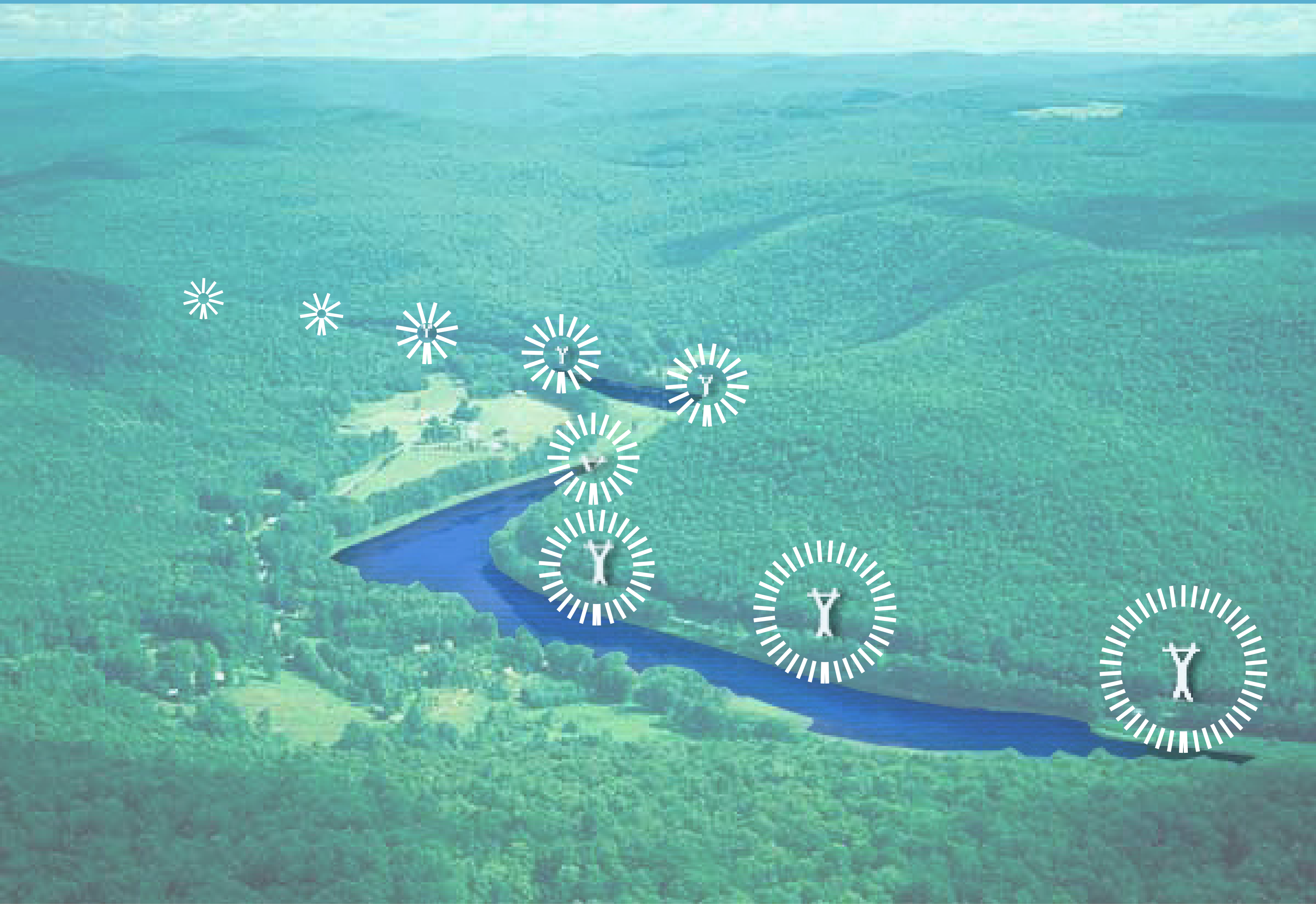
A River Endangered

Proposed Power Transmission and Its Impact on Cultural History along the Upper Delaware River

Prepared for the Upper Delaware Preservation Coalition by the Columbia University Urban Design Research Seminar | Spring 2007



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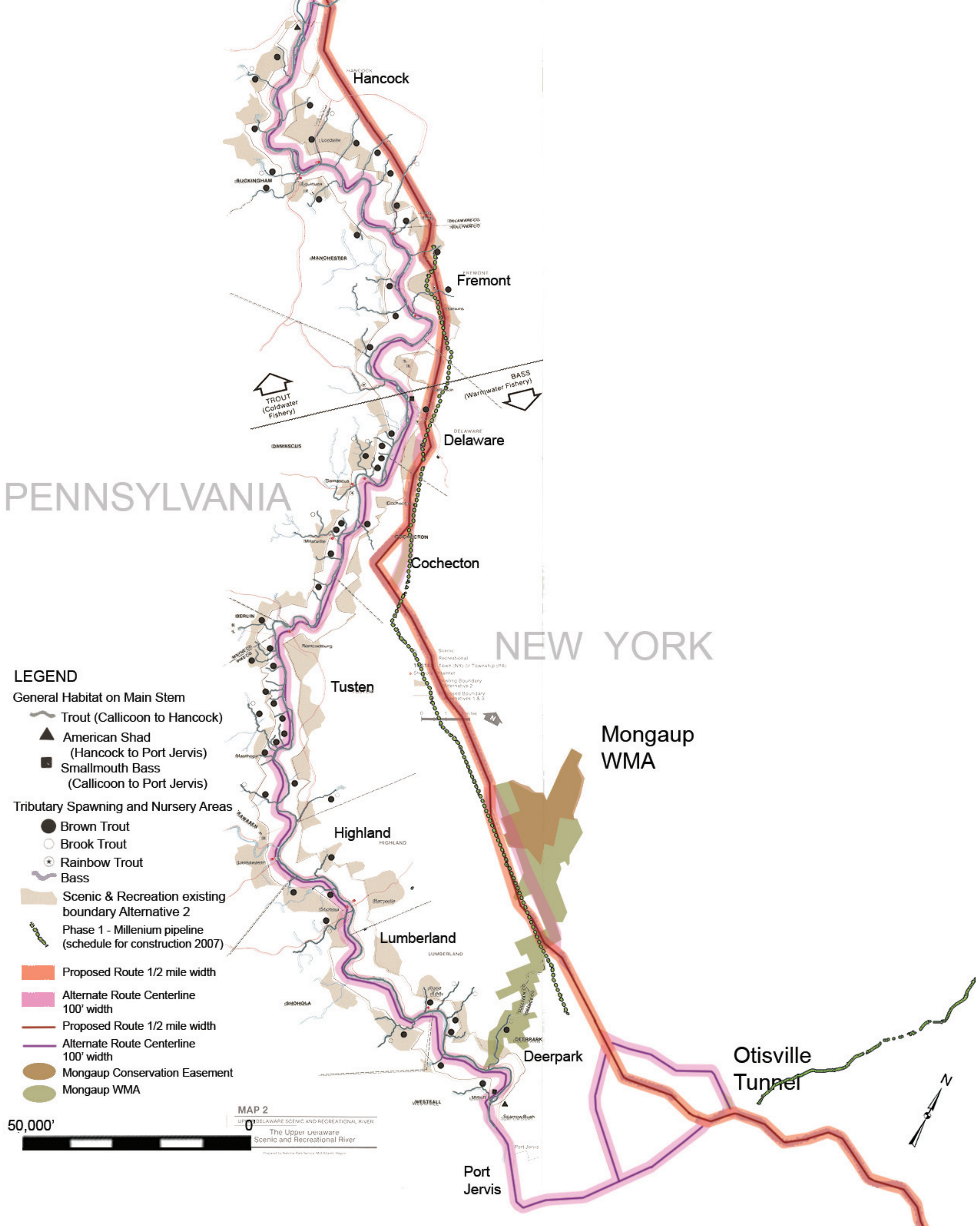


Scenic & Recreational River: Proposed Transmission Route

Developmental Threats Along the Upper Delaware River

During the last decade, the Upper Delaware "Wild and Scenic River" corridor has experienced increasing and problematic pressures for new development. Located within two and one-half hours from New York City, the corridor is the last in the metropolitan area to experience the effects of modern suburbanization. The local real estate market is being transformed by high prices closer in, as well as by demand from urban second home investors. New home development is threatening the fragile local ecologies and economies; and the potentials associated with "wild and scenic" qualities of the area are being weakened. For example, inadequate public oversight has led to the increasingly ubiquitous practice of "ridge-top cutting" along the river edges; and to the increasing disappearance of historic built and landscape resources. The negative effects of regionalization are also felt in other ways, most recently with the New York Regional Interconnect (NYRI) high-voltage power line proposal slated to run along the entire length of the "Wild and Scenic River."

The Upper Delaware River, the longest free-flowing river in the Northeast, has not only been noted for its natural beauty, bald eagle habitat, and countless opportunities for recreation and enjoyment, but is also an important cultural landscape. The area has a rich history of human use and occupation dating from around 6,000 years ago, when primordial glaciers receded and native peoples populated the river valley. Today, while much of the Upper Delaware is a unit of the National Park system as a Wild and Scenic River, almost all of the land in the river valley remains privately owned. Many residents reside in historically significant houses, and traces of the Upper Delaware's past are everywhere. From vestiges of bluestone quarries at Pond Eddy to the famous Roebling Aqueduct at Lackawaxen to the historic downtown in Narrowsburg, opportunities for discovery abound.

New York Regional Interconnection, Inc. (NYRI), a private company with Canadian backers, has applied to the New York State and the federal governments to construct an electric transmission line between Marcy and New Windsor, New York. While there are multiple routes under consideration, many believe that NYRI wants to build its transmission line directly along the Upper Delaware, as NYRI has acquired the right-of-way along 73 miles of railroad on the Delaware from Hancock to Port Jervis. For NYRI, the river route is the cheapest route. For the cultural resources of the Upper Delaware, this plan would be nothing short of a disaster.

While the entire Upper Delaware River valley is rich in cultural resources, this report focuses on a limited area, from Narrowsburg in the north to Pond Eddy in the south. This area, as represented by the three historic settlements of Narrowsburg, Lackawaxen, and Pond Eddy, provide not only exceptional examples of cultural resources, but also a fair sampling of the wide range of sites to be found throughout the river valley.

Upper Delaware River: Cultural History

Historic Structures and Sites

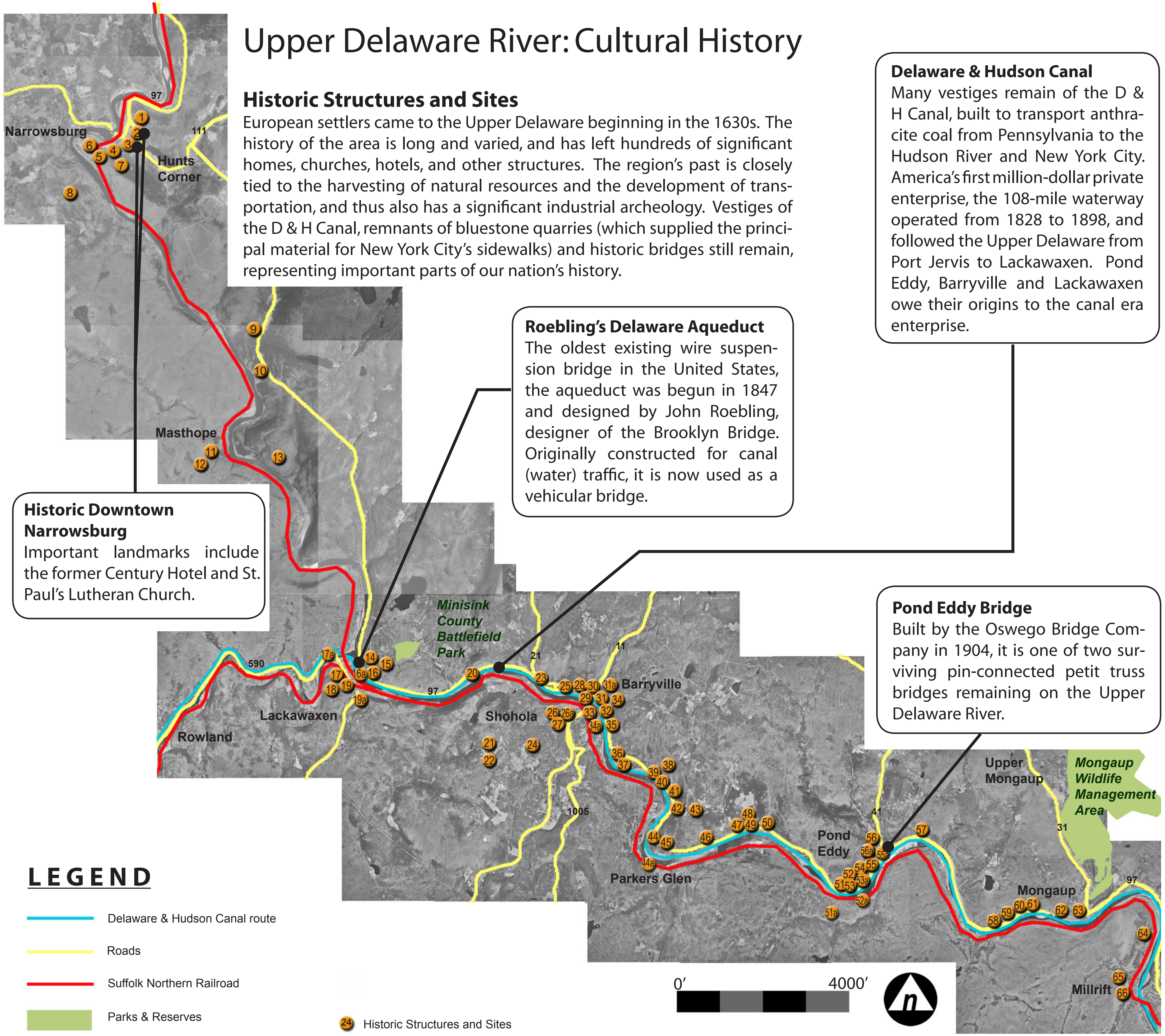
European settlers came to the Upper Delaware beginning in the 1630s. The history of the area is long and varied, and has left hundreds of significant homes, churches, hotels, and other structures. The region's past is closely tied to the harvesting of natural resources and the development of transportation, and thus also has a significant industrial archeology. Vestiges of the D & H Canal, remnants of bluestone quarries (which supplied the principal material for New York City's sidewalks) and historic bridges still remain, representing important parts of our nation's history.

Delaware & Hudson Canal
Many vestiges remain of the D & H Canal, built to transport anthracite coal from Pennsylvania to the Hudson River and New York City. America's first million-dollar private enterprise, the 108-mile waterway operated from 1828 to 1898, and followed the Upper Delaware from Port Jervis to Lackawaxen. Pond Eddy, Barryville and Lackawaxen owe their origins to the canal era enterprise.

Roebling's Delaware Aqueduct
The oldest existing wire suspension bridge in the United States, the aqueduct was begun in 1847 and designed by John Roebling, designer of the Brooklyn Bridge. Originally constructed for canal (water) traffic, it is now used as a vehicular bridge.

Historic Downtown Narrowsburg
Important landmarks include the former Century Hotel and St. Paul's Lutheran Church.

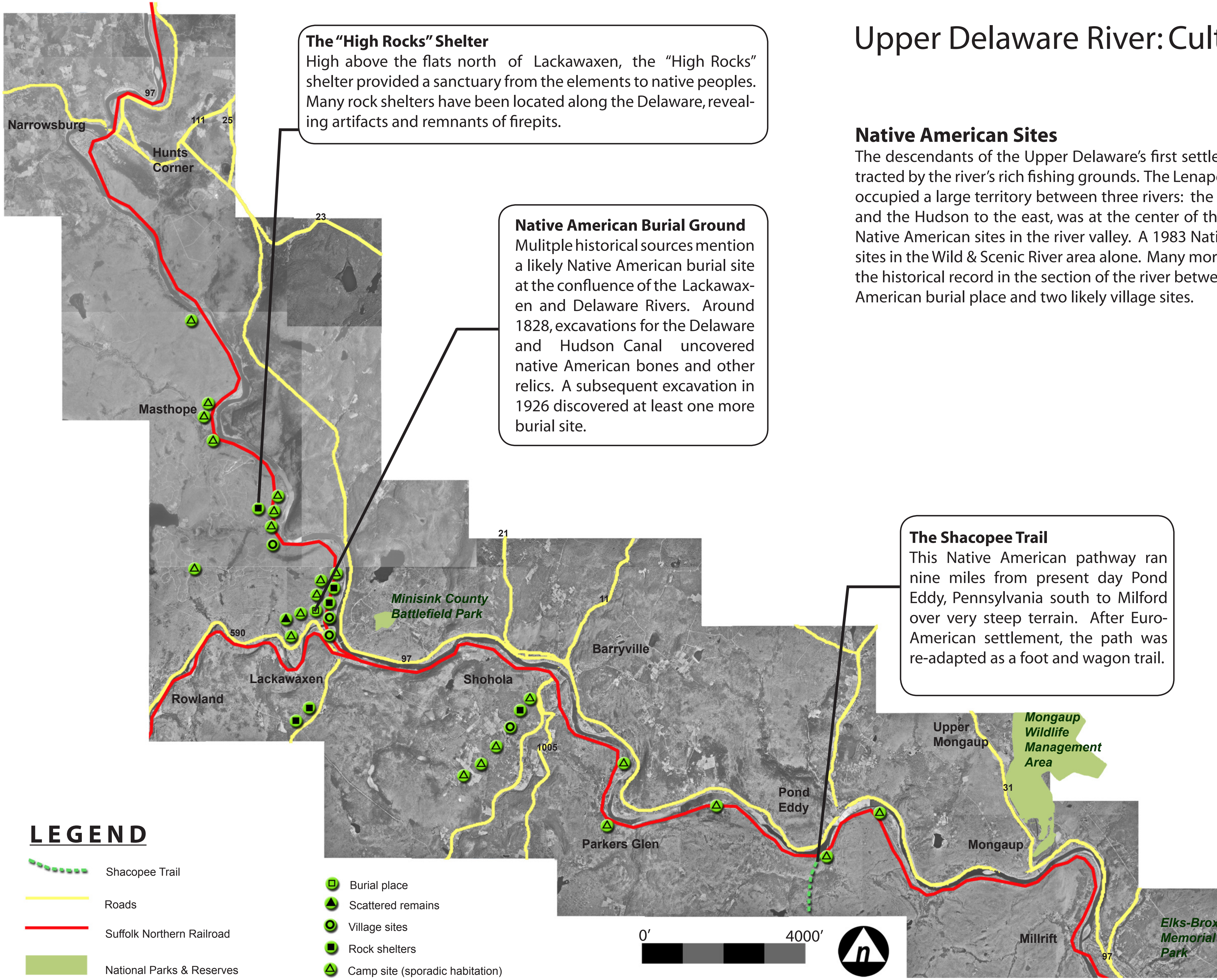
Pond Eddy Bridge
Built by the Oswego Bridge Company in 1904, it is one of two surviving pin-connected petit truss bridges remaining on the Upper Delaware River.



Historic Structures and Sites Inventory

	Closest Town	Name	Date if known
1	Narrowsburg	M. Kirk House	1840
2	Narrowsburg	Century Hotel	c. 1840s
3	Narrowsburg	St. Paul's Lutheran Church	1869
4	Narrowsburg	C & D Corner Service Station	c. 1925-30
5	Narrowsburg	Erie RR Freight Depot	1860
6	Narrowsburg	J & J Canoe Base and Restaurant	c. 1859-64
7	Narrowsburg	United Methodist Church	c. 1855
8	Narrowsburg	House	
9	Tusten	Tusten Meeting House/Cemetary	1856
10	Tusten	Hankins House	1845
11	Masthope	Masthope Plank House	c. 1848
12	Masthope	House	c. 1840-50
13	Tusten	House	
14	Minisink Ford	D & H Company House	c. 1870-90
15	Minisink Ford	House	
16	Minisink Ford	House	
16a	Lackawaxen	Roebling Aqueduct	1904
17	Lackawaxen	Zane Grey Home	1905
17a	Lackawaxen	Erie Railroad Bridge	c. 1905
18	Lackawaxen	St. Mark's Church	1848
19	Lackawaxen	D & H Company Office	c. 1855-60
19A	Lackawaxen	St. Ann's Catholic Church	1864
20	Minisink Ford	House	
21	Shohola	Oelker/Ecker Boarding House	1890s
22	Shohola	Boarding House & Outbuildings	1850s
23	Barryville	Hansen House	c. 1835-40s
24	Shohola	St. Jacobi Evang. Luth. Church	1871
25	Barryville	Parker's Garage	c. 1930s
26	Shohola	Thomas-Gardner Store	1849
26A	Shohola	Rohman's Hotel	1849
27	Shohola	House and Store	c. 1850-90s
28	Barryville	Methodist Episcopal Church	1902
29	Barryville	Riviera Theatre	1850s
30	Barryville	Congregational Church	1903
31	Barryville	Red's Garage	c. 1900-1910
31A	Barryville	Worzeo House	c. 1880
32	Barryville	House	c. 1875
32A	Barryville	Old Barryville Town Hall	1867
32B	Barryville	Lillian Wolff House	c. 1860
33	Barryville	Valley Brook Inn	c. 1875
34	Barryville	L.D. Fuller House	c. 1855
35	Barryville	Kerr House	c. 1865
36	Barryville	Johnson House	c. 1850s
37	Barryville	Johnson House Barn	c. 1900
38	Handsome Eddy	Mrs. McPhilorny's House	c. 1840-55
39	Handsome Eddy	Corwin House	c. 1855
40	Handsome Eddy	Corwin Barn	c. 1855
41	Handsome Eddy	House	
42	Handsome Eddy	House	
43	Handsome Eddy	Hillside Gospel Chapel	1893
44	Handsome Eddy	House	
44a	Parker's Glen	Historic Parker's Glen, PA	c. 1800s
45	Handsome Eddy	House	
46	Handsome Eddy	Wilson House	c. 1840
47	Handsome Eddy	Van Tuyl Outbuilding	c. 18-1900s
48	Handsome Eddy	Van Tuyl Farmhouse	c.1840s
49	Handsome Eddy	Van Tuyl Barn	18-1900s
50	Handsome Eddy	Donahue House	c. 1860s
51	Pond Eddy	(abandoned house)	c. 1850s
51a	Pond Eddy	Bluestone Quarries	1800s
52	Pond Eddy	Donald Kelly's House	c. 1850s
52a	Pond Eddy	Historic Pond Eddy, PA	c. 1800s
53	Pond Eddy	Boarding House and Store	1893
53A	Pond Eddy	Outbuilding	c. 1890s-1920s
54	Pond Eddy	Nora Larson House	c.1845-50
55	Pond Eddy	(abandoned house)	c. 1840s
55a	Pond Eddy	Pond Eddy Bridge	c. 1904
56	Pond Eddy	Franciscan Fathers' Scred Heart Chrch	c. 1910
56a	Pond Eddy	Pond Eddy Methodist Church	c. 1882
57	Pond Eddy	House	
58	Pond Eddy	House	
59	Pond Eddy	House	
60	Knight's Eddy	S.B. Farnham House	
61	Mongaup	E. Dee's Log Cabin	c. 1830-50
62	Mongaup	House	
63	Mongaup	House	
64	Millrift	Nearpass-Knickerbocker House	c. 1815-20
65	Millrift	Millrift Schoolhouse	
66	Millrift	Millrift Museum	c. 1905

Upper Delaware River: Cultural History



The "High Rocks" Shelter
High above the flats north of Lackawaxen, the "High Rocks" shelter provided a sanctuary from the elements to native peoples. Many rock shelters have been located along the Delaware, revealing artifacts and remnants of firepits.

Native American Burial Ground
Mulitple historical sources mention a likely Native American burial site at the confluence of the Lackawaxen and Delaware Rivers. Around 1828, excavations for the Delaware and Hudson Canal uncovered native American bones and other relics. A subsequent excavation in 1926 discovered at least one more burial site.

The Shacopee Trail
This Native American pathway ran nine miles from present day Pond Eddy, Pennsylvania south to Milford over very steep terrain. After Euro-American settlement, the path was re-adapted as a foot and wagon trail.

Native American Sites

The descendants of the Upper Delaware's first settlers occupied alluvial flatlands and rock outcroppings, attracted by the river's rich fishing grounds. The Lenape, or Delawares, as they were known by European settlers, occupied a large territory between three rivers: the Delaware River, flanked by the Sesquehanna to the west and the Hudson to the east, was at the center of this territory. Historical records reveal a veritable trove of Native American sites in the river valley. A 1983 National Park Service study revealed upwards of 400 known sites in the Wild & Scenic River area alone. Many more may lie undiscovered. Our study area lists some sites in the historical record in the section of the river between Narrowsburg and Pond Eddy including a likely Native American burial place and two likely village sites.

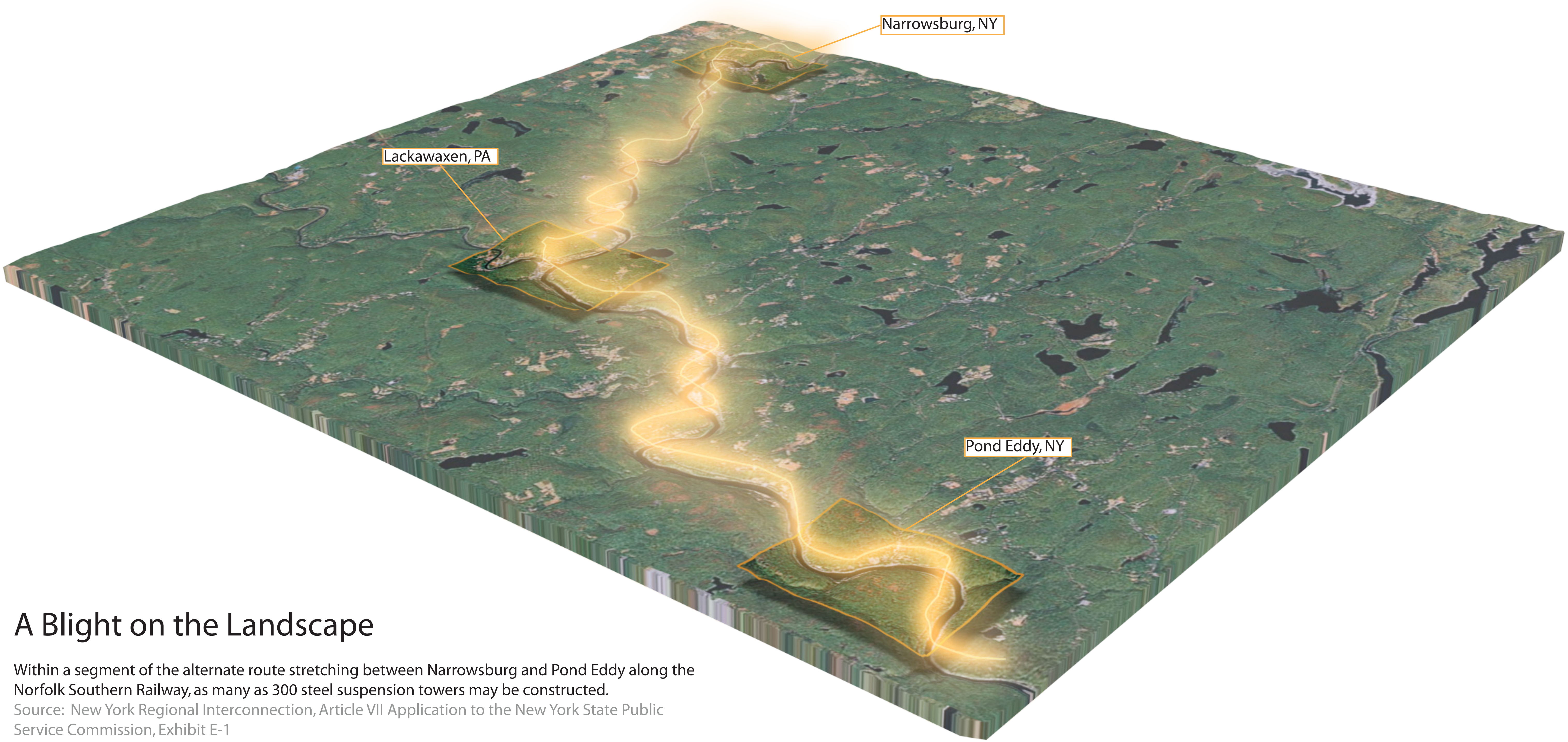
Mapping Source for Native American Sites:

1. Schrabisch, Max. Archeology of Delaware River Valley. Harrisburg: Commonwealth of Pennsylvania, 1930.

Mapping Sources for Historic Structures Inventory:

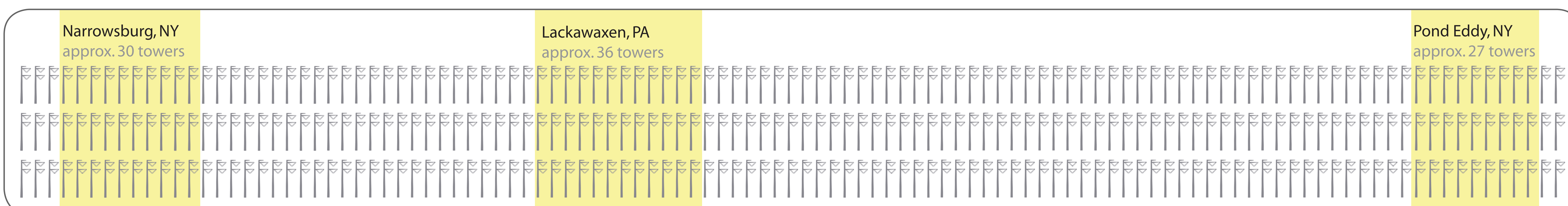
1. Schwarz, Frank. (Lumberland Town Historian) The Berme Church Historical Trail. (Pamphlet)

2. Upper Delaware National Scenic and Recreational River:



A Blight on the Landscape

Within a segment of the alternate route stretching between Narrowsburg and Pond Eddy along the Norfolk Southern Railway, as many as 300 steel suspension towers may be constructed.
Source: New York Regional Interconnection, Article VII Application to the New York State Public Service Commission, Exhibit E-1



Pond Eddy, NY

Local Scale and View Impacts

Plan View, Narrowsburg to Pond Eddy

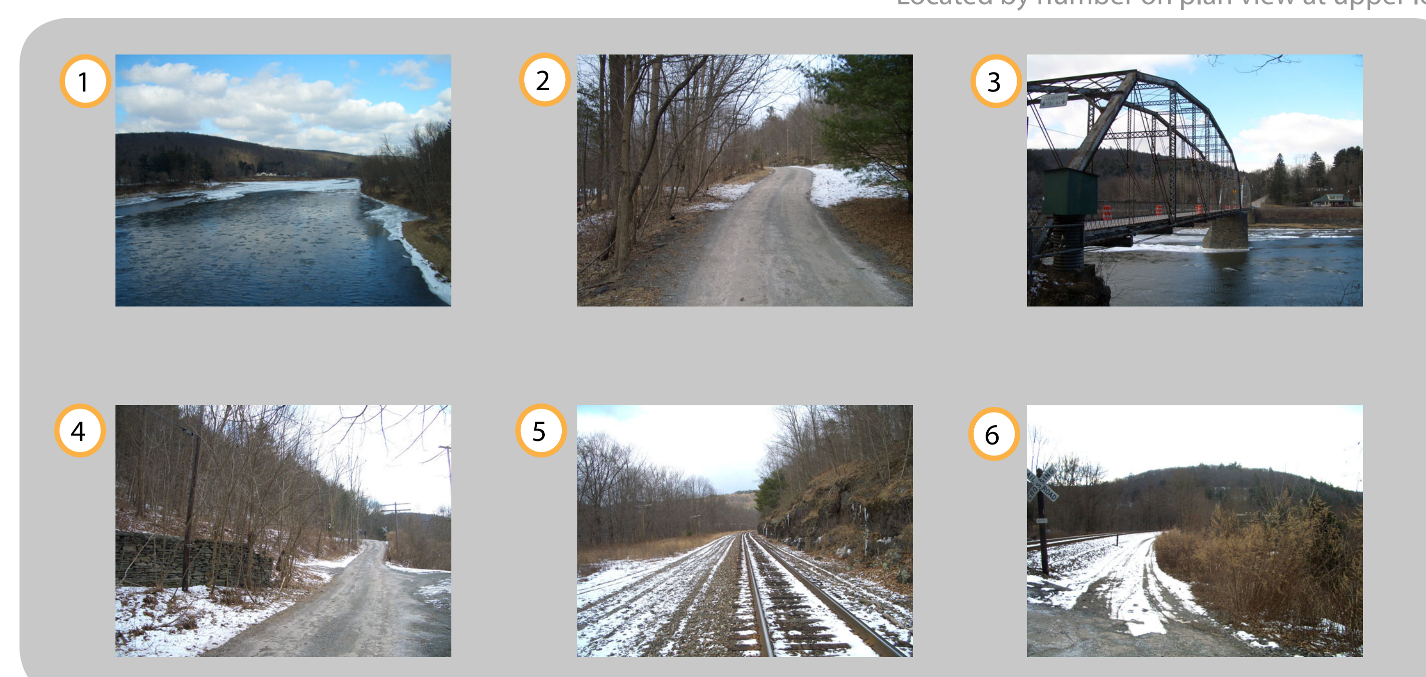
Pond Eddy showing potential route highlighted
Views indicated at lower right

Aerial view of Pond Eddy with section inset at left

View above Pond Eddy looking west with high voltage power line superimposed, highlighted

Endangered Views

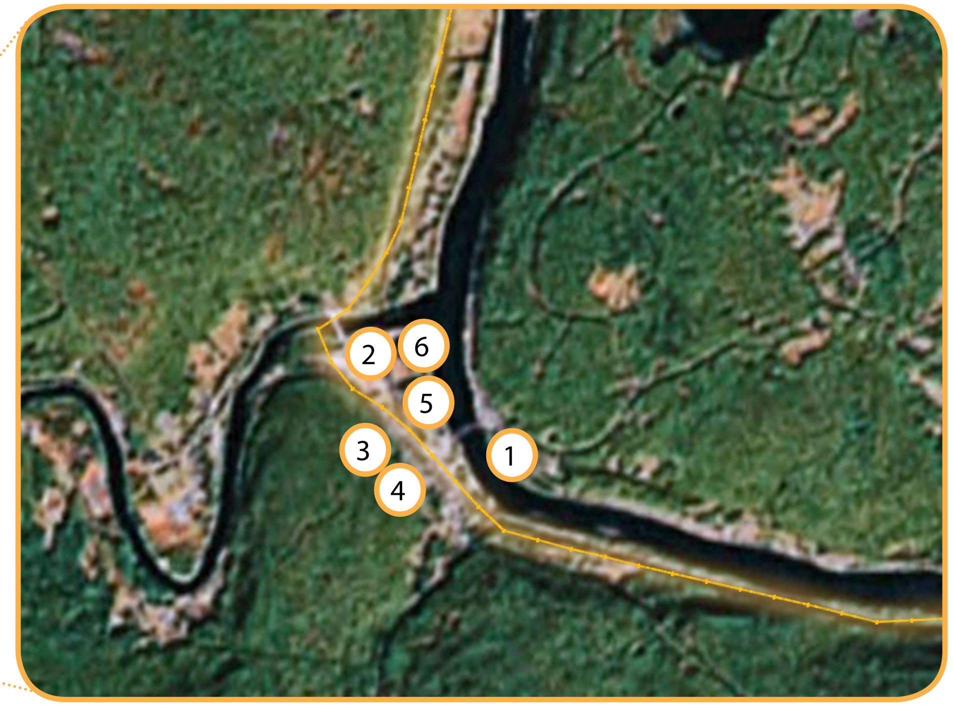
Located by number on plan view at upper left



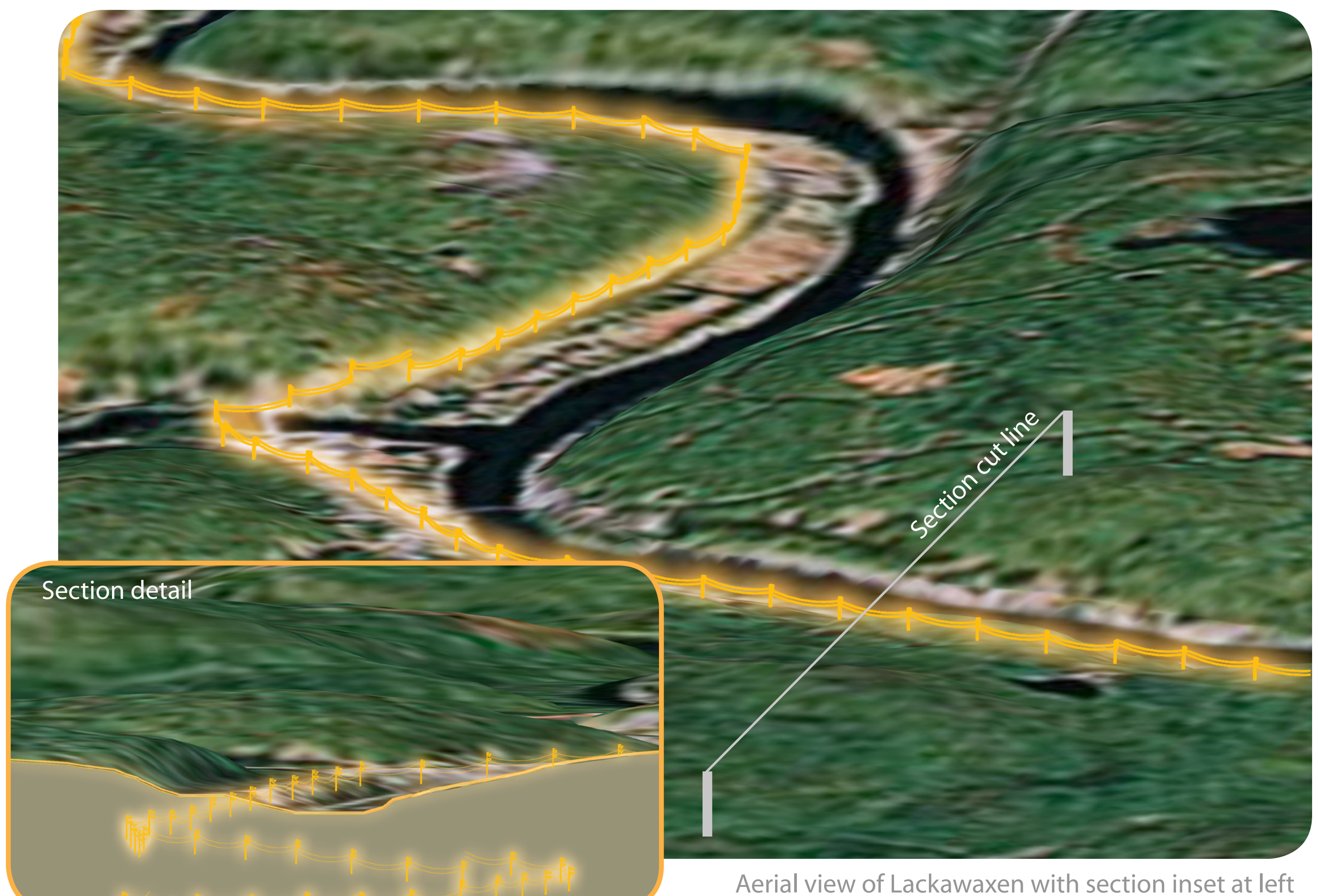
Lackawaxen, PA

Local Scale and View Impacts

Plan View, Narrowsburg to Pond Eddy



Lackawaxen showing potential route highlighted
Views indicated at lower right



Aerial view of Lackawaxen with section inset at left

View at Roebling Aqueduct with high voltage power line superimposed, highlighted

Endangered Views

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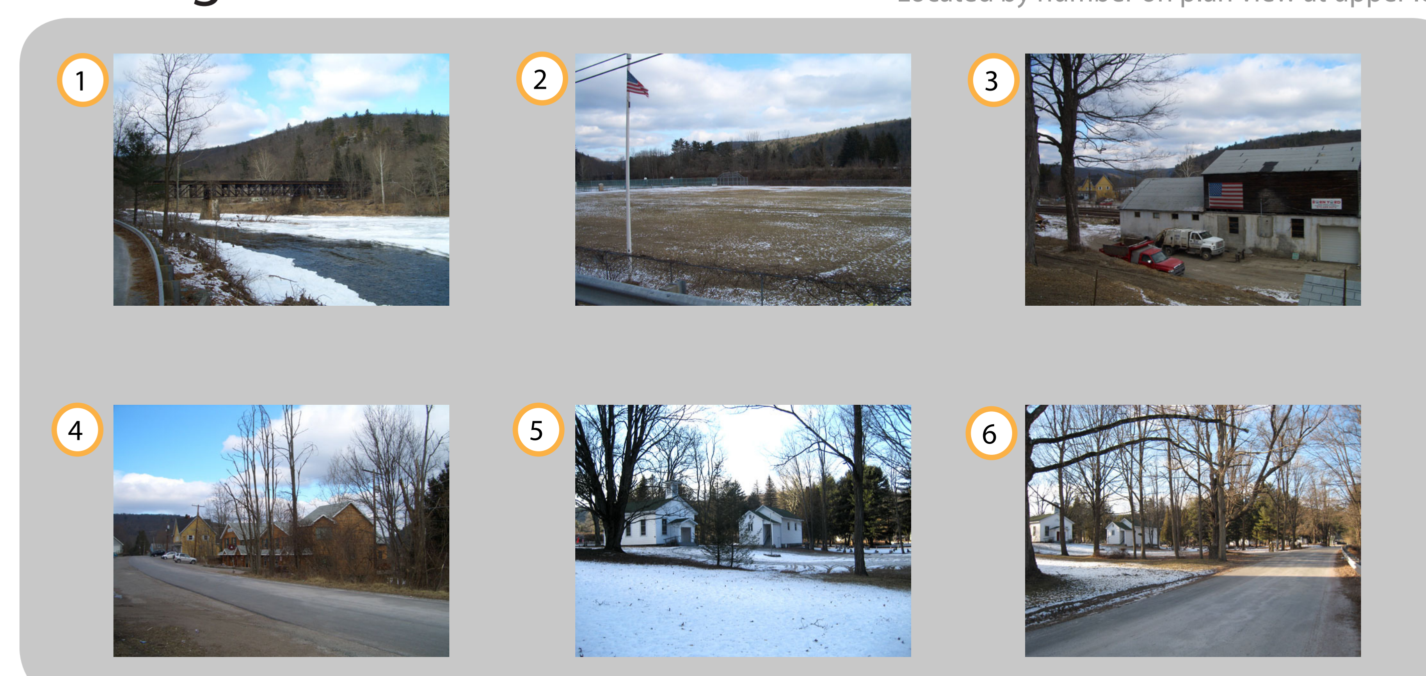
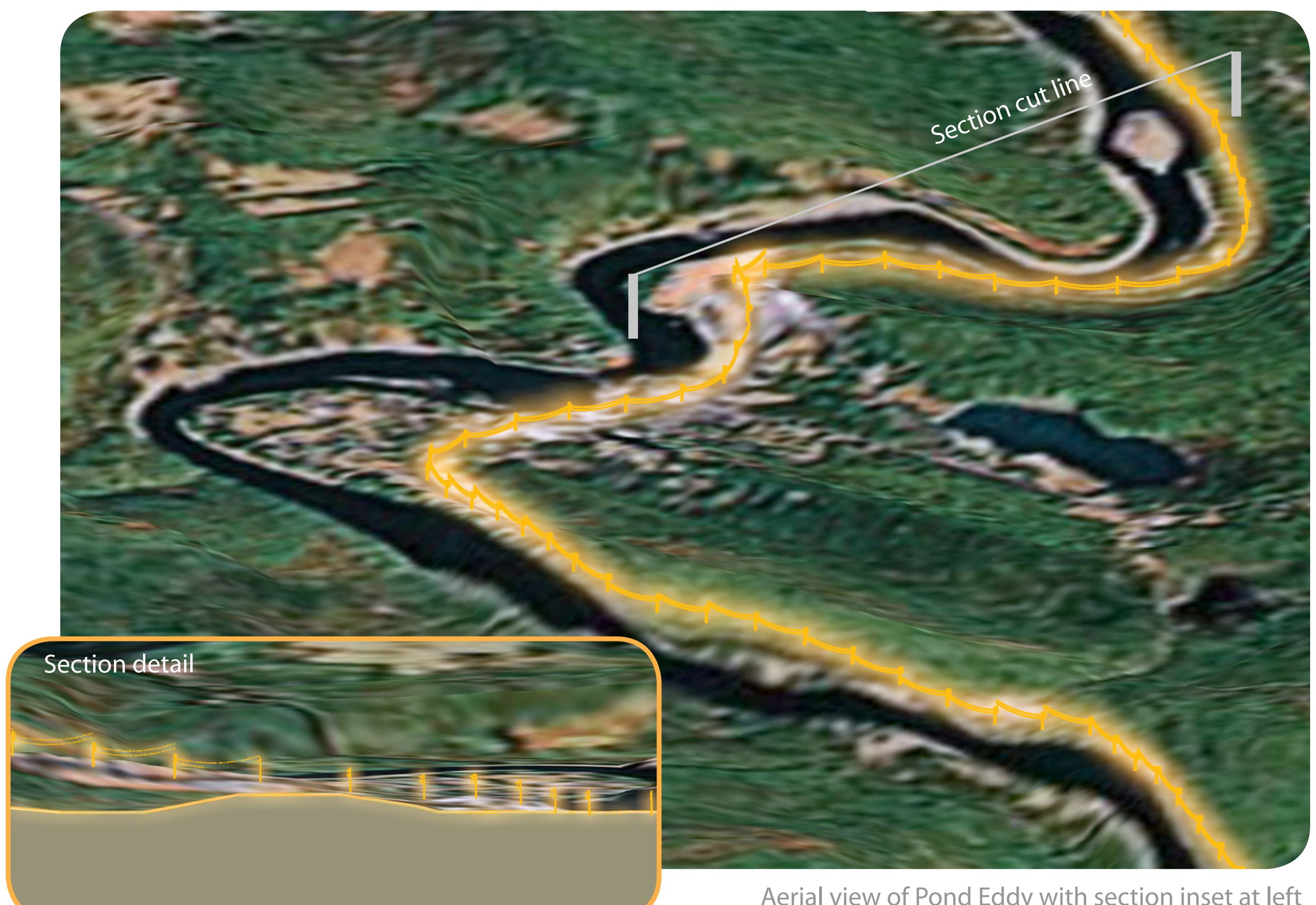


Narrowsburg, NY

Local Scale and View Impacts

Plan View, Narrowsburg to Pond Eddy

Narrowsburg showing potential route highlighted
Views indicated at lower right



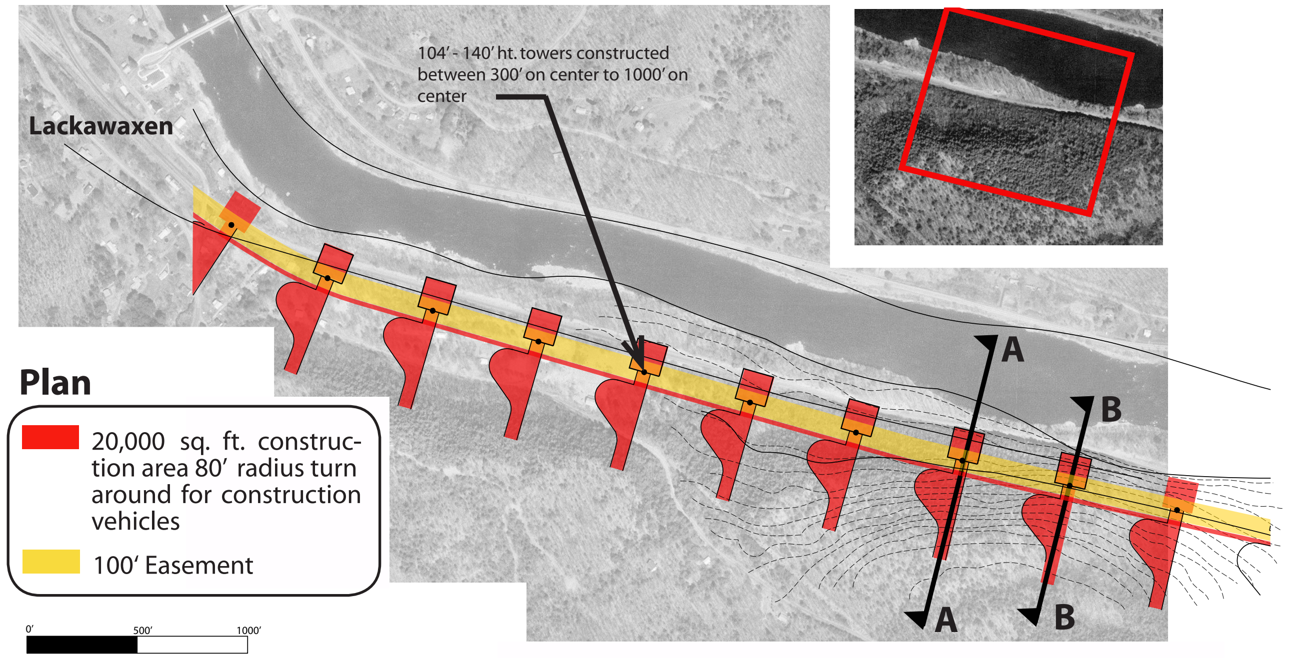
Aerial view of Pond Eddy with section inset at left

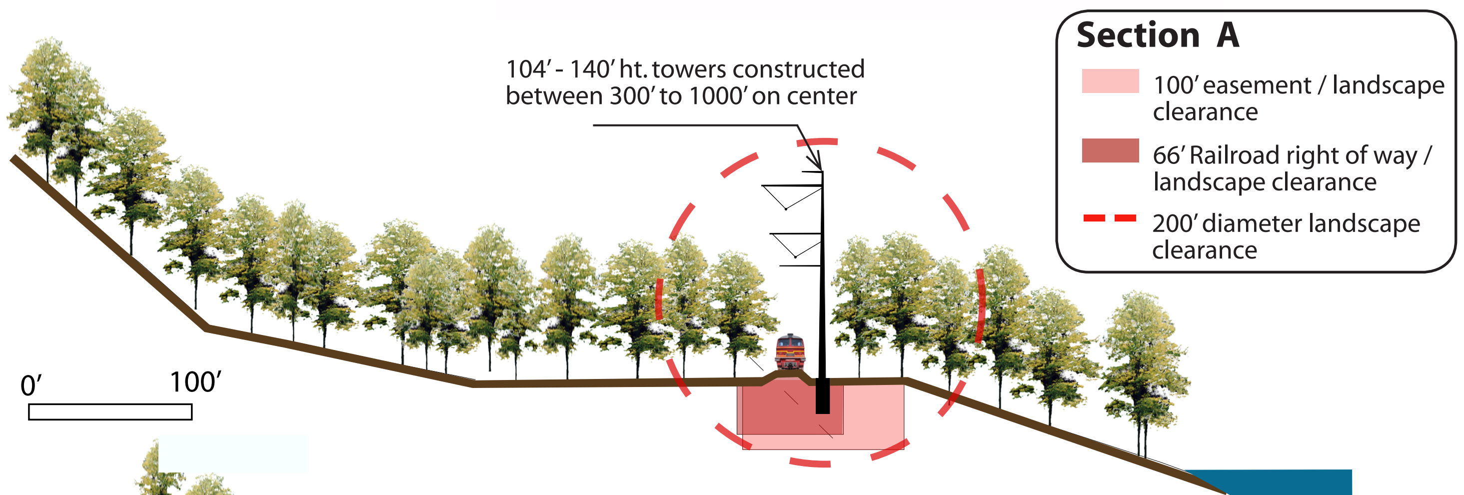
View along Main Street in Narrowsburg with high voltage power line superimposed, highlighted

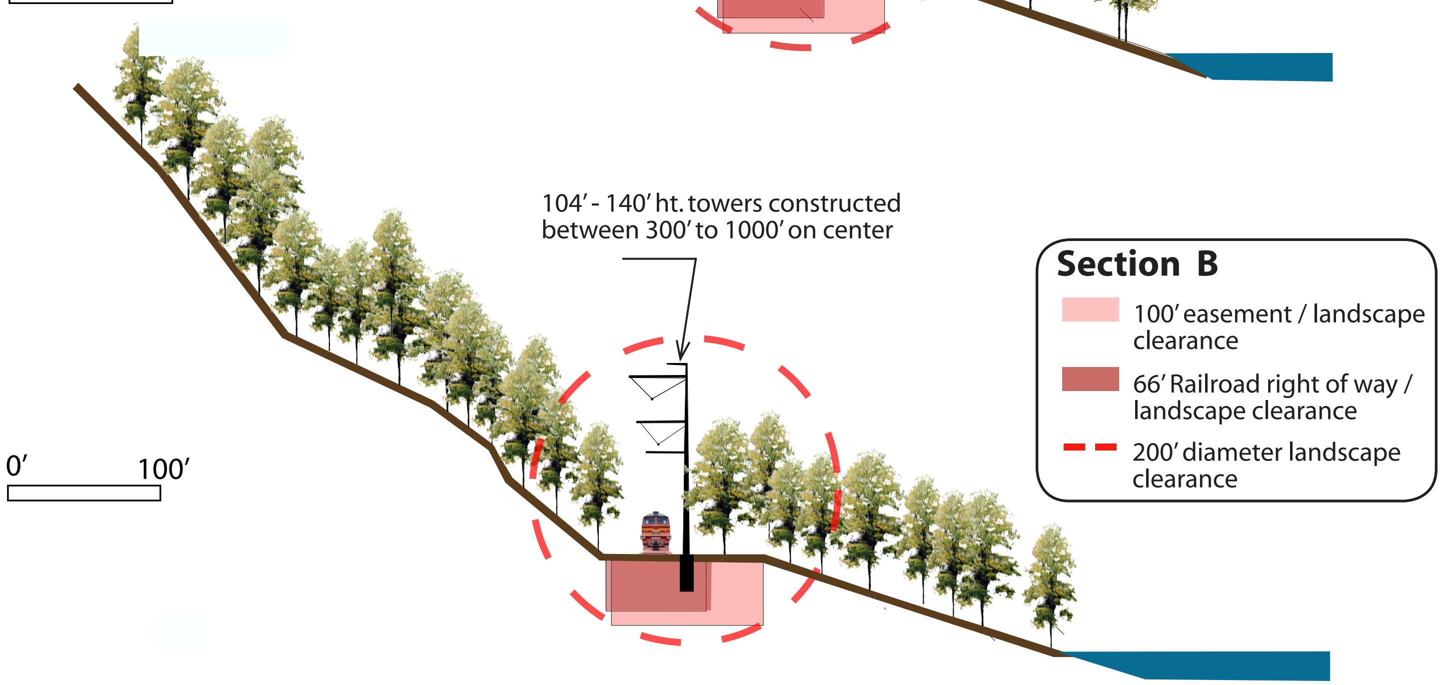
Endangered Views

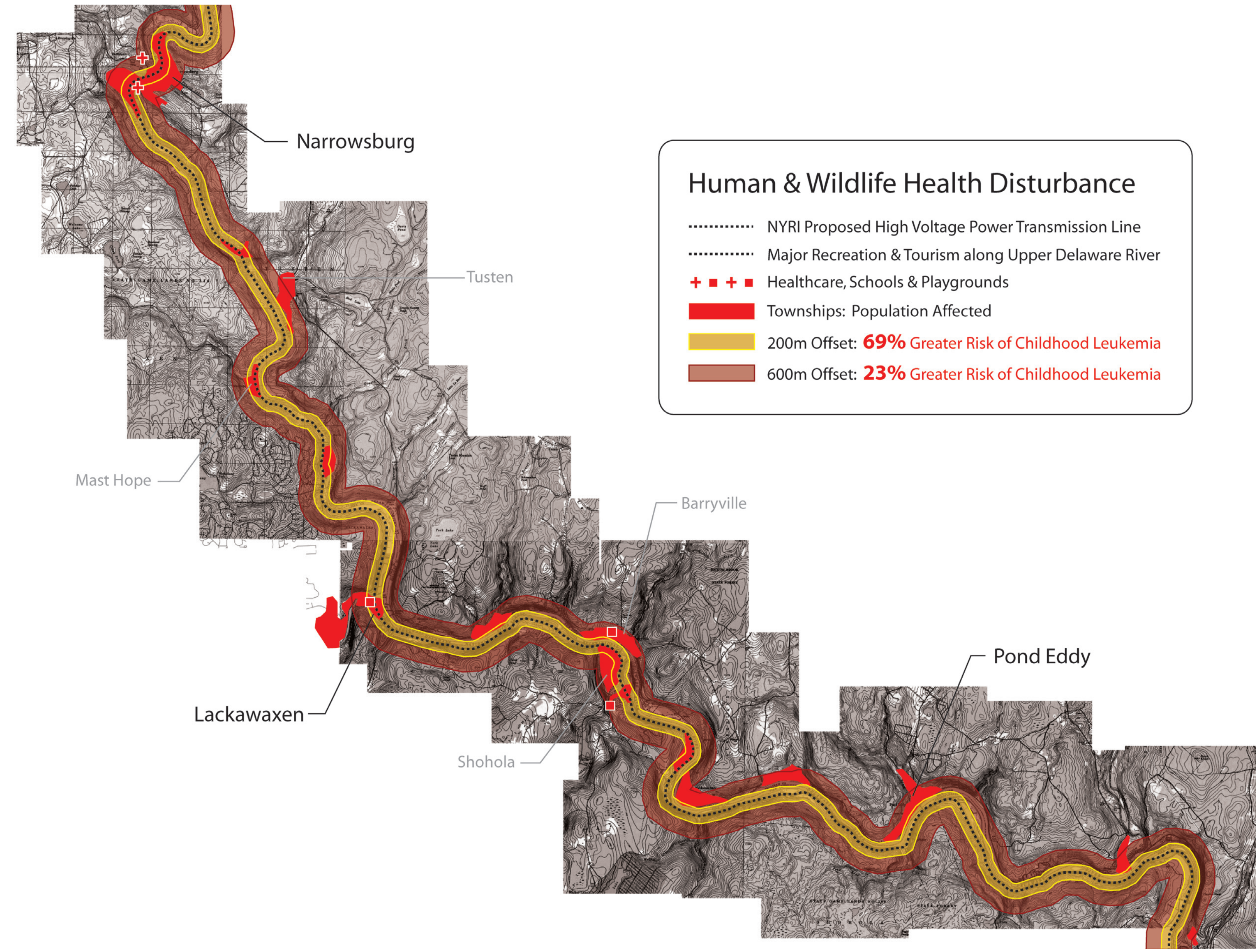
Located by number on plan view at upper left

Construction Disturbance Mapping



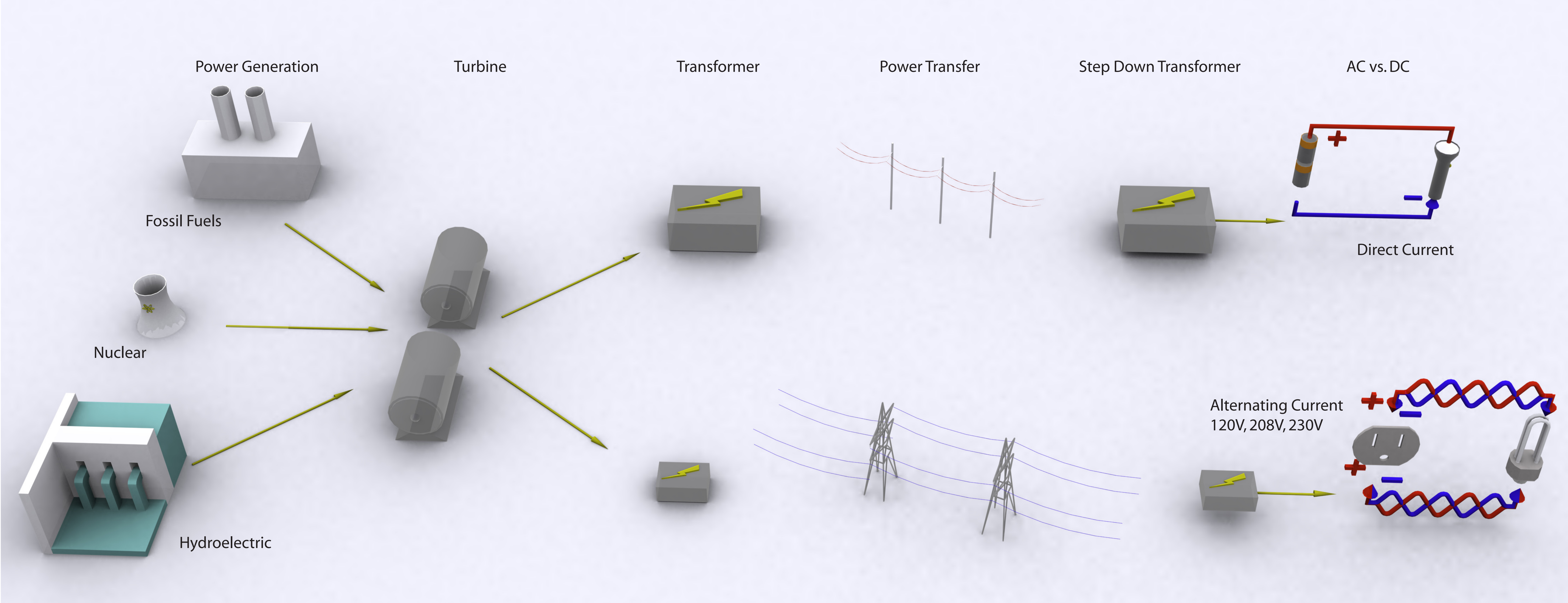






Power Transmission Lines & Health

High-voltage power lines generate electromagnetic fields and cannot be proven absolutely safe. In 1979, Nancy Wertheimer of the University of Colorado found that proximity to power lines correlated with an excess of childhood leukemia. There has been an ongoing debate in the scientific community as to whether the magnetic fields produced by overhead lines have ill effects on human health, but a 2005 study in the British Medical Journal indicates that children living within 600 meters of a high-voltage line had a 23% higher risk of leukemia, and those within 200 meters had a 69% greater risk. The map above shows the two different "risk zones" of 200m and 600m away from the proposed siting of the NYRI power line along the railroad in Narrowsburg, New York Lackawaxen, Pennsylvania, and Pond Eddy, Pennsylvania.



How We Power Our Lives

Every day, we go about our lives with relative ease thanks to a plethora of modern amenities. Lights, computers, and air conditioning are used daily without much thought about the real costs of generating and transmitting the required power. In order to fully understand the impact of power lines it is important to understand this process.

Electric Power Process

The majority of the New York region's power is derived from three main production sources: fossil fuels, nuclear power, and hydroelectric generation (dams). All of these processes rely on spinning large turbines, which generate electrical current. Next, transformers convert that current into a suitable voltage for long-distance transmission. After traveling over transmission lines, the high voltage power must be"stepped down"through a series of power substations and voltage boxes to meet industry standard 120V-240V Alternating Current.

HVDC Current: The Good the Bad and the (Very) Ugly

High Voltage Direct Current (HVDC) has established itself as the method of choice for long distance transportation of electricity.

While the efficiency of Direct Current (DC) is good, the majority of the world's electric devices utilize Alternating Current (AC) power. As a consequence, large and unsightly voltage stations are required just to make the electricity usable. With cheap energy being produced far away from its main users in urban areas, transmission lines have become a ubiquitous fixture in the landscape. Usually, they are paraded through the most economically efficient pathway (i.e. through cheap land) instead of the most ecologically non-invasive one. The question then becomes: Why should this power be produced so far away?

In addition to power lines, power stations required for HVDC (direct current) are significantly larger than those required by their HVAC (alternating current) counterparts.

Quick Facts

HVDC is only economical for distances over 189 miles and voltages more than 20 MW. The proposed NYRI line is only 185 miles long.

HVDC requires larger transformer stations to step up and step down voltage.

The majority of common electrical products use AC not DC.

HVAC would use 10% less copper and has less power loss by reducing voltage transformation

Is NYRI Necessary?

Heading Off New York's Energy Crunch is a self-titled overview provided by New York Regional Interconnection to promote the benefits of transmission as an enabling infrastructure in New York State's power system. Perhaps more importantly, it seeks to establish that transmission is a key element in any long range energy strategy for the United States. *(Source: NYRI Overview, Heading Off New York's Energy Crunch, May 2006.)*

NYRI posits there are three necessary actions that will promote a power supply to sustain and promote continued growth and prosperity for New York State:

Reduce Demand

NYRI describes reducing demand as an environmentally responsible element of any comprehensive energy strategy. However, the company states it is doubtful that additional improvements over those seen in the last 15 to 20 years in the efficiency of household and commercial electrical equipment will yield much more in the way of benefits. Instead, NYRI contends current and future developments in technology will make increased demands on our power supply.

Create New Generation

NYRI states that new generation cannot be a sole solution. New generation alone would necessarily need to be close to the area of demand and therefore near densely populated urban areas, which could exacerbate land use and environmental concerns.

Expand Capacity

NYRI states adding new capacity to the bulk power transmission system will tackle one of the root causes of the power crunch currently facing New York. According to NYRI, adding new transmission capacity would allow existing surplus power in the northern, central and western regions of New York State to reach high demand markets in the lower Hudson Valley and the southeast.

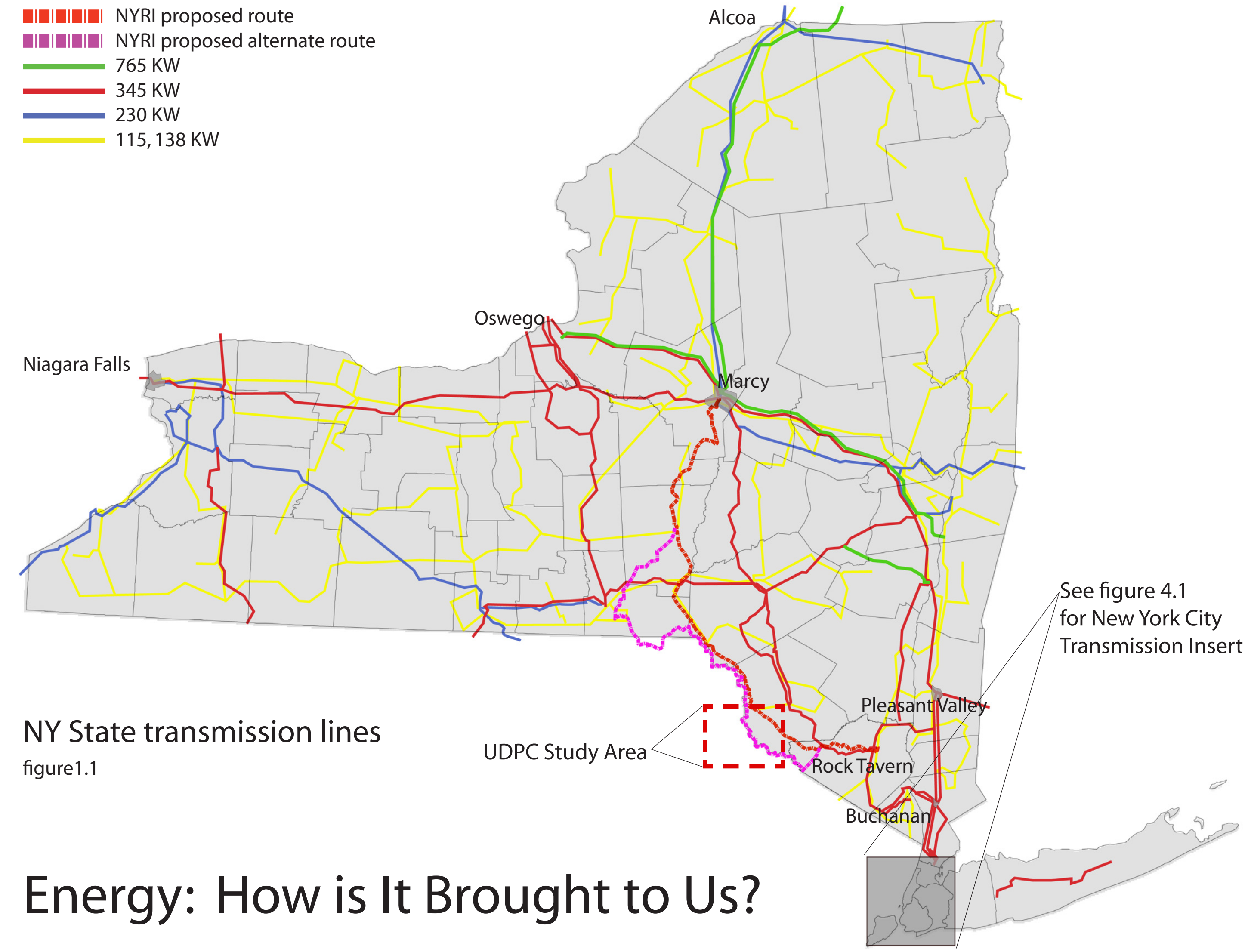
NYRI asserts a new transmission line will:

- *Alleviate transmission bottlenecks that are responsible for high costs and adversely impact air quality in New York State.*
- *Reduce congestion, which will encourage investment in generation of electricity from renewable sources located upstate.*
- *Reduce New York State's overall energy costs.*
- *Reduce emission of greenhouse gases*
- *Provide the most cost- effective way to meet growing demand without constructing new plants within urban areas.*

North America's electric system is facing challenges. There are major questions about how to allow a reliable, secure and affordable electric system to grow and prosper. It is important to understand how we situate ourselves in these challenges. What innovations might revolutionize the system while being low impact and respectful to our collective sense of significant and varied cultural and natural resources and values.

In May 2000, New York became the first state to offer incentive packages to developers who build environmentally sound commercial and apartment buildings. This innovative tax law is aimed at encouraging the housing materials and construction industries to adopt green practices on a large scale by providing tax credits to building owners and tenants who invest in increased energy efficiency, recycled and recyclable materials and improved indoor air quality. Residential and commercial buildings account for 37% of the energy consumed in the U.S. each year (primarily in the form of electricity). Making buildings more environmentally sound is a key step toward moving America's energy policy in a sustainable direction. It has the potential to set off a chain reaction through the building industry *(Natural Resources Defense Council - New York's Green Building Tax Credit.)*

Programs like these offer alternative solutions to large-scale transmission projects like NYRI. What else can be discovered when the entire system is considered?



NY State transmission lines
figure1.1

Energy: How is It Brought to Us?

The energy infrastructure for the United States is comprised of many components: a physical network of pipes for oil and natural gas, electricity transmission lines and other alternative means. There are:

- Approx. 5,000 power plants in the US
- Approx. 204,000 miles of transmission lines in North America (157,810 miles in the US, see figure 2.1)
- Over 16,000 generators with over 800,00 MW generating capacity.

When the National Energy Policy was drafted in 2001, there were plans for the electric transmission capacity to increase by 4% (equating to around 7,000 miles of power lines over the next ten years.) That policy recognizes that more electricity is being shipped longer distances over a transmission system that was initially designed only to provide limited power and reserve sharing among neighboring communities *(National Energy Policy, Chapter 7, 2001).*

Why the change?

For over a century, electric utilities in the United States were vertically integrated monopoly providers. Utilities were regulated by state public service commissions on a cost-of-service basis. The four steps of providing electricity (generation, transmission, distribution and retail sales) were centrally managed. By the late 1980s, there was growing political enthusiasm for free energy markets. The idea that electric utilities should be deregulated and face competition was a major issue. The concept was to treat electricity not as a public good, but as a commodity provided by competitive business, resulting in lower rates for consumers. The system has since increasingly separated into three isolated segments: generation, transmission and distribution. *(Source: A Failed Experiment, March 2007, Tellus Institute)*

Who is Minding the Store?

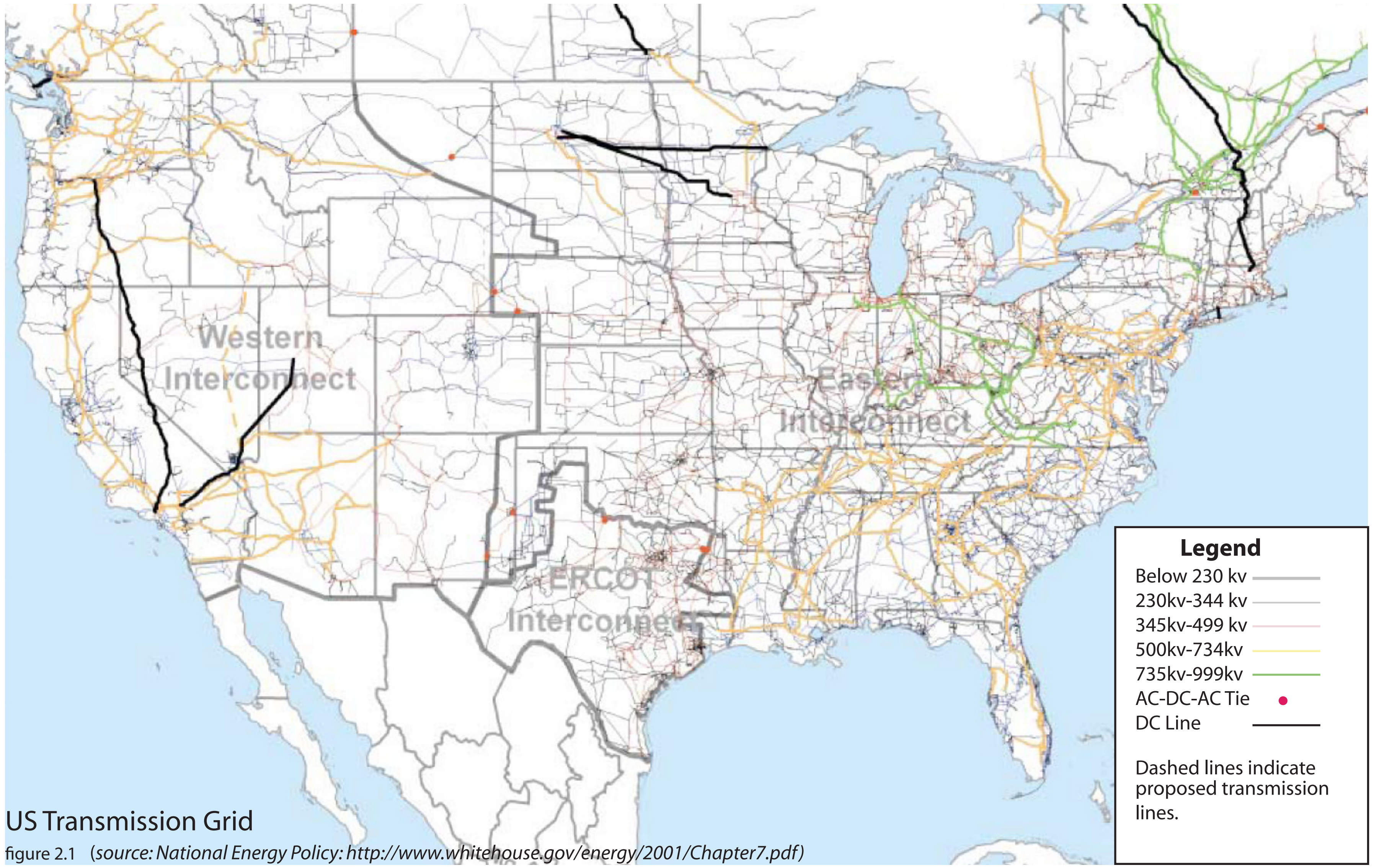
In 1996, to facilitate competition at the wholesale level, the Federal Energy Regulatory Commission (FERC) required transmission-owning utilities to "unbundle" their transmission and power-marketing functions, in order to provide nondiscriminatory, open access to their transmission systems by other utilities and independent power producers. Some states have required utilities to divest their generation assets as a part of restructuring.

These utilities currently supply only transmission and distribution service for customers who purchase electricity from other firms. Power marketers buy and sell power on wholesale markets and market electricity directly to customers. *(Source: National Energy Policy, 2001)*

Currently, the North American transmission grid is not unified. It is comprised of four integrated transmission grids serving North America: Western Interconnection, Eastern Interconnection, Electric Reliability Council of Texas, and the Province of Quebec *(Source: PA consulting Group)*.

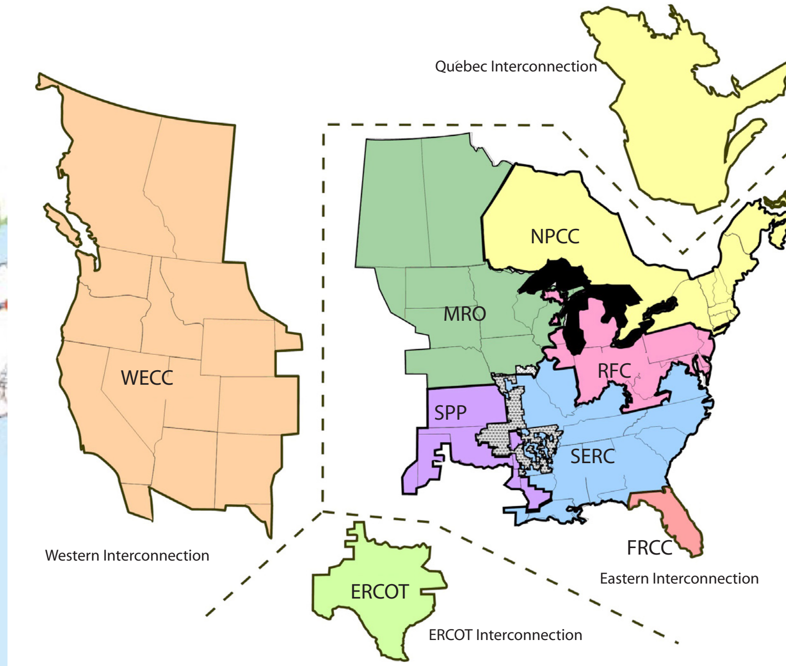
For all intents and purposes, these form four different grids. Transactions between them are limited because they are connected at only a few locations through interties. These break down into smaller regions (see figure 2.2) that are defined by transmission constraints. Overall reliability planning and coordination is provided by the North American Electric Reliability Council (NERC), which was formed in 1968 in response to the 1965 Northeast Blackout. NERC's stated purpose is to improve the reliability and security of the bulk power system for North America by developing and enforcing reliability standards; monitoring the bulk power system; assessing future adequacy; auditing owners, operators, users for preparedness; and educating and training industry personnel.

*W*hile this may seem to indicate multiple layers of oversight, the National Energy Policy indicated the lack of enforceable reliability standards is also a critical issue. There is a need for appropriate regulatory oversight to minimize potential abuse of the market power established by deregulation.



US Transmission Grid

figure 2.1 *(source: National Energy Policy: http://www.whitehouse.gov/energy/2001/Chapter7.pdf)*



NERC Interconnections

figure 2.2

The transmission grid in the United States is not a national unified grid. It is made up of four integrated transmission grids serving North America: Western Interconnection, Eastern Interconnection, Electric Reliability Council of Texas, and the Province of Quebec (see US Transmission Grid, figure 2.1). NERC (North American Electric Reliability Corporation) is a voluntary, self-regulatory non-profit organization whose members include utilities, transmission owners, providers, non-utility generators, power marketers, transmission customers, independent system operators (ISO) and the New York State Reliability Council. It works with eight Regional Reliability Councils to improve the reliability of the bulk power system. The councils are: Electric Reliability Council of Texas, Inc. (ERCOT), Florida Reliability Coordinating Council (FRCC), Midwest Reliability Council (MRO), Northeast Power Coordinating Council (NPCC), Reliability First Corporation (RFC), SERC Reliability Corporation (SERC), Southwest Power Pool, Inc. (SPP) and Western Electricity Coordinating Council (WECC). NERC is subject to audit by U.S. Federal Energy Regulation Commission (FERC). (source: http://www.nerc.com/)

National Energy Policy

At the beginning of 2001, President Bush directed his newly formed National Energy Policy Development Group "to develop a national energy policy to help private sector [and as necessary state and local governments] promote dependable, affordable and environmentally sound production and distribution of energy for the future." NEPDG issued a report to the President in May of 2001, which was soon after used as a basis for an energy bill passed by the House and executive orders signed by the President.

Subsequent groups have identified the key role of the energy policy as supporting economic growth by encouraging the provision of affordable, efficient and reliable energy services to the energy users. One such group, the National Energy Policy Initiative, states, "new energy technologies should be developed in response to market demand, not in response to politically driven preferences for particular fuels, industries or technologies." *(Source: www.nepinitiative.org).* Yet it is telling that the initial directive lists *business* as a primary recipient.

Transmission Constraints: *The Appeal at the National Level*

Chapter Seven of the National Energy Policy (America's Energy Infrastructure, a Comprehensive Delivery System) recognizes that the combined effect of regional shortages of generating capacity and transmission constraints reduces the overall reliability of the electric supply. Moreover, this effect reduces the quality of the power provided to end users.

Other than noting there have been a large number of "merchant" power plant proposals by independent power producers to sell energy in the wholesale market in the last few years, issues with transmission draw more attention from the policy.

The NEP suggests that in a given region, transmission can substitute for generation, allowing regions to import power that otherwise would need to be generated within the region. The NEP follows with the idea that transmission expansion may be more cost effective than generation additions, allowing regions better access to lower-cost generation. This commentary leads to the idea that transmission constraints are a main cause of limiting the power flows which result in consumers paying higher prices for electricity.

The NEP states that transmission constraints exist because there is a lack of sufficient investment in transmission and there continue to be issues with siting the transmission lines. The NEP offers two means to address these issues:

First, FERC is willing to consider innovative transmission pricing proposals to create incentives for investment by companies who operate transmission facilities.

Siting, the second issue, is currently under state oversight. The NEP indicates that it has national implications. One focus is to direct the development of legislation to grant authority to obtain rights-of-way for electricity transmission lines with the goal of creating a reliable national transmission grid. These types of measures imply a political preference towards transmission.

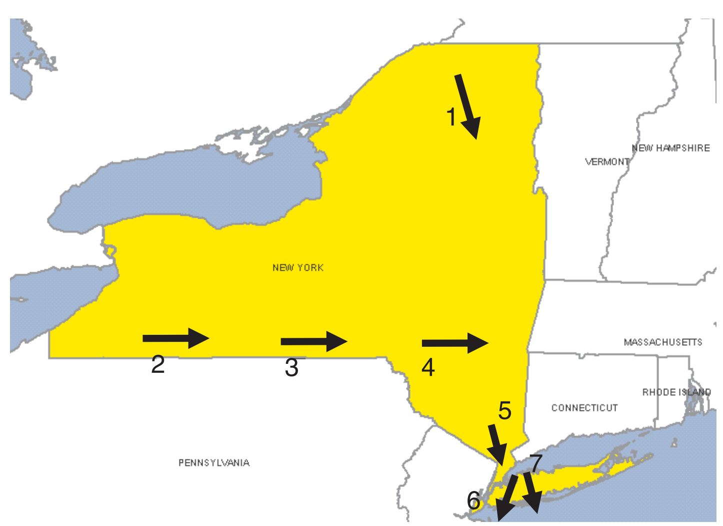
The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity. In 2005, the Energy Policy Act expanded the authority of FERC to:

- *oversee the reliability of the nation's electricity transmission grid*
- *implement tools, including penalty authority, to prevent market manipulation*
- *provide rate incentives to promote electric transmission investment*
- *supplement state transmission siting efforts in NIETCs.*
- *review holding company mergers and acquisitions and public utility acquisitions of generating facilities.*

DOE Congestion Report

In August 2006, the Department of Energy authored a congestion study suggesting that if a geographic area experiences electric energy transmission capacity constraints or congestion that adversely affects consumers, then that area can be deemed a National Interest Electric Transmission Corridor (NIETC), which gives private companies the right to seize property and site transmission lines over state and local objections.

Does this allow private corporations too much leeway in determining what is in the public good? Should there be a greater focus on sustainability and reliable efficiency within the network of generation, transmission and distribution?



Constraints in NY Region
(Source NYSIO, Department of Energy Congestion Study 2006)
figure 3.1

Disagreements: *Applications Not Yet Balanced*

A Failed Experiment

An article from the Tellus Institute, *A Failed Experiment, Why Electricity Deregulation Did not Work and Could not Work* (March 2007), describes the purposes of deregulation for the electric utility industry and some of its recent effects. Deregulation was expected to deliver lower rates, and better efficiency but has it really just led to new opportunities for profit without regard for the public interest?

The electricity grid was built to connect neighbor to neighbor, not move large blocks of power from one region to another. In a market-driven industry, electricity suppliers want a wide market to maximize profits. This encourages building more transmission lines that can lead to excessive construction or congestion of existing lines, neither of which are economically beneficial. overall

Under what is called "least cost planning," there is a certain level of transmission that is optimal; exceeding the amount is inefficient and not cost-effective. The Tellus Institute contends that what is often called a decline in transmission infrastructure may in fact be an inappropriate use of the existing infrastructure. The principal concern raised by the Tellus Institute is over reliance on the idea of the "market." All markets behave similarly: If supply is tight, then prices are higher for the demand market. In the case of electricity, this can lead to market manipulation through strategic bidding (bidding the price above a competitive level which is in the interest of the generation owners) or capacity withholding.

Capacity to Play the Market?

Con Edison recently filed papers with FERC that stated manipulation of a wholesale electricity market cost New York consumers approximately $157 million in the summer of 2006. The New York Independent System Operator (NYISO), with FERC approval, created an "installed capacity auction market" allowing companies serving consumer demand to purchase electricity for a capped rate. It pays all sellers of the electricity the same price. If the seller withholds capacity, it can constrain supply and raise the price of the other segments of its output. The inflated price of the cap can outweigh the loss from the capacity withheld.

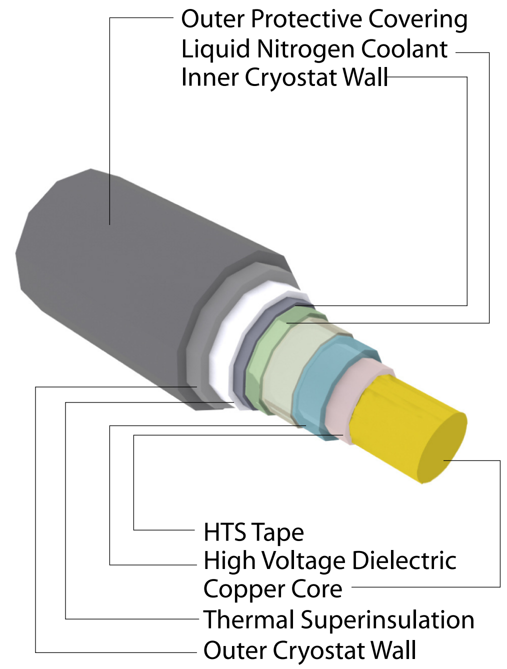
When capacity was added in the New York City market in the summer of 2006, there was an expectation that this cap would be reduced. However, it was not because market rules allow for withholding of capacity to drive up prices. NYISO has no way to prevent withholding of capacity, and there is no effective review of "market-based rates" in place. Also, there is no way for consumers to recover any overcharges. *(Public Utility Law Project of New York is a consumer advocacy group in utility and energy related matters.)*

This issue demonstrates the disagreements concerning rate caps and withholding between generation and transmission owners in the New York City area. More importantly, it illustrates a redundancy inherent in the electricity supply system for the state. It also indicates that the regulatory framework is providing a stable environment neither for the energy business nor for environmental and consumer protection. FERC regulates interstate wholesale markets. State and local agencies regulate retail markets. The regulatory framework governing electric power markets is clearly under stress. Efforts to loosen regulation and increase competition are not producing the anticipated results and stated goals.

Transmission issues are exacerbated by multiple players who are only concerned with their piece of the industry. Evidence of companies engaging in capacity withholding and overloading capacity to create the impression of constraints demonstrate that "transmission corridors" are not necessarily the national interest, but are clearly in the interest of private companies.

Before allowing the use of eminent domain for the creation of an NIETC, public-private partnerships must strengthen the effectiveness of the regulatory framework for a clear understanding of who is "minding the store," and for the consumer to receive the maximum benefit of economic and environmental value.

Electricity in the Next Century



Will the economic life of any new equipment, which may have a life span of 20 to 40 years, include the latest technologies to address future innovations? Can an electro-mechanical electric grid keep pace with innovations and demands of the digital and telecommunications network?

More power flowing through existing assets may be the best option. High Temperature Superconductivity (HTS) cables retrofitted to the existing Marcy-South line would provide this additional capacity while respecting local land use concerns. The technology could increase the line's capacity and absorb the increase of energy production. Distributed energy technologies could also be employed to reduce "upstream" needs for electric generation, transmission and distribution by decreasing peak demand. Only by addressing multiple technological innovations will the goal of the National Energy Policy be met: To provide an affordable, efficient, and reliable product to energy users. The following discusses alternatives to the addition of new transmission corridors.

What is New York City's True Energy Demand?

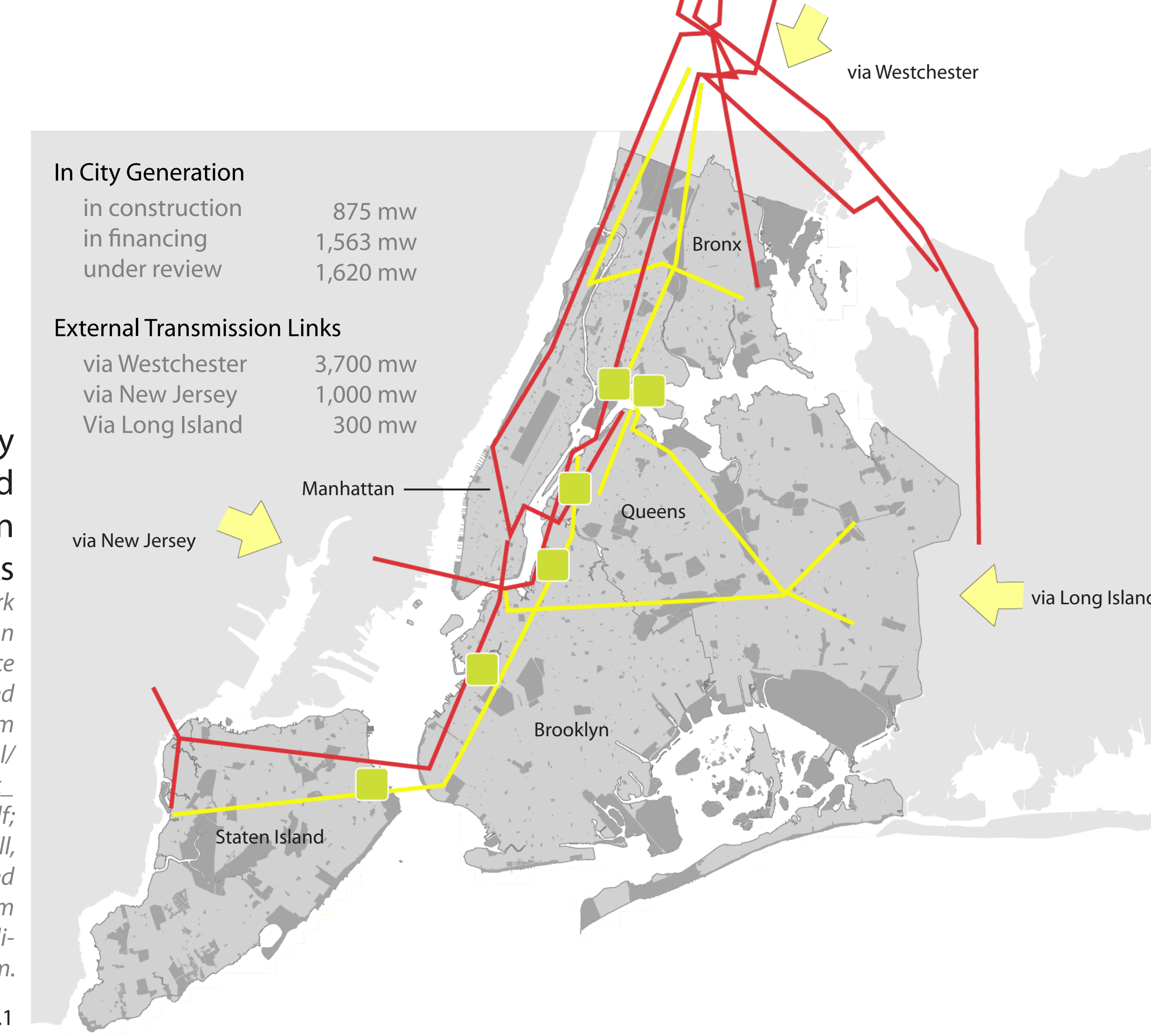
"In 2003, New York City's forecasted peak electricity demand was 11,020 megawatts. By regulation and for reliability purposes, 8,816 MW, or 80% of that forecasted peak load, had to be supplied by capacity available in-city. The available electricity supply capacity in the city exceeded the 80% requirement by only 71 MW."

Due to reliability concerns, the New York State Reliability Council and the New York Independent System Operator mandate that 80% of the City's peak load be met with in-City resources. *(Source: NYC Leading by Example NYC Energy Policy, January 2004).*

In 2004, a city commissioned task force examined the state of New York City's energy policy and arrived at a comprehensive program of action, which included recommendations for alternative energy supply, distributed resources, energy delivery, and initiatives of New York City agencies. Identified measures include:

- Enhancing the city's menu of energy efficiency programs
- Developing pilot energy educational programs
- Tying economic development & investment to energy efficiency
- Including clean on-site generation strategies as part of a least cost resource plan to supply the electricity needs of city agencies
- Seeking direct incentives and low-cost financing for peak load management enabling technologies
- Incorporating high-performance design strategies into city led capital projects for long-term value

Furthermore, the city government, the consumer of nearly 10% of the entire load used in New York City, should be challenged to serve as a model for energy efficiency.



NYC In-City Generation and Transmission Links

Source: New York City Energy Policy: An Electricity Resource Roadmap. Retrieved March 18, 2007 from www.nyc.gov/html/om/pdf/energy_task_force.pdf; Power Now! Small, Clean Plants. Retrieved March 18, 2007 from www.nypa.gov/facilities/powernow.htm.

figure 4.1

NYC: Alternatives to New Transmission Corridors

"With appropriate policies and incentives, distributed resources are often the most readily available, cost-effective, and underutilized clean energy resources that can potentially reduce or defer the amount of required new electric supply from generation and transmission systems. While it can take many years to plan, design and build electric generation plants, most distributed resources can be deployed within a year." *(NYC Energy Policy, January 2004).*

According to New York City's energy policy, distributed resources include:

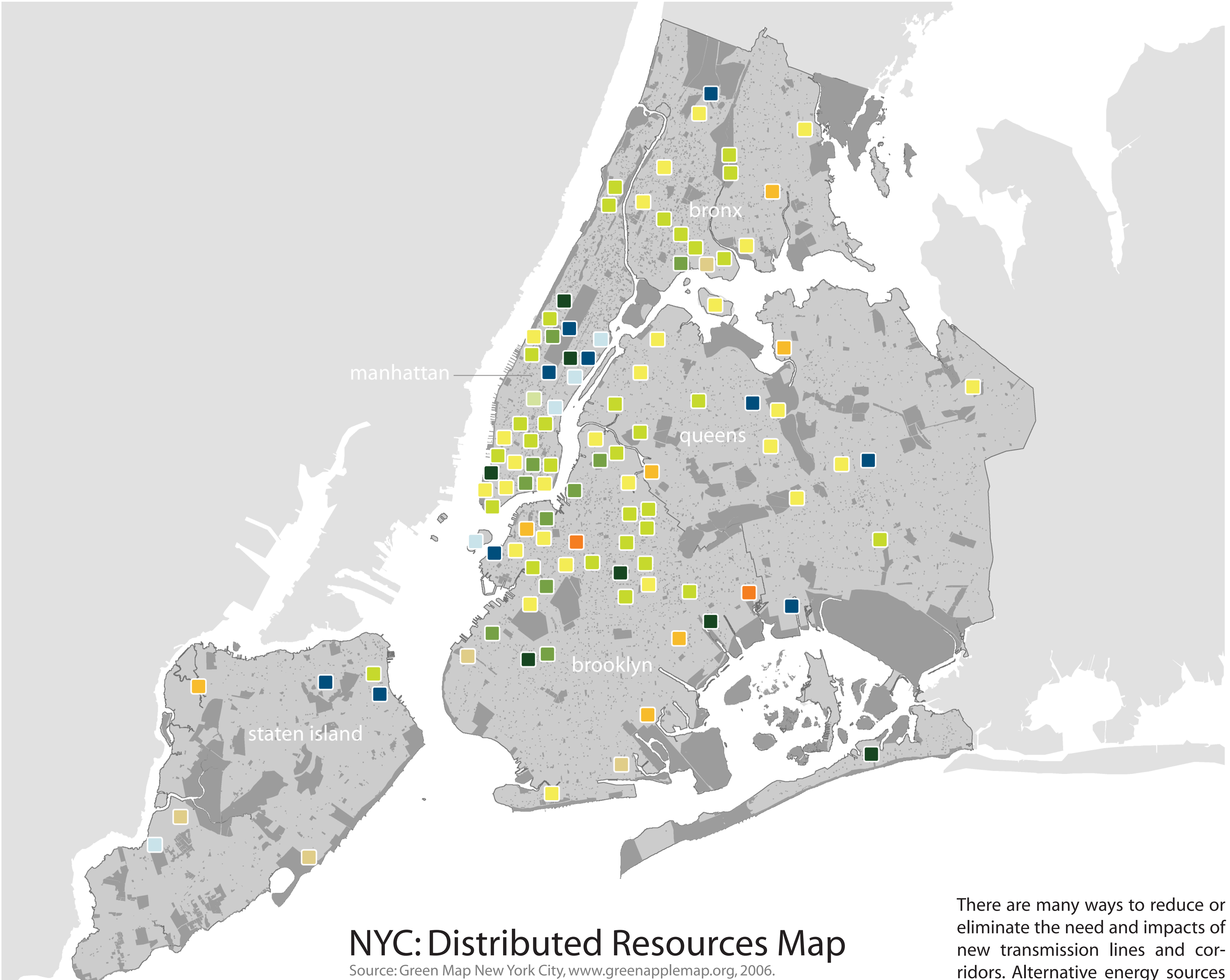
- **Energy Efficiency** targets permanent demand and energy usage reductions by the design, application and installation of energy efficient building materials and equipment.

- **Fuel Switching Applications** refer to the use of steam and gas chillers in lieu of electrically driven chillers for air conditioning systems in large buildings.

- **Thermal Energy Storage** encourages off-peak production and integration of chilled water storage and ice storage into air conditioning distribution systems.

- **Clean On-Site Generation** includes cogeneration and clean distributed generation, such as microturbines and fuel cells, often located at or near the intended place of use. Cogeneration has efficiencies of 70% to 95%, compared with national averages of 30% efficiency in conventional large generation plants.

- **Renewable Energy** is produced via landfill gas, solar photovoltaics, solar thermal, and wind power. Renewable energy promises environmental benefits, diversity of energy sources, and reduced reliance on fossil fuels for power generation.



NYC: Distributed Resources Map

Source: Green Map New York City, www.greenapplemap.org, 2006.
Ascher, Kate. "The Works: Anatomy of a City." New York, 2005.

1. Energy Efficiency
   - building envelopes (e.g. green roofs)
   - lighting and appliance usage
   - green businesses
   - building commissioning (i.e. a/c systems)
   - fuel switching applications (e.g. natural gas)
   - public facilities (opportunities)
2. Thermal Energy Storage
   - new building design (LEED)
   - passive thermal control (i.e. a/c, heating)
3. Clean On-Site Generation
   - co-generation
   - clean distributed generation
   - fuel cells
   - microturbines
4. Peak Load Management
   - business schedules: incentives for peak load management
   - energy usage trading market
5. Renewable Energy
   - solar photovoltaics
   - solar thermal
   - geothermal
   - bio-based energy
   - human-source (e.g. metro-turnstyles)
   - wind energy

There are many ways to reduce or eliminate the need and impacts of new transmission lines and corridors. Alternative energy sources are being pursued in many forward-looking regions implementing advanced technology, regulatory, and conservation measures.

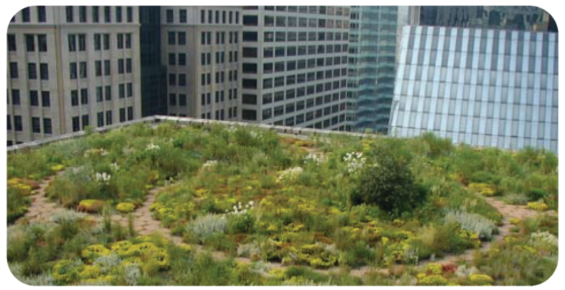
As New York City strives toward a vision of taking greater responsibility to meet its own energy demands, alternatives to long-distance transmission are documented in the New York City Energy Policy Task Force Report (2004).

The above map indicates a cross-section of distributed resources in use by forward-looking business, residents, and government agencies in effort to reduce or eliminate the upstream impact of new power transmission.

NYC: How are Distributed Resources Used?

Source: Green Map New York City, www.greenapplemap.org, 2006.
Ascher, Kate. "The Works: Anatomy of a City." New York, 2005.

resource 1



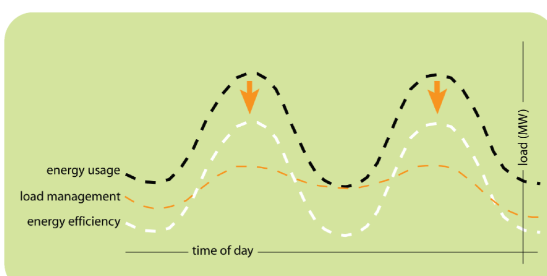
Annapolis, MD: www.arundel.blogspot.com + www.epa.gov

A **Green Roof**, consisting of vegetation and soil planted over a waterproof membrane, is an application used in industrial facilities, residences, offices, and other commercial property. Green roofs are widely used for stormwater management, energy savings, and aesthetic benefits.

resource 2

More and more, **green businesses, venture capitalists and entrepreneurs** are taking on pilot projects to include energy efficiency and green materials in their facilities. The NYC **city government**, a consumer of nearly 10% of power used in NYC, has been challenged to be a model for energy efficiency for the city.

resource 3



Peak Load Management aims to encourage temporary electricity demand and consumption adjustments according to wholesale capacity and local grid conditions. In times of peak demand, customers are asked to curtail their energy consumption or generate on-site power.

resource 4

Brooklyn, NY: Distributed Energy www.foresterpress.com

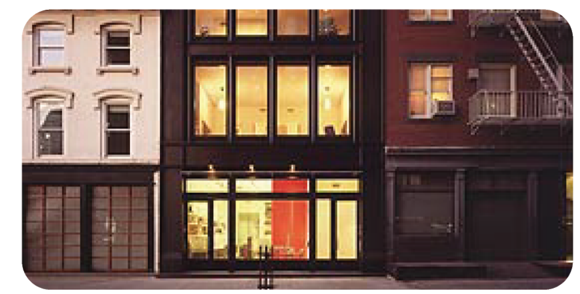
The Clinton Hill Apartments in Brooklyn are the nation's largest residential microturbine-operated facility. **On-Site Co-generation** produces electricity and hot water from direct heat or steam in an efficient manner and will reduce Clinton Hill energy costs and usage by 40%.

resource 5

New Haven, CT: Fuel Cells www.nickelinstitute.org

Fuel Cells, another form of on-site generation, is a device that converts the chemical energy of a fuel, often natural gas or hydrogen, directly into electrical energy. The generation is connected to the distribution level of the grid located at or near the intended place of use.

resource 6



New York, NY: Geothermal Townhouse, Photo: Paul Warchol

In cold weather, renewable **geothermal heat** warms underground pipes filled with circulating water, which then transfers heat into the building. In hot weather, the circulating fluid 'removes' the heat from the building and transfers it into the earth.

resource 7

Bio-based Renewable Energy includes bio-diesel, anaerobic digesters (often from landfill gas), and biomass, which includes plant-based fuels like ethanol. The Oakwood Beach Waste-water Treatment facility, near the Fresh Kills landfill, uses anaerobic digesters to create power from waste. www.greenapplemap.org.

resource 8

Bahrain World Trade Center: www.bahrainwtc.com

Wind Power Renewable Energy, operates 24 hours a day to produce clean, quiet and efficient energy. Wind power is now incorporated into both advanced urban high performance building design and for power generation in more localized residential locations.

Selected Bibliography

Ascher, Kate. "The Works: Anatomy of a City." New York, 2005.

City of New York, An Electricity Resource Roadmap, NYC Energy Policy, January 2004.

FERC & EPAct 2005, Meeting Milestones, August 8, 2006.

Green Map New York City, www.greenapplemap.org, 2006.

New York Regional Interconnection, Heading Off New York's Energy Crunch, www.nyri.us/pdfs/NYRI_ProjectOverview.pdf, May 2006.

National Energy Policy Initiative, www.nepinitiative.org/, 2003-2004.

Public Utility Law Project. Did Electricity Market Manipulation Cost New York Consumers $157 Million in the Summer of 2006? http://www.pulp-network.blogspot.com, March 21, 2007.

Rosen, Richard and Stutz, John. A Failed Experiment, Why Electricity Deregulatoin Did Not Work and Could Not Work, Tellus Institute, March 1, 2007.

Schrabisch, Max. Archeology of Delaware River Valley. Harrisburg: Commonwealth of Pennsylvania, 1930.
Schwartz, Frank. (Lumberland Town Historian). The Berme Church Historical Trail. (Pamphlet)

Upper Delaware National Scenic and Recreational River: Cultural Resource Survey. Philadelphia: United States Department of the Interior, 1983.

U.S. Department of Energy, Chapter Seven, America's Energy Infrastructure A Comprehensive Delivery System, National Energy Policy, 2001.

U.S. Department of Energy, Office of Electric Transmission and Distribution, Grid 2030 A National Vision for Electricity's Second 100 Years, July 2003.

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Urban Design Team: Tonja Adair, Michael Bello, Jay S. Lim, Dynelle Volesky Long, David Lukmire, and Christopher Reynolds; Professor Richard Plunz.

Looking Forward: Valuing the Upper Delaware River

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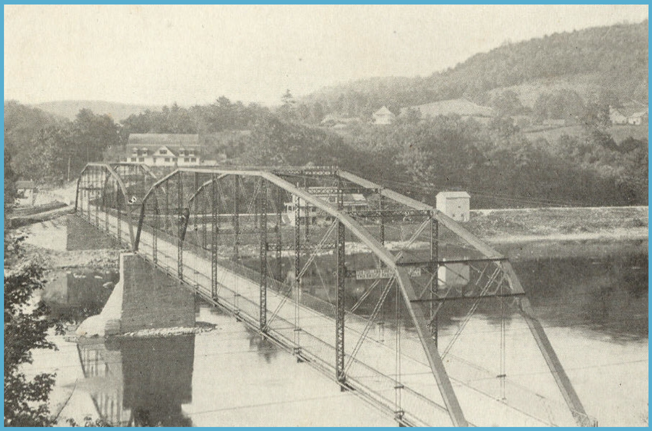
“Why have we not taken care of those places? They are a first and great part of our lives. Love, struggle, work, children — all came to us there.”

Zane Grey, Lackawaxen, Pennsylvania 1929



Pond Eddy Bridge, circa 1904. National, New York and Pennsylvania Registers of Historic Places.

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