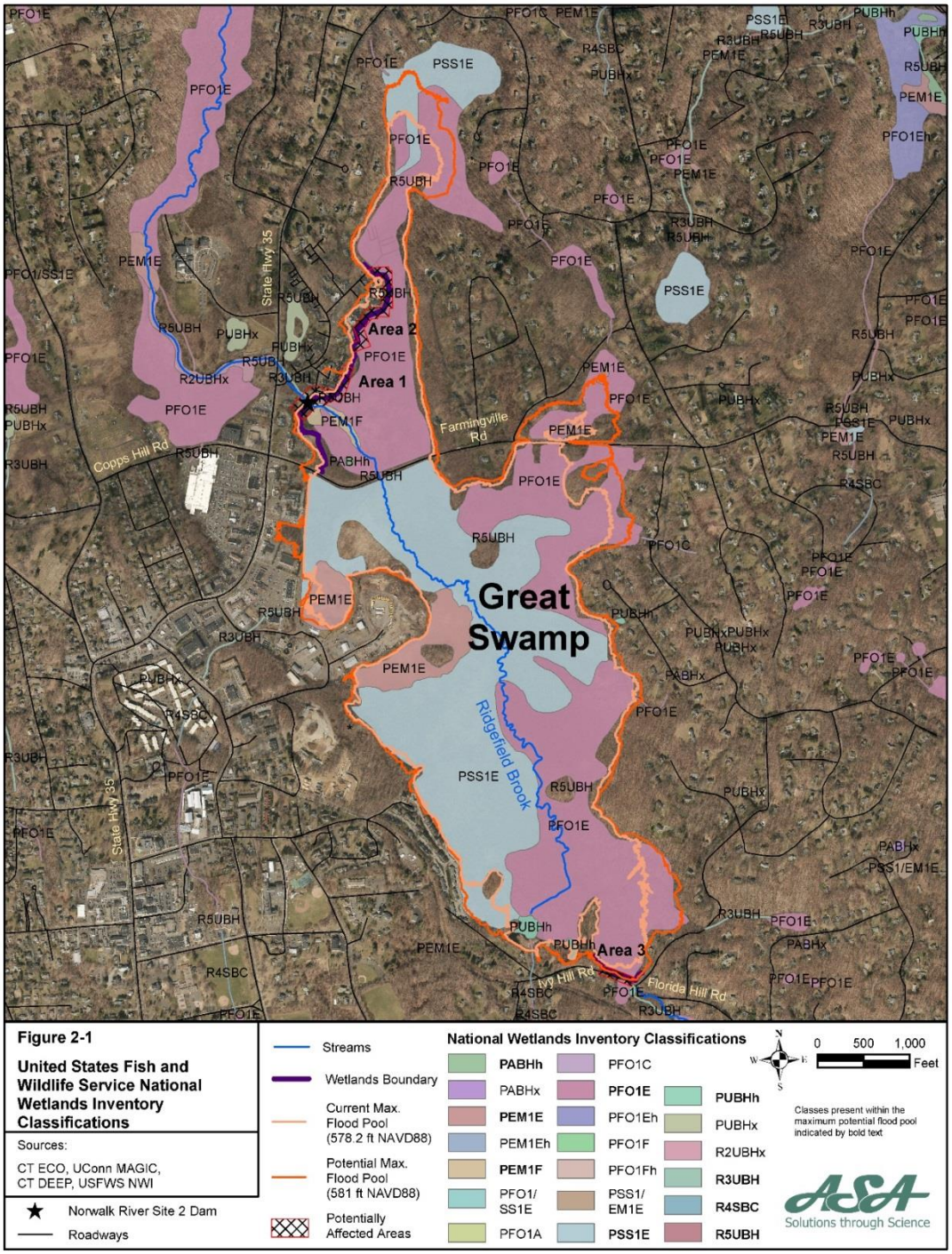
Norwalk River Subwatersheds and Adjacent Titicus River Subwatershed

Sources:
CT DEEP, CT ECO, ESRI

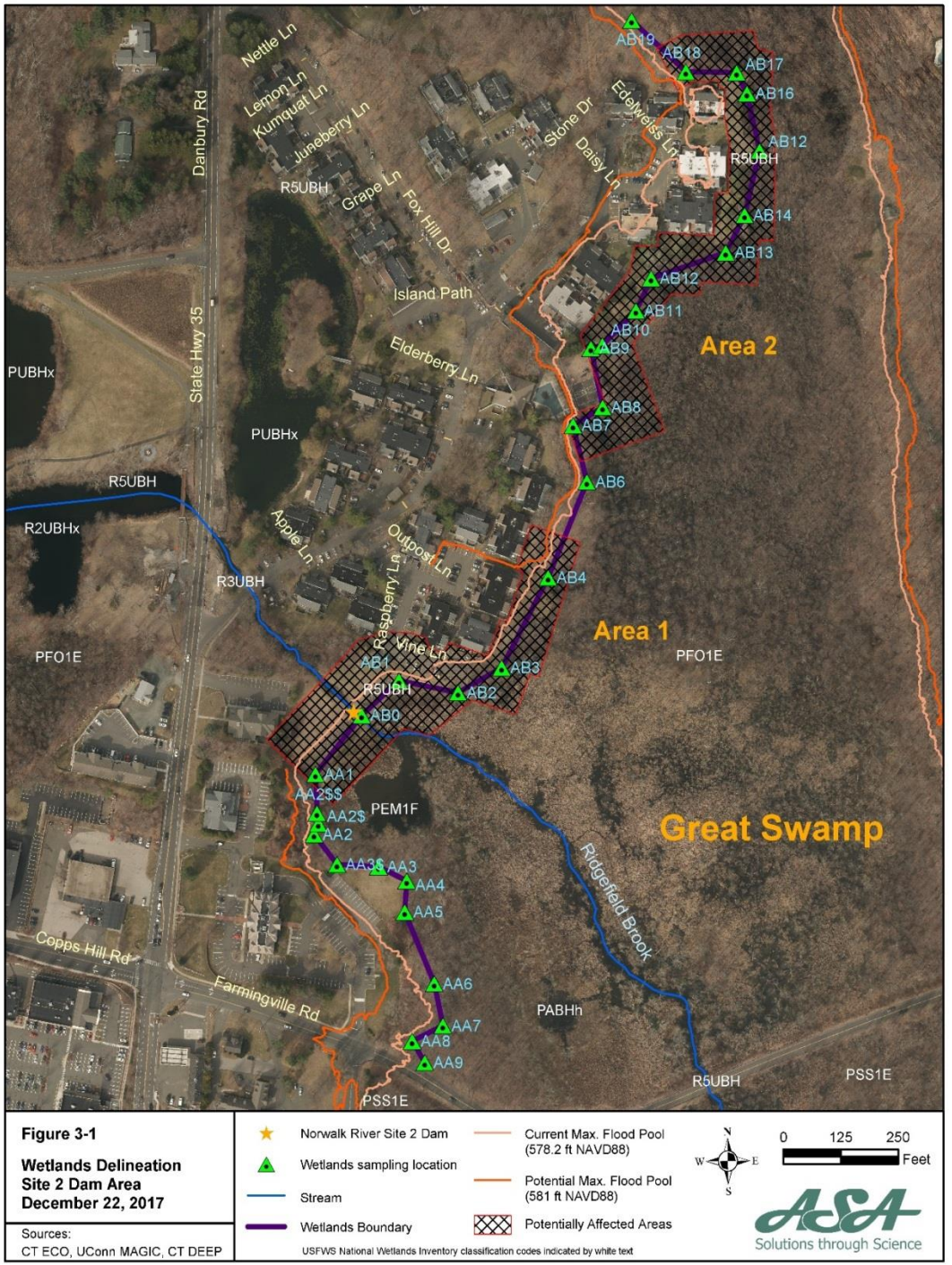
ASA
Solutions through Science


Norwalk Site 2
Dam Location
Ridgefield Brook
Ridgefield Brook
Norwalk River Upstream
Norwalk River Midstream
Norwalk River
Norwalk River Downstream
Norwalk Dam
Legend
Land Cover
Cultivated Crops
Deciduous Forest
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Developed, Open Space
Emergent Herbaceuous Wetlands
Evergreen Forest
Hay/Pasture
Herbaceuous
Mixed Forest
Open Water
Shrub/Scrub
Woody Wetlands

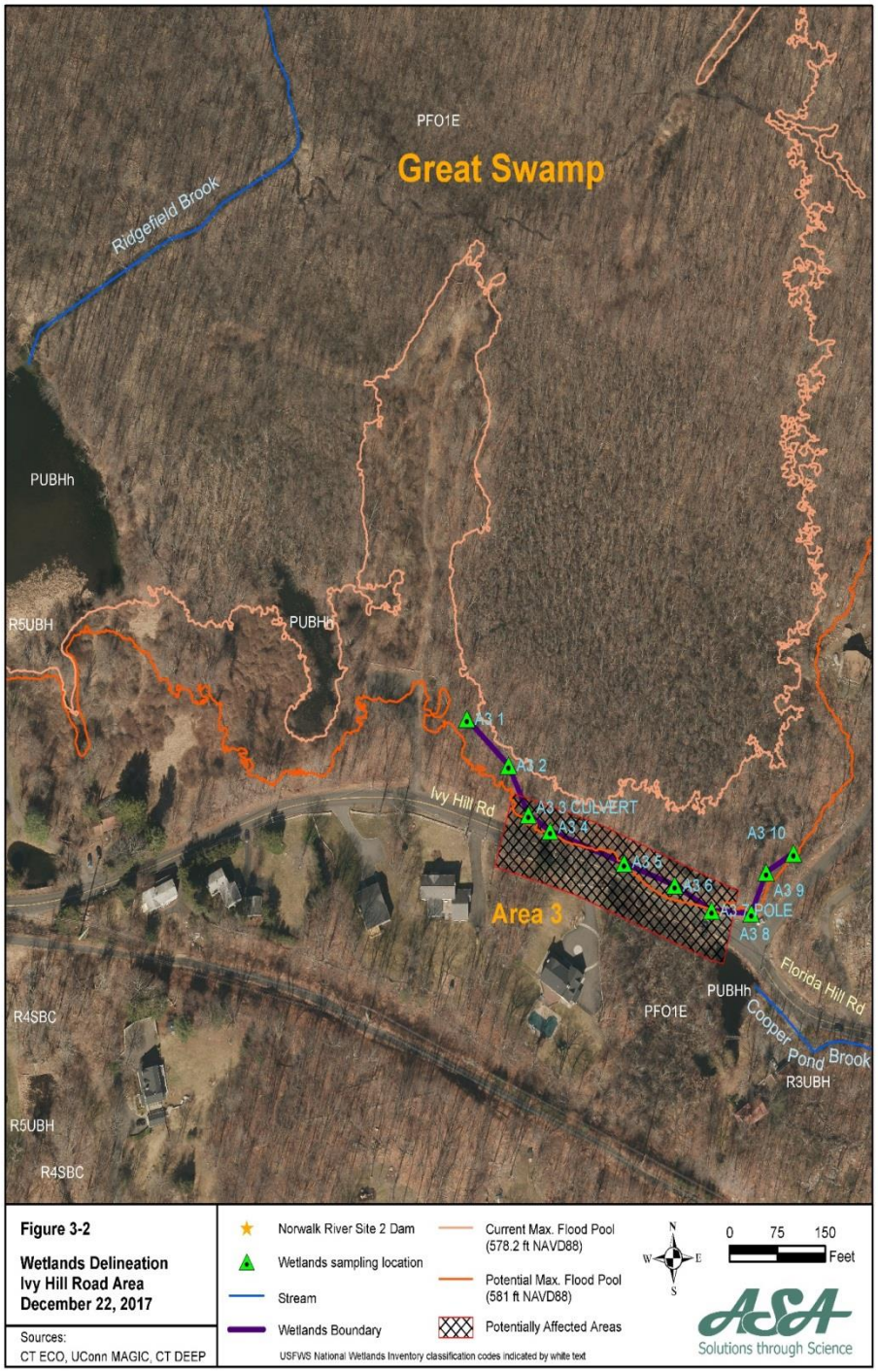
Wetland Types



Wetlands Delineation in Areas 1 and 2 (near Fox Ridge Condos)



Wetlands Delineation in Area 3 (near Ivy Hill Road)



Representative Wetland Types

Palustrine Deciduous (PFO1)

Palustrine Emergent Marsh (PEM/PFO5)

Palustrine Emergent Marsh –
Dam Inlet

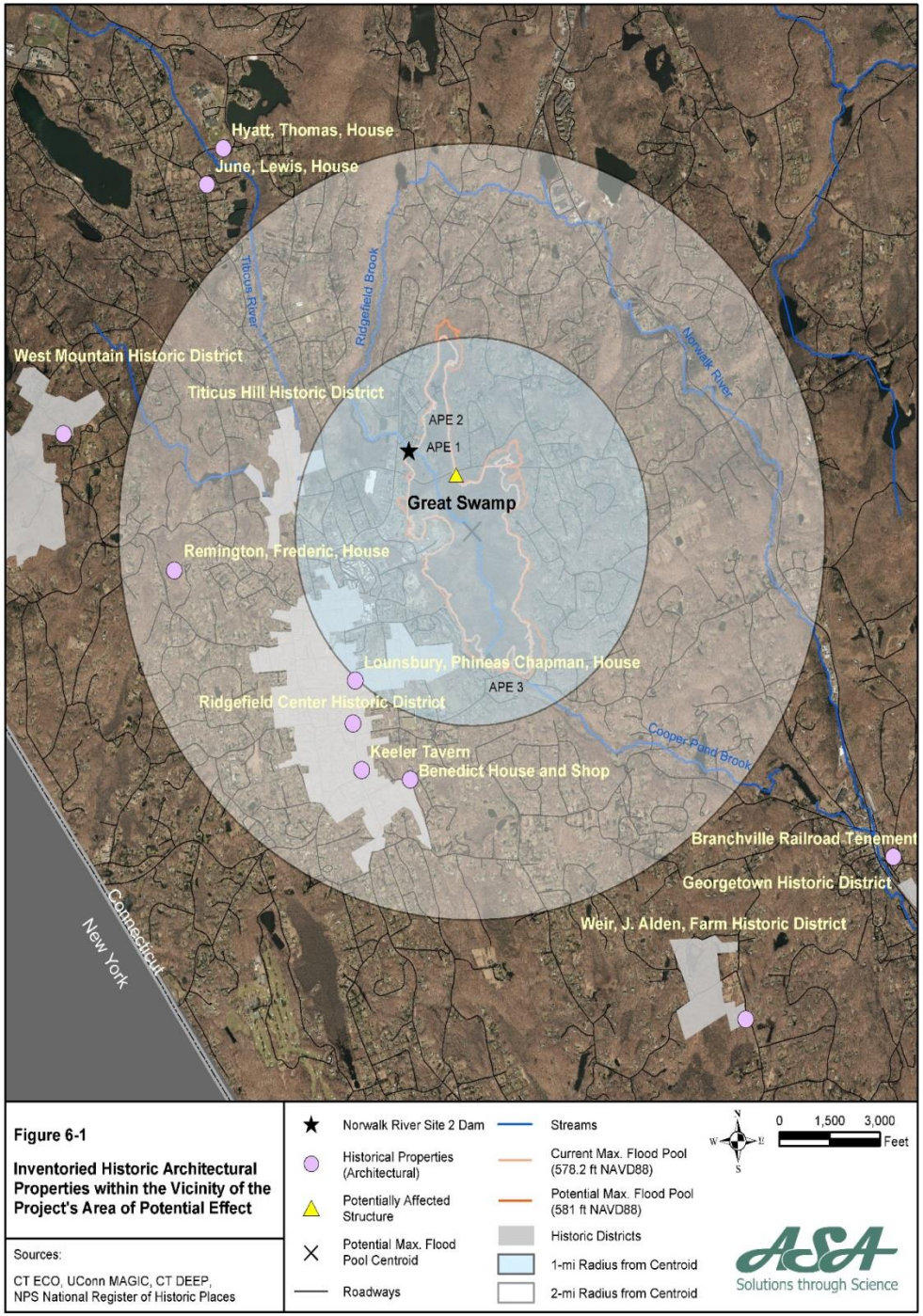
Typical Hydric Soil –
silty loam/mucky peat

Surface Water Quality

Water Quality Conditions

- Two sampling locations near project area
  - Farmingville Road
  - Route 35
- Two key criteria
  - *E. coli*
  - Dissolved Oxygen (DO)
- **Results**
  - Neither sampling site met E. coli standard
  - DO frequently exceeded standard

Historic Architectural Properties



Historic Properties in Area

- Two National Register listed Historic Districts and three National and State Register listed properties near project area:
  - Ridgefield Center Historic District
  - Titicus Hill Historic District
  - Phineas Chapman Lounsbury House
  - Benedict House and Shop
  - Keeler Tavern
- Construction will not adversely affect these properties

Archaeological Resources

- No previously recorded archaeological sites in Areas of Potential Effect.
- Three previously recorded camp sites located within ½ mile of site.
- Nine other similar sites (camps, fishing camp, lithic workshops, and mortuary site) located within 2.5 miles of the site.
- Most of the dam site and adjoining area is already disturbed.

CT Natural Diversity Database Areas

CT Natural Diversity
Species and Their Status

- Appalachian blue (azure) butterfly (*Celastrina neglectamajor*) - Endangered
- Beck's water-marigold (*Bidens beckii*) - Special Concern
- Wood turtle (*Glyptemys insculpta*) - Special Concern
- Eastern box turtle (*Terrapene carolina carolina*) - Special Concern

Appalachian blue butterfly

Beck's water-marigold

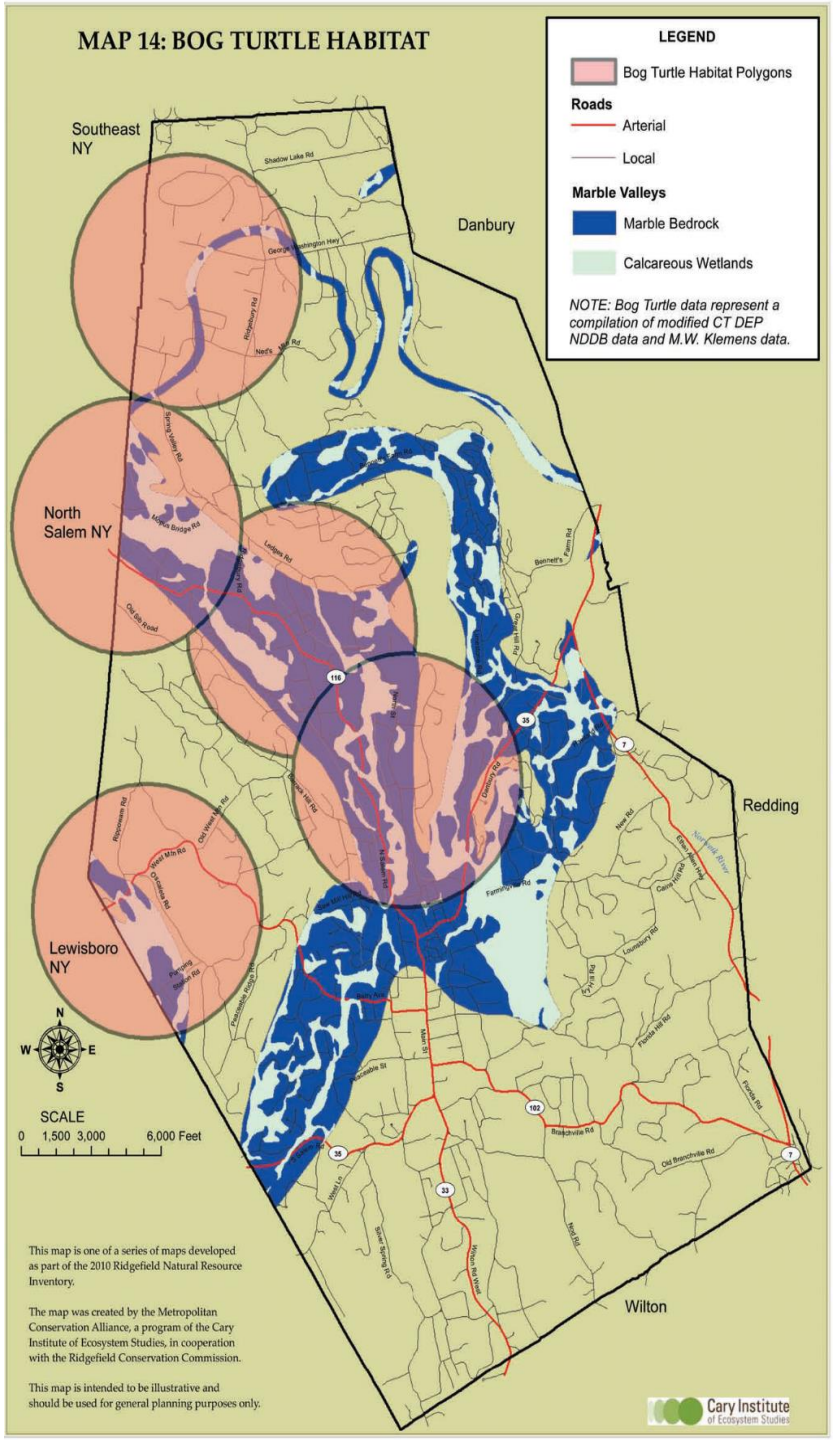
Box Turtle

Wood Turtle

Federally Listed Species

- Bog turtle (Clemmys muhlenbergii) – Threatened Species

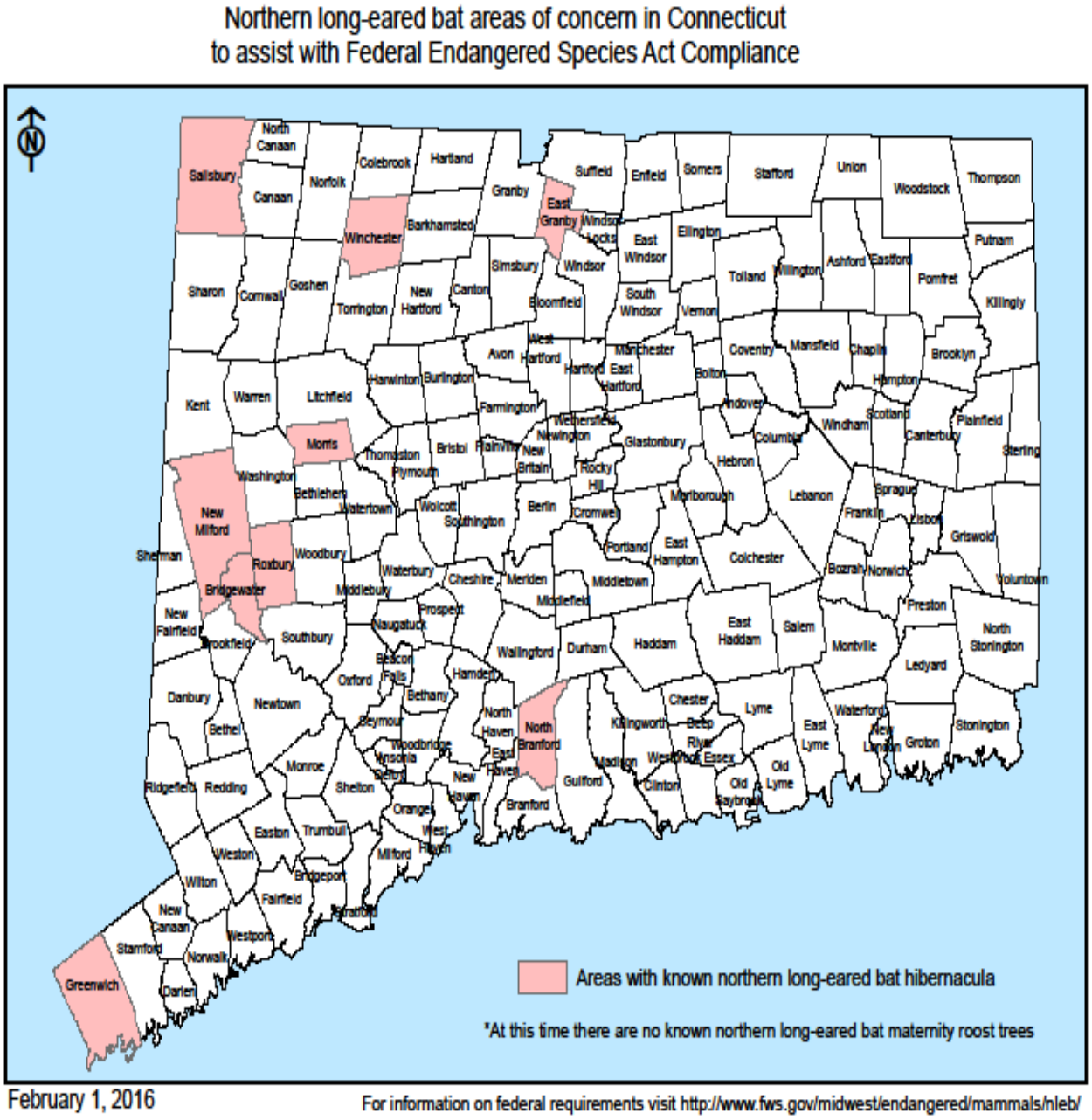
Bog Turtle Habitat Map



Federally Listed Species

- Northern long-eared bat (*Myotis septentrionalis*)
  - All of CT is within range of NLEB.
  - No known NLEB hibernacula or maternity roost trees have been designated or recorded within the Town of Ridgefield or neighboring areas.

Northern Long-eared Bat Areas



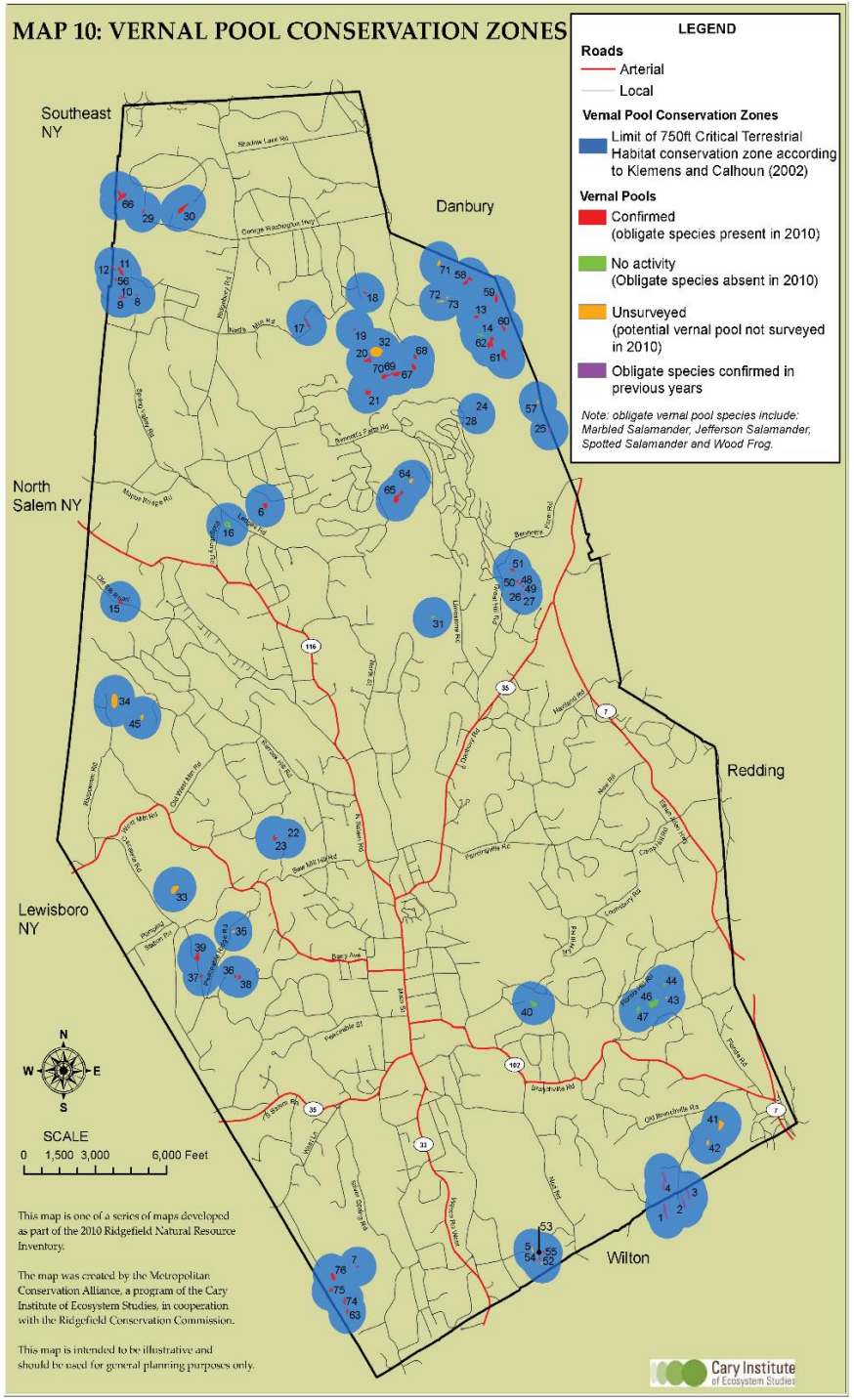
Some of the Invasive Species Observed in Area

- Garlic mustard
- Japanese barberry
- Winged euonymus
- Privet
- Purple loosestrife
- Reed canary grass
- Common reed
- Multiflora rose
- Japanese knotweed

Ridgefield Natural Resource Inventory Maps: Vernal Pools

Focal Species

- Salamanders
- Wood frog



Fish and Macroinvertebrate

- DEEP and University of CT collaboratively created the freshwater fish community database.
- 2,270 sample sites across CT
- No sampling sites at dam or in flood pool
- No essential fish habitat identified

Socio-Economic Impacts

- Evaluate Damages from Various Storm Events and the Breach (2, 5, 10, 25, 100, and 500-yr.)
  - Residential Properties
  - Public Properties
  - Commercial and Industrial Properties
  - Roads, Bridges, etc.
- Benefits and Costs of Alternatives
- Social and Cultural Impacts
- Environmental Justice / Civil Rights


Fox Hill Drive Bridge Below Dam
DO NOT ENTER
DO NOT ENTER

Route 35 Bridge Below Dam


Footbridge Below Rt. 35


Bridge on Ethan Allen Highway


Bridge off Ethan Allen Highway


idge near Branchville off Ethan Allen Highway
137
NOD HILL
BREWERY
RIVERSIDE
FENCE

Turn it over to Paul Welle

General Condition of the Dam

- Inspected annually
- Regularly mowed and maintained
- Overall good condition
- High hazard classification now (Significant when constructed)
- A dam assessment performed by NRCS in 2011 indicates inadequate spillway capacity

Norwalk River Site 2 Dam – Hydrology and Hydraulics

- Developed hydrologic parameters using latest available data
  - LiDAR
  - Aerial photos
  - Land cover by manually digitizing watershed and cover types from aerial photographs
  - Local future land use maps

Norwalk River Site 2 Dam – Hydrology and Hydraulics

- Evaluate impact of existing dam on flooding
  - 2-year through 500-year storms
- Evaluate impact of breach of existing dam on flooding
- Evaluate impact of proposed alternatives on flooding

Required Alternatives to be Considered

- No Federal Action
- Decommissioning (removal)
- Nonstructural
- Rehabilitate to current criteria

Rehab. Alternatives Considered During Assessment of the Dam

- Overtopping Protection for the Dam
- Raising the Top of Dam Elevation
- Increasing the Spillway Capacity
- Removing the Dam


Breach Map From Assessment Report in 2011
Dam Site
Esri, HERE, Garmin, © OpenStreetMap contributors, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/
USDA, USGS, AeroGRID, IGN, and the GIS User Community

Planning Process Steps

- Identify concerns and opportunities
- **Inventory and forecast resource conditions**
- Formulate alternative plans
- Evaluate alternative plans
- Compare alternative plans
- Select final plan
- Submit request for funding

Turn it back to Wade

Concerns

- Dam Safety
- Human Health and Safety
- Flood Damages
- Environmental Issues
- Cultural Resources
- Floodplain Management
- Environmental Justice and Civil Rights

It’s Early in Planning Phase Now

- Additional Work is Needed Before a Solution is Finalized:
  - Engineering - Detailed Studies and Analyses
  - Environmental and Cultural Resources - Concerns and Impacts
  - Economics – Impacts/Damages, Benefits and Costs
  - Human – Social and Cultural Issues

Overall Planning Schedule:

- Collection and Analysis of Data – June 2018
- Formulation and Evaluation of Alternatives - March 2019
- Draft Plan – September / October 2019
    - Interagency and Public Review Period
- Final Plan - December 2019

Future Actions

- DEEP and NRCS will manage planning process and conduct technical reviews of each planning phase
- Once alternatives have been fully evaluated and a preferred alternative is being considered:
  - Hold a second public meeting
  - Reviews by Federal and State agencies
  - Reviews by local public and interested parties
- DEEP and NRCS select preferred alternative and approve plan
- Request plan authorization from NRCS Chief
- Request design and construction funds

Commitment to Public Safety

- **NRCS**
- **DEEP**
- **CT Dam Safety Agency** is requiring that something be done to upgrade the dam.
- Public Involvement
  - Everyone has a stake in the project.
  - Everyone must be willing to “give and take” in order to come up with the best solution.

We Need Your Help

- If you have any specific information on the overall watershed, upstream or downstream, adjacent properties, or the embankment, reservoir, etc., please let us know.
- We want to develop the best plan possible but can only do that if we get good input .

Points of Contact

- DEEP Contact is Ray Frigon
  - Supervising Environmental Analyst
  - (860) 424-3797
  - Raymond.Frigon@ct.gov

- NRCS is Kristin Walker
  - Project Engineer
  - (860) 871-4033
  - Kristin.Walker@ct.usda.gov

Handout

- Questions and Answers Document

THANK YOU!

QUESTIONS AND COMMENTS?