Creating a Natural Resources Inventory

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Climate Smart Communities Webinar

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Working to achieve six key benefits:

• vital estuary ecosystem
• clean water
• resilient communities
• conservation of fish, wildlife, and habitats
• preservation of river’s natural scenery
• enhanced opportunities for education, access, recreation, and inspiration

http://www.dec.ny.gov/lands/4920.html
Today’s Presentation

• What’s at stake?
• Natural resources inventories (NRIs): The process and examples
• Guidebook: *Creating a Natural Resources Inventory*
• Putting the Inventory to Work
What’s at stake if we don’t plan proactively to conserve important natural resources?

- water quality and quantity
- flood control
- temperature moderation
- carbon storage
- clean air
- human health
- recreation and education
- scenery
- fisheries and forest products
- natural pollinators

natural resources

diamonds

“ecosystem services”
What’s at stake?

Climate Change Resilience

Conservation of natural resources like forests, wetlands, and floodplains can help communities build resiliency to:

• increasing temperatures,
• sea level rise, and
• variability in precipitation.
An acre of trees absorbs the same amount of CO₂ in one year as the amount produced by a car driven 26,000 miles.  
(North Carolina State Cooperative Extension)

An acre of wetland can store 1-1.5 million gallons of floodwater. 
(United States EPA)
“In many instances, it is less expensive for a community to maintain open space that naturally maintains water quality, reduces runoff, or controls flooding than to use tax dollars for costly engineered infrastructure projects such as water filtration plants and storm sewers.”
In 2011, residents and nonresidents spent $9.2 billion on wildlife-related recreation (hunting, fishing, and wildlife-watching) in New York.

(USFWS 2014)
“The future is literally in our hands to mold as we like. But we cannot wait until tomorrow. Tomorrow is now.”

- Eleanor Roosevelt
Recommended Conservation and Planning Approach

1. Identify what you have
2. Prioritize
3. Plan, protect, and manage
identify what you have
What is a Natural Resources Inventory (NRI)?

• a compilation and description of natural resources within a particular area (municipality, watershed, region)

• primary focus is naturally-occurring resources, but cultural resources are often included
What is a Natural Resources Inventory (NRI)?

It can take many forms, for example:

- a stand-alone document, or a chapter in a comprehensive or open space plan
- a series of GIS maps, PDF maps, Google Earth Pro maps, or a display of large-format maps
- a watershed characterization in a watershed plan, or a county-wide or regional inventory

What does your community need? What will it use?
Who develops an NRI in NY? **CACs and EMCs**

**CACs (Article 12-F, General Municipal Law)**
“…shall keep an inventory and map…of all open areas within the municipality…” and “…all open marsh lands, swamps and all other wet lands in a like manner…”

**EMCs (Article 47, Environmental Conservation Law)**
“…shall develop and maintain an inventory of natural resources within the county…shall include wetlands and open spaces…”
What is included in an NRI?

geology and soils

water resources

habitats & wildlife

cultural resources

climate conditions

land use

Photos by Laura Heady

Ch. 4
What is included in an NRI?

Two approaches:

• “Basic” NRI – uses publicly available data
• “Detailed” NRI – basic data + new analysis or study

What does your community want?
What is included in an NRI?

1) maps
What is included in an NRI?

1) maps
2) data and sources

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### Soils Descriptions:

<table>
<thead>
<tr>
<th>Label on Map</th>
<th>Name</th>
<th>Reaction*</th>
<th>Depth (inches)</th>
<th>Drainage**</th>
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</thead>
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<td>CnB</td>
<td>Chenango gravelly silt loam</td>
<td>se, nc</td>
<td>&gt;60</td>
<td>sx-w</td>
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<tr>
<td>HgB</td>
<td>Hoosic gravelly loam</td>
<td>nc</td>
<td>&gt;60</td>
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<td>&gt;60</td>
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<tr>
<td>HSF</td>
<td>Hoosic soils</td>
<td>nc</td>
<td>&gt;60</td>
<td>x-w</td>
</tr>
</tbody>
</table>

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What is included in an NRI?

1) maps
2) data and sources
3) report (goals, methods, resource descriptions, findings, recommendations)

Soils

Soil underlies and shapes the biodiversity of a region. Such soil characteristics as pH (acidity and alkalinity), drainage, soil texture, depth to bedrock, and slope inform the types of habitat likely to occur in a particular area, with distinctive natural communities becoming established on calcareous (alkaline) soils, acidic soils, clayey soils, sandy soils, and shallow soils, among other soil types.

Soil characteristics also influence human uses of the land: soils range in suitability for food production, their proneness to flooding and inundation, vulnerability to soil erosion and soil instability, and efficiency at filtering pollutants and wastes. What we grow, where we build, and how we maintain the quality of our environment depend directly on the nature of our soils.
What is included in an NRI?

1) maps
What is included in an NRI?

1) maps
2) data and sources
What is included in an NRI?

1) maps
2) data and sources
3) report (goals, methods, resource descriptions, findings, recommendations)
Why inventory natural resources?

NRIs provide an opportunity to educate and raise awareness about your community’s natural assets.

- educates landowners
- prepares developers
- contributes to community vision

Photo by G. Goff
Why inventory natural resources?

NRIs provide a valuable reference for planning, designing, and reviewing. They help decision-makers to:

- know what questions to ask
- provide consistency in reviews
- consider the context of a project, i.e., the “big picture”
Why inventory natural resources?

NRIs also help us view resources at a town-wide or county scale (and beyond). They provide:

- visualization of natural features and interconnectedness
- foundation for comprehensive plan and zoning updates, open space planning, watershed planning
**Bottom Line:**
Why inventory natural resources?

In order for your community to “insure” or plan for what’s most important, it needs to know what it has and where it is, its priorities, and sources of risk.
Examples of Inventory Projects

Town of Rosendale NRI
Done by: environmental commission, volunteers
$$$: Minimal costs covered by commission’s budget
- Used existing data + commission created original data on historical and cultural sites, and protected open space.

Town of Shawangunk OSI
Done by: team of graduate students, which included resident
$$$: Minimal costs covered by town board
- Used existing data + created original data and analysis on unfragmented forest, riparian travel corridors, and wetland/floodplain buffers.
Examples of Inventory Projects (cont’d)

Town of Ancram Natural Resources Conservation Plan

Done by: CAC and Hudsonia Ltd.

$$$: Funding from Hudson River Valley Greenway, Hudson River Bank and Trust Foundation, and the Town

- Used existing data + habitat mapping completed by volunteers.
Examples of Inventory Projects (cont’d)

Town of Pleasant Valley Open Space and Farmland Plan

Done by: Open Space Committee, Taconic Site Design and AKRF

$$$: Funding from Hudson River Estuary Grant

- Used existing data to inventory natural resources and identifies and describes priority areas.

Technical and Funding Assistance
The Guidebook at a Glance

• Outlines an approach to developing an inventory
• Recommends resources to inventory
• Suggests available data to include and where to find help
• Considers ways to analyze the results
• Presents ideas and examples for putting the inventory to work

www.dec.ny.gov/lands/100925.html
Who is the guidebook especially designed for?

Boards, commissions, and groups that are:

• involved in environmental review and conservation planning
• starting or updating an NRI, comp plan, open space plan, or watershed characterization
• taking the next steps with a completed inventory
What’s in the guide?

Ch. 1: Introduction (why/what)
Ch. 2: Getting Started (process)
Ch. 3: Mapping Options (online tools and GIS)
Ch. 4: What to Include (inventory components)
Ch. 5: Analyze the Information (what does it all mean?)
Ch. 6: Putting the Inventory to Work (next steps)

plus appendices....
Resources to include in an NRI:

- geology and soils
- water resources
- habitats & wildlife
- cultural resources
- climate conditions
- land use
Each resource description includes:

- background
- what to include (readily available data)
- detailed inventory studies (to gather new, local data)
- where to find help

Where to find help
See Appendix A for organization contact information, Appendix B for publications and web resources, and Appendix C for sources of GIS data.

**Background**

Streams, reservoirs, lakes, ponds and their adjacent riparian (streamside) habitats provide critical benefits to communities, including clean water, flood management, and recreational opportunities such as fishing and boating. The health of the Hudson River estuary is closely linked to the health of its tributaries and their watersheds.

There are various classification systems for surface water systems based on a range of physical conditions, habitat values, and human uses, including hydrology, flow, river depth, surface area, temperature, habitat structure, water quality, sensitivity to pollutants, and recreational uses, among other attributes. A basic NRI may simply document known streams and waterbodies, while detailed inventory studies can recognize characteristics relevant to local water resource concerns and interests.

Perennial streams flow continuously throughout years with normal precipitation, but some may dry up during droughts. Intersect streams only flow seasonally or after rain. They can easily be overlooked when dry, but have great impact on the water quality and quantity of larger downstream waters and watershed protection. Stream barriers, such as dams and poorly designed and installed culverts, can have serious effects on stream habitat, local flooding, and water quality. Bridge open bottom culverts and similar structures that completely span a waterway and associated riparian area and floodplain usually have the least impact on streams. Stream habitat values are discussed further in the Wetland and Riparian Habitat section.

Poorly planned development in a watershed can dramatically increase the amount of stormwater runoff, chemical, sediment, and other contaminants entering streams and waterbodies, threatening water quality, degrading habitat value, and increasing flood risk. Precipitation has become more variable and extreme with climate change.

Where to find help

See Appendix A for organization contact information, Appendix B for publications and web resources, and Appendix C for sources of GIS data.

**Detailed inventory studies**

Intermittent streams and small waterbodies are not captured on USGS and statewide stream maps. These important resources can be identified and delineated through aerial photography interpretation, map analysis, local knowledge, and on-site visits to create more accurate maps. See Appendix C, Biodiversity Assessment, for details.

The New York State Inventory of Dams and the USGS National Hydrography Database document a small fraction of dam locations. Many dams, especially small ones, are missing from these data sets. Culvert data sets do not exist on any standard, county or statewide scale in New York. The DEC Hudson River Estuary Program is collecting information on dams and culverts in the Hudson Valley. Field surveys run in 80 dams and culvert inventory sites.

Where to find help

See Appendix A for organization contact information, Appendix B for publications and web resources, and Appendix C for sources of GIS data.

**Streams and Waterbodies**

Streams and waterbodies can be mapped and described using the USGS National Hydrography Dataset or more detailed local data sources, available. Some local and county agencies have developed finer-scale stream maps, for example. This information may be displayed with watershed boundaries, which provide logical units for evaluating surface water resources (Watershed Delineation). The National Hydrography Dataset can be viewed online using the USGS Hydrography Viewer and GIS data can be obtained from the USGS website. It may be helpful to locate floodplains such as floodplains, riparian wetlands and forests, waterbodies, and urban waterbodies in a single map in the NRI.

Poorly planned development in a watershed can dramatically increase the amount of stormwater runoff, chemical, sediment, and other contaminants entering streams and waterbodies, threatening water quality, degrading habitat value, and increasing flood risk. Precipitation has become more variable and extreme with climate change.
Example: Wetlands

Background: defining features, multiple values, relation to other surface water, mapping issues

What to include: National Wetland Inventory, NYS Freshwater Wetlands, soils drainage data (poorly and somewhat poorly drained classes)

Detailed inventory studies: wetland inventory and evaluation methods, wetland buffer delineation

Where to find help: DEC Freshwater Wetlands Program, DEC Hudson River Estuary Program, county soil and water conservation districts
Town of Pleasant Valley surface hydrology

Town of Ancram detailed wetlands
Example: Forests

Background: interior forest habitat, forest corridors, fragmentation of forests, pests and invasive species

What to include: large forests (>200 ac), matrix forest blocks and linkage zones, significant communities

Detailed inventory studies: biodiversity assessment (habitat mapping), managed forest land, street tree inventory

Where to find help: Hudson River Estuary Program, New York Natural Heritage Program, DEC Forest Stewardship Program
Town of Pleasant Valley woodlands

Rensselaer Plateau interior forest
Your NRI is complete. What’s next?

Analyze the information:

• Which resources have the greatest value to the community? Why?
• What are the threats?
• Are there resources that have importance to adjacent communities or the region?
Your NRI is complete. What’s next?

Putting the Inventory to Work:

• public education
• comprehensive planning
• open space planning and implementation, watershed plans
• critical environmental areas
• zoning and subdivision regulations
• development review

➤ A completed NRI can receive up to 5 points through the Climate Smart Communities Certification Program (Action 6.17)
Climate Smart Communities Program certification actions informed by NRIs:

6.19: Preserve natural areas through zoning or other regulations

7.10: Create or update a watershed assessment to identify flooding and water quality priorities

7.12: Conserve, revegetate, reconnect floodplains and riparian buffers

7.13: Conserve natural areas for species migration and ecosystem resilience

7.17: Conserve wetlands and forests to manage stormwater, recharge groundwater, and mitigate flooding
Identify high priority natural areas in your comprehensive plan or an open space plan

- Critical habitat areas
- Large forests
- Wetland complexes
- Drinking water protection
- Working farmland or forests
- Scenic resources
Example from the Town of Red Hook: Community Preservation Fund

Real estate transfer tax toward open space preservation; must first by approved by NYS legislature.

Parcels ranked for protection by:

- Agriculture and water resources
- Ecological features
- Scenic vistas, trails, and greenways
- Historical values

➢ Update will consider habitat connectivity
Adopt a Site Resource Assessment Checklist to streamline conservation analyses of proposed sites

Example from the Town of Rhinebeck:

- stream and waterbody buffers?
- significant habitats or wildlife corridors?
- active farmland?
- scenic and historic resources?
- climate resilience values
- sea level rise, storm surge, or flood vulnerability?
Identify and prioritize areas for stormwater management at the start of the design process

NYS Stormwater Management Design Manual guidelines:

- Preserve existing natural areas
- Minimize impervious surfaces
- Use green infrastructure practices to reduce additional runoff

Photo by Laura Heady
Example from the City of Newburgh: Green Infrastructure Opportunity Mapping

The city’s current NRI effort plans to highlight and analyze impervious areas for their potential contributions to green infrastructure functions, including:

- existing streets, medians, and sidewalks
- hard-packed underutilized and vacant lots
- surface parking

This information will be incorporated to project reviews following the CAC’s Green Infrastructure Policy.
Designate Critical Environmental Areas

- A specific area designated by a state or local agency through SEQR as having **exceptional or unique environmental or cultural characteristics**. Examples:
  - Aquifer or reservoir protection
  - High quality stream corridor
  - Rare plant or animal habitat
  - Ridgelines or steep slopes

- Brings attention to high priority resources during SEQR

http://www.dec.ny.gov/permits/45500.html
Example from Dutchess County: Stissing Mountain CEAs

- Mountain area – steep slopes
- Headwater forests and wetlands
- Exceptional wildlife habitat
Use zoning to conserve priority natural areas

Overlay zoning

- Applies a new set of standards and incentives within existing zoning districts to better achieve natural resource protection goals (does not replace existing zoning districts)

  - Steep slopes
  - Floodplains
  - Wetlands
  - Aquifers
  - Significant habitats

Town of Warwick Biodiversity Overlay Zone
Example from the Town of Coxsackie: Natural Resource Protection Standards

Applies to all land containing natural resource constraints, including:

- Steep slopes
- Watercourses
- Wetlands
- Wildlife habitat
Example from the Town of Coxsackie: Natural Resource Protection Standards

Wetland and watercourse protection:

- Protects all NWI wetlands and 50-ft buffer
- Requires field delineations of all wetlands
- Protects variable-width buffers on streams based on USGS maps; 25-ft buffer on all other streams
- Specifies allowable uses/management of buffer areas (e.g., no lawns)
Adopt a Wetland and Watercourse Ordinance

Example: Town of Woodstock

- Protects all streams and wetlands, including small streams, and small, isolated wetlands in the municipality
- Protects adjacent buffer areas of variable width (30-100 ft) based on drainage area or wetland size
- Wetland inspector and planning board refer to townwide habitat map
What else is in the guide?

App. A: Agencies & Organizations
App. B: Publications & Web Resources
App. C: Recommended GIS Data Sources
App. D: Information about Commonly Used Maps
App. E: Biodiversity Assessment Overview

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Federal Agencies and Programs
New York State Agencies and Programs
Statewide and Regional Nongovernment Organizations
County Agencies, Programs, and Land Uses

Appendix B: Publications and Web Resources for Further Reading and Research
Geology and Soils
Water Resources
Fisheries and Wildlife
Climate Change and Mitigation
Cultural Resources
Land Use

Appendix C: Recommended GIS Data Sources

Appendix D: Information About Commonly Used Maps

USGS Topographic Maps
NYS-County Soil Survey Maps
National Wetlands Inventory Maps
Areal Photographs

Appendix E: Biodiversity Assessment Overview

Appendix F: Hudson Valley Climate Resilience
Climate Hazards in New York State
Climate Risk
Building Resilience through Adaptation

Appendix G: Model Local Law to Adopt the NRI

Appendix H: Sample Checklist for Assessing Site Resources During Subdivision Review

Appendix I: Examples of Maps from a Municipal NRI

Appendix J: Examples of Inventory Projects

Town of Rosendale Natural Resources Inventory
Town of Hamden Natural Resources Inventory
Town of Shokan Natural Resource Inventory and Analysis
Town of Amenia Natural Resource Conservation Plan
New Paltz Open Space Plan
Mamakwa Town Regional Open Space Plan
Wappinger Creek Natural Resource Management Plan

District County Natural Resources Inventory
What else is in the guide?

App. F: Hudson Valley Climate Resilience
App. G: Model Local Law to Adopt the NRI
App. H: Sample Checklist for Assessing Site Resources During Subdivision Review
App. I: Examples of Maps from a Municipal NRI
App. J: Examples of Inventory Projects
Creating a Natural Resources Inventory
A Guide for Communities in the Hudson River Estuary Watershed

• PDF version available to view or download at: www.dec.ny.gov/lands/100925.html

• Limited number of print copies available

• Technical assistance available for Estuary watershed communities

• Estuary Grant funding
Hudson Valley Natural Resource Mapper

Interactive web map

- Estuary
- Streams & Watersheds
- Wetlands
- Large Forests
- Biodiversity

www.hudson.dnr.cals.cornell.edu/mapper
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Thank you!