4.0 AFFECTED ENVIRONMENT

4.1 GEOLOGY

4.1.1 Physiography

The Millennium Pipeline Project would be within the Erie Lowlands, Allegheny Plateau, Hudson Mohawk-Lowlands, Hudson Highlands, Newark Lowlands, and New England Uplands physiographic provinces of New York. The pipeline would begin in the Erie Lowlands (MP 32.9). Topography is relatively flat with relatively thick unconsolidated deposits of clay, silt, sand, and gravel. Between approximate MPs 37.0 and 339.0, the pipeline would be in the Allegheny Plateau physiographic province. Flat-topped to rounded hills, dissected by rapidly flowing streams, high plateaus and steep-sided valleys dominate the topography. Unconsolidated deposits are thickest along the region's valley floors and floodplains. Bedrock across the Allegheny Plateau consists of predominantly Devonian age formations of limestone, shale, sandstone, and dolomite.

The Hudson-Mohawk Lowlands and the Hudson Highlands physiographic provinces would be crossed between approximate MPs 339.0 and 376.0. The Hudson-Mohawk Lowlands are broad river valleys and gently rolling hills. Surficial deposits are relatively thick and the underlying bedrock is comprised predominantly of Ordovician limestones, shales, sandstones, and dolostones. These rocks are relatively easily eroded compared to the more resistant metamorphic rocks that form the Hudson Highlands. The Hudson Highlands are a southwest to northeast trending series of uplands consisting of three major areas separated by two ancient fault systems, the Reservoir fault to the west and the Ramapo fault to the east.

East of the Hudson Highlands, the pipeline would be within the northern edge of the Newark Lowlands physiographic province (approximate MPs 376.0 to 387.0). The Newark Lowlands topography consists of gently rolling flatlands intersected by ridges. Bedrock consists of Mesozoic sedimentary units of sandstone, shale, and conglomerate, intruded by more resistant igneous rocks that form the region's characteristic ridges.

The pipeline would be in the Manhattan Hills portion of the New England Uplands from approximate MP 387.0 to the pipeline's terminus at MP 421.8 in Mount Vernon. This is a landscape of rolling hills and valleys that closely mirrors the underlying metamorphic bedrock. Elevations range from 10 feet above sea level, where the Croton River joins the Hudson River near MP 396.8, to 325 feet above sea level in the Sprain Ridge Park near MP 416.6. The bedrock is generally highly resistant to erosion and is often at or near the surface especially along the flanks and tops of the region's hills.

Table 4.1.1-1 lists areas where blasting may be required. In Westchester County, along the 9/9A Proposal, blasting may be required along the entire proposed route except for about 1.3 miles between MPs 391.3 and 391.6, MPs 396.0 and 396.4, MPs 401.3 and 401.6, and MPs 407.4 and 407.7. However, because 88 percent of this portion would be adjacent to or within a road or the abandoned railroad right-of-way (e.g., bicycle path), Millennium believes that there may be sufficient cover in these areas so that blasting would not be necessary.

TABLE 4.1.1-1

Locations Where Blasting May Be Required a/

Physiographic Province	County	Approximate Milepost
Erie Lowlands		None
Allegheny Plateau	Cattaraugus	94.5 - 94.7 115.5 - 115.6
	Steuben	151.9 - 153.8 156.2 - 156.6 168.9 - 169.2 169.6 - 170.7 171.8 - 172.1
	Chemung	215.2 - 215.5
	Tioga	227.6 - 228.0 229.0 - 230.1 230.9 - 231.4
	Broome	272.1 - 272.5
	Delaware	285.1 - 285.3 285.5 - 287.0 287.7 - 288.8 288.9 - 291.1 297.4 - 297.7
	Sullivan	298.1 - 299.1 299.7 - 300.4
Hudson-Mohawk Lowlands	Orange	341.2 - 342.3 348.2 - 348.7 354.8 - 355.2
Hudson Highlands	Orange	363.5 - 364.0 365.0 - 365.2 368.4 - 369.1 371.0 - 371.6
Newark Lowlands	Rockland	384.9 - 385.3
New England Uplands	Westchester	390.1 - 391.3 391.6 - 396.0 396.4 - 401.3 401.6 - 407.4 407.7 - 421.3

a/ Bedrock <5 feet below surface.

4.1.2 Mineral Resources

Millennium identified 5 active (or reclaimed) and 3 abandoned mining pits or quarries, 15 oil and gas fields, and 5 historic quarries that would be crossed by or would be within 1,500 feet of the pipeline or storage yards (see table 4.1.2-1). The U.S. Geological Survey (USGS) maps and the photo alignment sheets for the project show one additional gravel pit at MP 309.0, but its status is unknown. Several active oil and gas fields as well as the East Independence and Greenwood gas storage field would be crossed in western New York. Extensive salt deposits are also mined in this region; however, Millennium states that no deep salt mines are in the vicinity of the project area. Farther east, sand, gravel, and crushed and dimension stone are the primary mineral resources.

TABLE 4.1.2-1

Mineral Resource Areas Crossed or Within 1,500 Feet

County	Approximate Milepost	Type of Mineral Resource
Chautauqua	32.9 - 79.9	Lakeshore gas field
	60.6 - 63.0	Ellery oil field
Cattaraugus	85.7 - 86.6	Little Valley gas field
	95.0 - 95.1	Active gravel pit (2)
	98.2 - 98.5	Bear Hollow gas field
	99.7 - 101.5	Humphrey oil field
	105.9 - 106.8	Five Mile oil field
	109.9 - 111.4	Five Mile oil field
	112.2 - 112.5	Country Club oil field
Allegany	120.2 - 121.6	Clarksville oil field
	125.2 - 125.7	Richburg oil field
	139.2 - 139.4	Trapping Brook gas field
	143.5 - 147.2	Fulmer Valley oil field
	146.5 - 148.6	East Independence gas storage
Steuben	152.6 - 152.9	Greenwood gas storage field
	168.2 - 172.5	Rathbone gas field
Tioga	224.4	Reclaimed sand and gravel pit
	228.4 - 228.5	Abandoned sand and gravel pit
Broome	264.5 - 264.5	Active sand and gravel pit
	269.7	Inactive bluestone quarry
	272.9 - 273.0	Active quarry
	273.6 - 273.6	Abandoned quarry
Delaware	279.0	Historic quarry
	279.9	Historic quarry
	280.1	Historic quarry
Sullivan	301.6	Historic quarry
	Storage Yard 84	Historic quarry
	309.0	Gravel pit

With the exception of the producing natural gas fields, the segment in Lake Erie is not noted for its potential mineral resources. Pennsylvania has designated a large offshore area (Norfolk Moraine) north of Erie, Pennsylvania, for commercial sand extraction. This moraine extends to the Canadian side of Lake Erie south of Long Point. There are no sand extraction operations in these areas at this time. However, natural gas exploration activities have been underway in Lake Erie for 83 years. There are a number of gas

producing areas along the Canadian shoreline, and gas pipelines extend out to the Canada-U.S. border. These pipelines are predominantly small diameter (ranging from 2 to 4 inches) and laid on the lake bottom. Well heads may extend about 5 feet above the lake bottom, and there has been damage to some wellheads and pipelines from anchors and ice scour. Consequently, the pipelines and wellheads are now buried in water depths of less than 30 feet. Figure 4.1.2-1 shows the location of the sand reserves and natural gas pipelines in Lake Erie.

4. .3 Geologic Hazards

Geologic hazards that can affect underground pipelines and appurtenant facilities include se micity landslides, and karst terrain.

Seismicity is the most widespread geologic hazard for the proposed pipeline. While earthquakes are common throughout the northeastern U.S., their distribution is far from uniform. The largest earthquake recorded in the New York and the Lake Erie region was a Modified Mercalli Intensity VIII event in Massena, New York, in 1944. Three other large earthquakes of Modified Mercalli Intensity VII (Rockaway Beach [1884], Attica [1929], and Warrensberg [1931]) have also been documented. The Great Lakes United conservation group pointed out that fault systems do run through the Lake Erie and Ontario Basins. Documented seismic activity of recent years (1992 to 2001) indicates an abundance of small earthquakes with a magnitude of 2 to 3 in the southern Ontario region, with clusters located at the east end of Lake Erie, throughout Lake Ontario, and near the edge of Lake Erie about 40 miles west of the Lake Erie landfall. Across the project area, earthquake occurrence and commensurate seismic hazard is greatest in the vicinity of the Ramapo fault (MP 378.7). However, no surficial displacement has occurred along the Ramapo fault during the last 10,000 years (Howard et al., 1978). This analysis is supported by a report prepared for Columbia that includes a detailed analysis of the seismic potential of the Ramapo fault (Quittmeyer, 1986). Millennium would acquire Columbia's existing pipeline in this area. A series of earthquakes also occurred near Ardsley in October 1985, consisting of a foreshock, mainshock, and aftershocks that continued intermittently for months. The mainshock had a magnitude of about 4 and was the largest earthquake to occur in the southeastern New York and northern New Jersey region in at least 50 years.

Seismically induced soil liquefaction is not considered to be a major risk to the pipeline and appurtenant facilities. Soil liquefaction can occur when soft, unconsolidated sands and silts are water saturated and subjected to intense seismic shaking. If these conditions exist and there is a 90 percent probability of horizontal ground accelerations of greater than 10 percent of gravity in a 50 year period as indicated by USGS Open File Report 82-1033 (Algermissen et al., 1982), the area is defined as having potential for soil liquefaction. This report indicates that only those facilities in southeastern New York in the vicinity of the Ramapo fault have probability values greater than 10 percent. Saturated unconsolidated soil conditions in this area would be limited to stream crossings, valleys, and fill deposits. Because there would be no construction in the immediate vicinity of the Ramapo fault and only short, isolated segments of the project area have potential for soil liquefaction, soil liquefaction risk is low.

Landslide hazards are not widespread in the project area and, if found, are confined to isolated locations along the pipeline route. Deep-seated landslides or rock avalanche hazards along the proposed route would be unlikely. Landslide potential would be highest across the uplands of the Allegheny Plateau and Hudson Highlands where relief is greatest. Susceptible areas would include rivers where valley walls contain unconsolidated deposits and clay-rich erodible rock formations susceptible to earth flows and slumps. The area with the most potential for landslides is in the highlands between MPs 315.5 and 348.7.

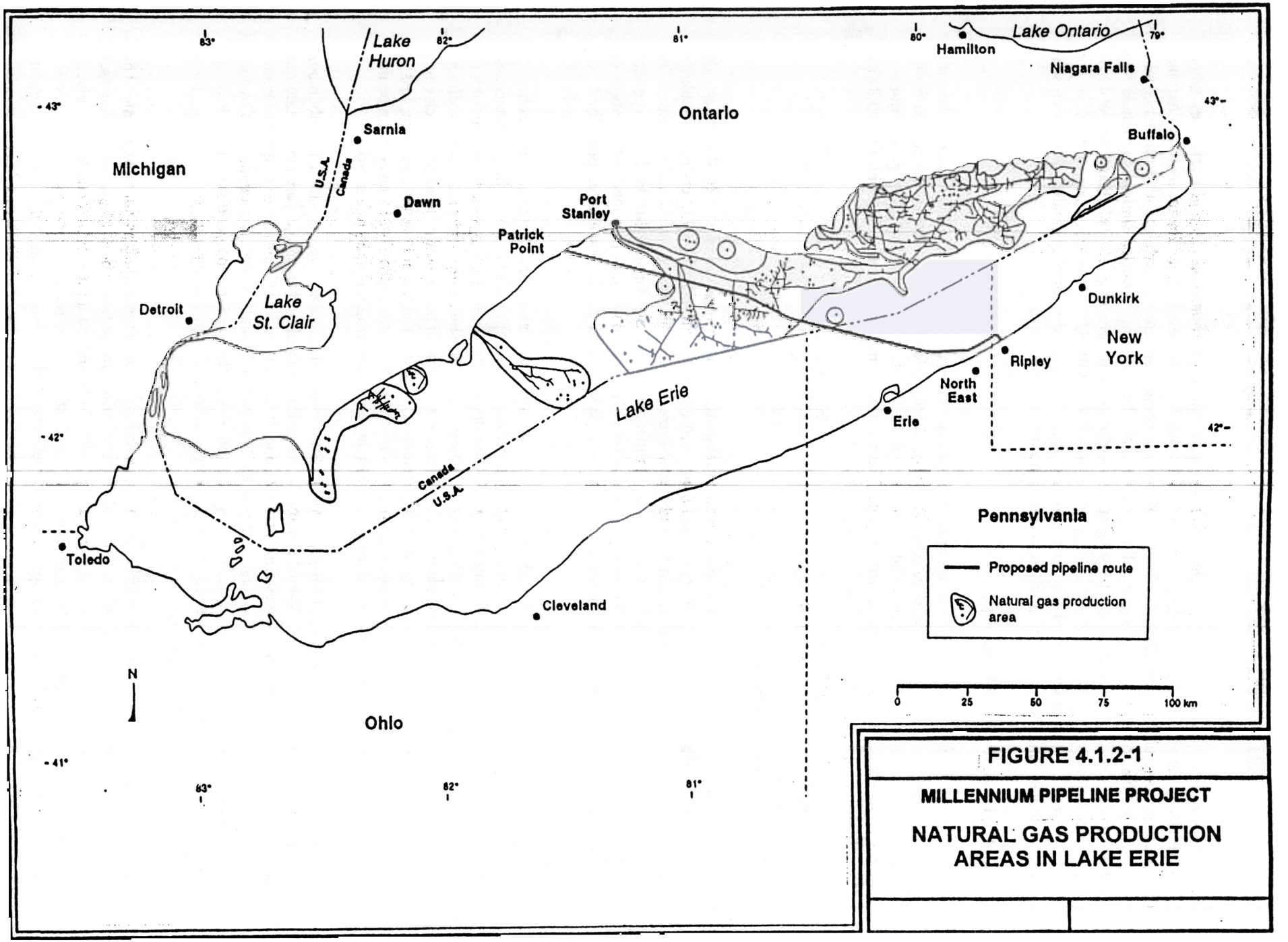

FIGURE 4.1.2-1

MILLENNIUM PIPELINE PROJECT

NATURAL GAS PRODUCTION AREAS IN LAKE ERIE

Karst terrain develops in regions that are underlain by carbonate rocks and evaporites where weathering and erosion produce a high degree of rock solubility. The resulting landforms include sinkholes, caves, and irregular topography. Although parts of the project area are underlain with carbonate rocks, associated hazards to the proposed pipeline are minimal. Millennium identified shallow carbonate rock formations that may be susceptible to karst formation and underlie the pipeline at MP 87.3, and between MPs 330.3 and 340.1, MPs 340.5 and 341.2, MPs 349.5 and 352.0, MPs 353.1 and 353.6, and MPs 355.4 and 362.4. However, karst terrain only presents a hazard where large rapidly forming sinkholes occur close to the ground surface. This type of sinkhole is not found in the project area.

Paleontological Resources

While many geologic formations have the potential to contain fossils, Millennium has not identified any sensitive paleontological resources within the project area. However, we received a comment from a landowner in Horseheads, New York, that mastodon and mammoth bones were found during the summer of 1999 in the Pine Creek area near Catharine Creek. The pipeline would cross Catharine Creek about 0.8 mile south of Pine Valley at MP 198.5.

4.2 SOILS

Pipeline Facilities

The U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) (formerly the Soil Conservation Service) soil surveys, developed in cooperation with Cornell University Agricultural Experiment Station, were used to determine and characterize the soils that would be crossed by the pipeline and aboveground facilities. In addition, the NRCS maintains the State Soil Geographic database to collect, store, maintain, and distribute soil survey information. This database also provided information on characteristics of the soils that would be crossed by the pipeline or affected by the aboveground facilities.

The NRCS data specifically address soil-related limitations associated with the construction of shallow excavations that directly relate to pipeline trenching, including: steep slopes, which can increase the difficulty of trenching and backfilling in areas of side slope construction; shallow to bedrock soils or high rock content, which can increase the difficulty of trenching; severe erosion, which presents greater sediment control problems during construction; and a high seasonal water table or potential for flooding, which could result in the need for trench dewatering, a greater potential for soil rutting, soil horizon inversion, loss of fertility, or a greater potential for soil compaction. In New York, the fertile topsoil layer can be permanently damaged from mixing with subsoil because of its general thinness throughout the project area.

The Millennium Pipeline Project is within the Northeast Climate Region which has abundant precipitation throughout the year. Annual precipitation is at least 40 inches in the project area in Chautauqua and Cattaraugus Counties; parts of western Allegany County; eastern Broome County; and most of Delaware, Sullivan, and Orange Counties. Annual precipitation is between 30 and 40 inches in central and eastern Allegany County; Steuben, Chemung, and Tioga Counties; and the western and central parts of Broome County. Most of the soils in the project area are wet from early autumn through mid- spring. Frost penetration is moderate to deep.

Most of the project area is underlain by bedrock formations of interbedded sandstone and shale. The depth of soil material to bedrock varies. The shallowest locations range from about 14 inches to 5 feet (see table 4.1.1-1 for locations where blasting may be required). Soils are predominantly glacial tills (i.e., glacial drift made up of varying proportions of clay, silt, sand, stones, and rocks or boulders) in the higher elevations, on slopes, and on tops of slopes. Many of these glacial tills contain a naturally formed "fragipan"

or a brittle horizon which is low in porosity (poor permeability) and which restricts vertical drainage resulting in lateral or cross-horizon drainage within the soil profile. The fragipan also contributes to the occurrence of a perched, seasonally high water table with saturated surface and upper subsoil conditions. Soils, which do not have a distinct fragipan in the subsoil but which are shallow to bedrock, are also limited in vertical drainage because of the impermeability of the bedrock. Soils in the lower (valley) elevations include glacial tills, glacial outwash (sandy-gravelly loams), and alluvial sediment deposits that can be subject to cutbank caving or sloughing when trenched.

Some of the valleys also contain deposits of glacial lake-laid sediments with a relatively high water table. Organic muckland soils, with island inclusions of glacial tills, are found in a unique portion of the Hudson Hills physiographic region known as the "black dirt" area between MPs 350.3 and 353.3. This area is composed of peat deposits that have developed over thousands of years and are centered in the Wallkill and Pochuck River drainages in the Pine Island area in Warwick, Goshen, and Minisink in Orange County. A complex system of dikes, primary and secondary drainage ditches, and levees are used to drain some 17,000 acres of these soils for agricultural use. It is an area with an extremely high water table and organic deposits that reach a thickness of over 30 feet in the deepest areas before reaching a distinct substrata or parent material.

Farmland is an important resource in the state, with agricultural land use in the project area varying by county. The pipeline would cross a total of 59.4 miles of agricultural land, the majority of which is in Steuben County (13.6 miles) followed by Chautauqua County (9.7 miles) and Cattaraugus County (9.1 miles) (see table 4.8.1-1 in section 4.8). Millennium has contacted the affected counties to identify areas where the pipeline would cross land within the Conservation Reserve Program (CRP). The only identified locations where the pipeline would cross CRP land would be in Allegany County (MPs 139.7 to 139.9 and MPs 147.2 to 147.9). Some farms that would be crossed by the pipeline are enrolled in Production Flexibility Contracts, which are conservation reserve contracts in New York. Eligibility for this program would not be affected by the project.

In its comments on the DEIS, the U.S. Department of the Interior, Office of the Secretary (DOI) commented that milepost locations should be identified for all land incentive areas or other Federal restoration areas, such as the Wetlands Reserve Program, Environmental Quality Incentives Program, Partners for Fish and Wildlife Program, or conservation easements established by the Farmers Home Administration. The Wetland Reserve Program and Environmental Quality Incentives Program are managed by the NRCS. Millennium contacted the Deputy State Conservationist of the NRCS and all of the NRCS county offices for information on these programs. Although one of the county offices reported that the pipeline would not cross properties enrolled in either of these programs and several county offices promised to review their files to determine if the pipeline would cross these types of properties, most county offices and the Deputy State Conservationist responded that the names and locations of participants in these programs are protected under the Federal Privacy Act.

The Partners for Fish and Wildlife Program is administered by the FWS. Although the FWS indicated that one property might be affected, Millennium has determined that this property would not be crossed by the pipeline. Millennium also contacted the U.S. Department of Agriculture concerning conservation easements established by the Farmers Home Administration. However, this program was phased out of existence during a restructuring of the department. Millennium could not find any information about this conservation easement program or how or where it was presently administered. None of the county offices of the NRCS had any information concerning the program.

Millennium would determine if any land is enrolled in these programs based on discussions with landowners. If such lands are crossed, it would coordinate with the appropriate agencies to identify any mitigation requirements that would be necessary to maintain eligibility of the land with the specific program.

4.2.2 Aboveground Facilities

Aboveground facilities proposed by Millennium include those that would be located entirely on the right-of-way of the proposed pipeline (i.e., launcher/receivers, over pressure protection facilities, and mainline valves) and those off right-of-way (i.e., measuring facilities, regulator station, remote blowdown valves, and cathodic protection rectifier beds). Soil characteristics for launcher/receivers, overpressure protection facilities, and mainline valves are similar to those previously discussed for the pipeline. Soil characteristics associated with three proposed measuring facilities and the regulator station include mostly silt loam soils at the Union Center Regulator Station; extremely stony soils at the Wagoner Station; severe erosion, steep slope, and rock outcrop at the Ramapo Station; and no soil limitations at the Mount Vernon Station. None of the soils at the aboveground facility sites are classified as prime farmland soils by the NRCS.

4.3 WATER RESOURCES

4.3.1 Groundwater

Groundwater resources along the proposed Millennium pipeline include: phreatic (water table) aquifers in shallow, unconsolidated sediments; unconfined aquifers in bedrock formations including sedimentary, metamorphic and igneous rock; and confined and artesian aquifers in bedrock as well as unconsolidated sediments. Most portions of the proposed route have groundwater yields that can sustain single-dwelling, domestic use wells (i.e., 10 gallons per minute [gpm] capacity or less). There are both unconsolidated overburden and bedrock aquifers along the proposed route that have been developed for municipal and community water supplies.

Table 4.3.1-1 lists the principal aquifer areas that would be crossed by the pipeline. A total of 13 major aquifer systems, including 7 NYSDEC-recognized primary aquifers and 5 EPA-designated sole source aquifers, would be crossed. Millennium also identified locations where the pipeline would cross portions of locally designated aquifer protection districts or well head protection areas. These include the:

Mayville Aquifer Protection Area (MPs 43.8 to 45.9 and MPs 46.2 to 46.6) where the Town of Mayville has several wells (ranging from 30 to 75 feet deep) that draw from a stratified drift aquifer;

Lower Cassadaga Valley Aquifer Protection Area (MPs 56.6 to 65.2);

Town of Union/Villages of Johnson and Endicott Aquifer Protection District (MPs 243.0 to 247.5) where there are nine wells in the stratified drift along the river (ranging from 80 to 100 feet deep);

Hillcrest Water Protection District (No. 1 Wellfield) (MPs 249.8 to 250.2) where the Town of Fenton has three wells screened in glacial materials in the confined aquifer (approximately 180 feet deep); and

Northgate Well, Chenango Aquifer Protection Area (MPs 249.7 to 250.0) in the Endicott Primary Aquifer where the Town of Chenango has a well in gravel materials (25 feet thick).

TABLE 4.3.1

Aquifer Areas Crossed

County/Municipality	Approximate Milepost	Aquifer	Distance of Protection Area Crossed (mi)
Pipeline			
Chautauqua			
Chautauqua	43.8 45.9	Mayville Aquifer Protection Area	2.1
Chautauqua	46.2 46.6	Mayville Aquifer Protection Area	0.5
Ellery and Gerry	56.6 65.2	Lower Cassadaga Valley Aquifer Protection Area	8.6
Cattaraugus			
Great Valley	94.7 - 95.4	Salamanca Primary Aquifer	0.8
Olean	109.9 - 110.3	Olean Primary Aquifer	0.4
Olean	110.8 - 111.7	Olean Primary Aquifer	0.9
Olean	112.1 - 112.2	Olean Primary Aquifer	<0.1
Portville	115.1 - 115.7	Olean Primary Aquifer	0.6
Steuben			
Campbell, Erwin	180.3 - 182.6	Corning Primary Aquifer	2.4
Chemung			
Big Flats	195.3 - 195.7	Corning Primary Aquifer	0.4
Horseheads	202.7 - 202.9	Corning Primary Aquifer	0.2
Horseheads	203.1 - 203.4	Corning Primary Aquifer	0.3
Tioga			
Barton, Tioga and Owego	216.8 - 238.2	Clinton Street - Ballpark Sole Source Aquifer	21.4
Candor, Tioga	228.2 - 228.7	Owego Primary Aquifer	0.5
Candor, Tioga and Owego	230.4 - 230.9	Owego Primary Aquifer	0.5
Broome			
Maine, Union, Chemango, Fenton, Port Dickinson, Kirkwood, Windsor, Sanford	238.2 - 268.4	Clinton Street - Ballpark Sole Source Aquifer	30.2
Town of Union, Villages of Johnson and Endicott	243.0 - 247.5	Union/Johnson/Endicott Aquifer Protection District	4.5
Fenton	249.8 - 250.2	Hillcrest Water Protection District No. 1	0.4
Chenango, Fenton, Port Dickinson	249.6 - 250.8	Endicott Primary Aquifer	1.2
Chenango	249.7 - 250.0	Chenango Aquifer Protection Area	0.3
Delaware			
Various communities	274.0 - 292.1	New Jersey Coastal Plain Sole Source Aquifer	
Orange			
Minisink, Warwick	348.6 - 353.8	15 Basin Sole Source Aquifer	5.2
Warwick, Tuxedo	363.8 - 365.9	Highlands Sole Source Aquifer	2.1
Orange and Rockland			
Tuxedo and Ramapo	365.9 - 380.4	Ramapo River Basin Sole Source Aquifer	
Rockland			
Ramapo	377.1 - 377.4	Ramapo Primary Aquifer	0.4
Ramapo	378.8 - 378.9	Ramapo Primary Aquifer	0.2
Westchester			
Cortlandt	394.5 - 396.8	Croton Primary Aquifer	0.2
Ramapo Station			
Ramapo, New York	376.4	Ramapo River Basin Sole Source Aquifer	<0.1
Wagoner Station			
Milford Township, Pennsylvania		New Jersey Coastal Plain Aquifer	<0.1

In addition, the pipeline would cross four public water supply watersheds: one between MPs 37.7 and 39.9 (Ripley watershed), one between MPs 41.7 and 43.6 (Westfield watershed), one between MPs 368.2 and 369.3 (We-Wah Lake watershed), and one between MPs 416.5 and 416.7 (Grassy Sprain Reservoir Watershed).

A primary aquifer is defined in Title 6 New York Codes, Rules and Regulations Part 360-1.2(b)(10) as a highly productive aquifer that is presently used as a source of public water supply by major municipal water supply systems. To determine if an aquifer qualifies as a primary aquifer, the NYSDEC Division of Water uses the following guidelines from the Technical and Operational Guidance Series (TOGS) Document 2.1.3 relating specifically to the question of aquifer productivity:

> the aquifer should occupy at least 5 to 10 square miles of contiguous area at a minimum;
>
> saturated deposits of highly permeable materials should average at least 20 feet through much of the area, with some locations at least 50 feet thick; and
>
> sustained yields to individual wells should be at least 50 gpm or more from sizable areas (2 square miles or greater) throughout the aquifer.

While the TOGS allows for some degree of flexibility in applying the above guidelines, the document states: "In all cases, however, the general level of water resource capability suggested by these three guidelines should be met." The pipeline would cross the Salamanca, Olean, Corning, Owego, Endicott, Ramapo, and Croton primary aquifers. All of these aquifers are in stratified drift deposits.

The major criteria for sole source aquifer designation are that the aquifer provide 50 percent or more of the drinking water for the aquifer service area, and that the volume of water that could be provided by alternative supplies is insufficient to meet demand. The five sole source aquifers that would be crossed by the pipeline are discussed in the following section.

The Clinton Street-Ballpark Sole Source Aquifer covers approximately 41 square miles and would be crossed between approximate MPs 216.8 and 268.4. Aquifer materials are glacial sediments in bedrock valleys with aquifer thicknesses exceeding 200 feet in some locations. Water quality has been generally good but elevated concentrations have been reported for chlorinated organic compounds, iron, lead, manganese, and total dissolved solids (EPA, 1984). Additionally, increased bacteria levels are reported in areas west of the Endicott-Binghamton area and attributed to dredging activities for river navigation in the Susquehanna River.

The New Jersey Coastal Plain Sole Source Aquifer covers approximately 4,200 square miles and would be crossed between MPs 274.0 and 292.1. Aquifer materials are a mixture of highly productive water bearing sands and sediments interbedded with various silt and clay layers that create confining and semiconfining units. Also included in this aquifer are those areas within 2 miles of the Delaware River, because the river is considered a streamflow source zone for the aquifer system. The Wagoner Station would also be within this aquifer area.

The Fifteen Basin Sole Source Aquifer covers approximately 1,735 square miles in New York and New Jersey and would be crossed between MPs 348.6 and 353.8. Aquifer materials are fractured bedrock that is recharged by the shallow overlying stratified drift deposits. Depth to water is 20 to 40 feet in the rock aquifer on hillsides and very close to the land surface in the valleys. Ambient water quality is variable because the thinness of the overlying deposits and the fractured nature of the bedrock make this aquifer prone to surface contamination. Reported potential parameters of concern include animal wastes, fertilizers, pesticides, bacteria, petroleum products, and stormwater runoff (EPA, 1988).

The Highlands Sole Source Aquifer would be crossed between MPs 363.8 and 365.9. Like the Fifteen Basin Aquifer, aquifer materials are fractured bedrock recharged by the overlying stratified drift deposits. Water quality is generally very good, and only stormwater runoff has been identified as a potential source of contaminants to the system (EPA, 1988).

The Ramapo River Basin Sole Source Aquifer covers approximately 161 square miles in New York and New Jersey and would be crossed between MPs 365.9 and 380.4. The Ramapo Station is also within this aquifer area. Aquifer materials include unconsolidated materials and fractured bedrock that is recharged by the overlying deposits as well as by the Ramapo River. These interconnections make the aquifer susceptible to contaminants introduced at the land surface or from the Ramapo River. Reported potential parameters of concern include volatile organic compounds, heavy metals, and stormwater runoff (EPA, 1992).

The Croton Primary Aquifer is identified by the NYSDEC Division of Water/Technical Services (1997) as an aquifer for use by community water systems to serve large populations. It is used for public water supply, although no public or private wells have been identified near the proposed route.

Aquifer materials for private and public water supplies can include both stratified drift and bedrock formations. Many residential water wells are in shallow, near surface drift materials that are highly dependent on precipitation or perched groundwater for local recharge. Most aquifer materials for larger community water systems (e.g., homeowners' associations or condominium complexes) or public water supplies outside of sole source aquifer areas are carbonate or crystalline bedrock formations that are overlain by unconsolidated sediments that serve as recharge pathways for precipitation and surface water.

Generally, the carbonate aquifers are unconfined in the upper 200 feet of the formation and may extend to 600 feet below ground surface and be confined at depth. Aquifer rock types include limestone, dolomite, marble, calcareous shale, and calcareous siltstone. The crystalline aquifers comprise a variety of metamorphic and igneous rock including schist, granite, gabbro, diorite, granodiorite, and pegmatite. Like the carbonate rock aquifers, the crystalline rock aquifers can extend from 20 to 600 feet below ground surface.

The pipeline would also cross a sandstone aquifer comprising sandstone and sandy dolomite with average well depths of 100 to 300 feet. In addition to the above materials, there are also lower grade aquifer materials that are defined principally by joints, fractures, faults, and bedding planes where water can accumulate.

Millennium identified 235 private wells or springs on properties that would be crossed by the pipeline that could be affected by construction (see table 4.3.1-2). Millennium identified only one public community water supply, Windsor Oaks Property Owners Association (near MP 394.6), within 150 feet of the construction work area.

TABLE 4.3.1-2

Private Wells and Springs On Properties Crossed by the Pipeline

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Chautauqua	37.0	Cattaraugus	76.5	Allegany	120.6	Steuben	152.1
	40.0 (2)		79.7		123.9		154.2
	42.3		84.5		124.1		157.1
	43.6 (2)		90.0		125.7		158.4
	48.2 (2)		95.0		126.8		178.1
	49.6		99.7		129.8		181.8 (2)
	59.2		100.2		131.4		181.9 (3)
	61.4		108.5		135.1		185.3
	62.5		110.3		137.7		185.4
	63.3		111.2		138.8		185.5
	66.2		111.4		140.8 (2)		186.0 (2)
	67.6		115.3 (2)		141.0 (2)		186.5
	68.0				141.5		186.6 (2)
	70.1				143.2		188.1
					145.8		190.0 (2)
					147.3		190.1
							190.2
Subtotal	**17**		**13**		**18**		**23**
Chemung	192.9	Tioga	226.7	Broome	244.2	Delaware	277.0
	193.8		230.3		244.6		277.6
	195.2		230.4 (2)		245.0		284.5 (2)
	199.7		231.2 (2)		250.9 (2)		284.8
	200.5		237.8 (2)		251.0 (2)		285.6
	203.3				252.8 (2)		287.5 (2)
	203.9				253.1		292.4
	204.2 (2)				253.7		295.4
	204.3				253.8 (3)		296.1
	204.4 (2)				254.8		
	205.7				255.7		
	207.6				255.9		
	211.0				256.0 (3)		
	212.3				256.2		
	214.1 (2)				257.8 (2)		
					257.9		
					258.1		
					258.2 (2)		
					258.9		
					259.2 (2)		
					259.4		
					259.6		
					259.7		
					260.1 (2)		
					260.3 (2)		
					269.4		
					273.7		
					275.1		
					275.3		
Subtotal	**18**		**8**		**41**		**11**

TABLE 4.3.1-2 (cont'd)

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Sullivan	302.6 303.9 304.8 305.2 306.3 (2) 307.4 (2) 307.5 309.9 310.4 (2) 311.1 311.7 312.7 312.8 (2) 313.2 314.1 314.3 315.2	Orange	339.9 340.0 (2) 340.4 (2) 340.5 340.6 (2) 341.5 (2) 343.1 343.3 (2) 343.4 343.5 343.6 344.1 345.6 347.9 348.3 (2) 356.0 (3) 356.1 356.3 (3) 356.7 357.1 (2) 358.0 (2) 358.1 358.6 358.7 (2) 359.7 (2) 360.3 (3) 363.9 364.0 364.1 (2) 364.2 (3) 364.3 (2) 364.6 (3) 369.3	Rockland	373.4 383.5 383.7 (2) 383.9 384.2 384.7 384.8 384.9 385.0	Westchester	None
Subtotal	**21**		**55**		**10**		**0**

GRAND TOTAL: 235

NOTE: Numbers in parentheses ( ) indicate number of wells at that location.

4.3.2 Surface Water

The Millennium pipeline would cross a total of 507 waterbodies, of which 308 are perennial (including Lake Erie) and 199 are intermittent (see table H1 in appendix H). These crossings include 21 major waterbody crossings (waterbodies, including lakes and ponds, that are greater than 100 feet wide at point of crossing), 251 intermediate crossings (waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at point of crossing), and 235 minor crossings (waterbodies less than or equal to 10 feet wide at point of crossing). One of the major waterbodies, the Neversink River (MP 341.0), contains two channels at the point of crossing that cumulatively span a width of about 129 feet. Three of the intermediate waterbodies (Tributary Drainage Ditch [MP 72.9], Cayuta Creek [MP 215.0], and Rutgers Creek [MP 344.0]) are listed as over 100 feet wide in table H1 in appendix H. However, their reported widths include associated saturated wetlands, and the actual stream channel widths are less than 100 feet.

All of the waterbody crossings would be in New York, except for the 32.9-mile-long U.S. portion of the Lake Erie crossing, which is mostly in Pennsylvania state waters (see section 4.3.3). Of the 21 major waterbody crossings, 16 would be rivers or creeks (Tributary Lake Erie, Genesee, Cohocton, Chenango, Susquehanna, West and East Branches Delaware, Neversink, Hudson, and Croton Rivers; Tributary Cassadaga Creek, Olean, Owego, Callicoon, Pochuck, and Wheeler Creeks), 1 would be a lake (Lake Erie), 2 would be reservoirs (Mongaup/Rio Reservoir and Indian Kill Reservoir), and 2 would be ponds.

Six of the waterbodies are designated or listed in either the Nationwide Rivers Inventory (NRI) or New York State inventory for their wild, scenic, or recreational values (Chautauqua Creek, and Genesee, Cohocton, West Branch Delaware, East Branch Delaware, and Wallkill Rivers) (see section 4.8.3 for additional discussion).

The Croton River crossing (MP 396.8) would be along an abandoned section of U.S. Route 9 that is about 600 feet east of the existing highway. At the proposed crossing, the Croton River is within the Croton River and Bay Significant Coastal Fish and Wildlife Habitat as designated under the New York State Coastal Management Program and the Significant Habitats and Habitat Complexes of the New York Bight Watershed as designated by the FWS. In addition, both the Hudson and Croton Rivers crossings are within EFH as designated by the NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

The waters of New York are classified and protected on the basis of their existing or expected best use (NYSDEC, 1994). These waters include classifications "AA," "A," "B," and those class C designated as trout (T) or trout spawning (TS) streams (see H2 in appendix H for state water quality classifications). These waters are collectively referred to as protected waters and are subject to the stream protection restrictions of the NYSDEC Protection of Waters program. A total of 126 trout or trout spawning streams would be crossed by the pipeline and are identified in the table H1 in appendix H. The Saw Mill River, which would be crossed 11 times, and most of its tributaries are classified as trout waters. However, the Saw Mill River had a fish consumption advisory due to toxic organics.

Six drainage basins would be crossed by the Millennium Pipeline Project (see table 4.3.2-1). The water quality within these drainage basins is generally good, with very good water quality in the Allegheny and Delaware River basins and lower water quality in the lower reaches of the Hudson River drainage basin mostly due to urban development (EPA, 1997). The Delaware River basin is extensively used for public water supplies and includes three major reservoirs that are part of the water supply for New York City.

TABLE 4.3.2-1

Drainage Basins Crossed

Drainage Basin	Approximate Number of Miles Crossed	Number of Waterbodies Crossed	Number of Major Waterbodies
Lake Erie Basin	43.9	15	2
Allegany River Basin	83.9	125	2
Genesee River Basin	23.2	25	1
Susquehanna River Basin	117.4	145	5
Delaware River Basin	74.6	94	5
Hudson River Basin	74.3	103	6
TOTAL	**417.3**	**507**	**21**

The pipeline route would have five waterbody crossings that would be either within 3 miles of active public water intakes or used for water supply:

Belson Creek at MP 38. (about 2.6 miles upstream of the supply intake for the Alford Reservoir);

Olean Creek at MP .2 (about .6 miles upstream of the supply intake for Olean);

Genesee River at MP 137.3 (about 0.3 mile downstream of the active primary intake and 1.5 miles upstream of the inactive secondary intake for Wellsville);

Indian Kill Tributary at MP 367.0 (about 0.2 mile upstream of the community water intake for Indian Kill); and

Indian Kill Reservoir at MP 367. (water supply for Tuxedo).

The 9/9A Proposal would cross the Grassy Sprain Reservoir watershed, which is part of the New York City water supply system, for approximately 750 feet near MP 416.5. However, no public water intakes are located within 3 miles downstream of any waterbody that would be crossed (New York State Department of Health, 1982).

The pipeline would also cross four aqueducts: the Old Croton Aqueduct (MP 397.4), New Croton Aqueduct (MP 401.2, 410.3, and 413.8), Delaware Aqueduct (MP 418.1), and Catskill Aqueduct (MP 418.2). The Old Croton Aqueduct is no longer in use, but is listed on the NRHP and is a National Historic Landmark (see discussion in section 4.9, cultural resources). The Old Croton Aqueduct and State Park is owned and administered by the NYSOPRHP and would be crossed about 1,500 feet east of the U.S. Route 9 and State Route 9A interchange. At this location, the terrain is relatively flat, and the buried aqueduct is protected by mounded soil.

The New Croton, Delaware, and Catskill Aqueducts provide essential water supplies to New York City from various reservoirs, including the Ashokan, Neversink, Rondout, Pepacton, and Cannonsville Reservoirs. The New Croton Aqueduct would be crossed at three locations: about 1,100 feet north/northwest of the State Route 9A/100 interchange (MP 401.2); on the South County Trail about 200 feet south/southwest of the Interstate 87 overpass in Greenburgh (MP 410.3); and on new right-of-way between State Route 9A and Interstate 87, north of the Mount Hope Cemetery (MP 413.8). The Delaware Aqueduct would be crossed at MP 418.1, approximately 190 feet from shaft 23. The New Croton and Delaware

Aqueducts are in deeply buried sections at the pipeline crossing at 95, 40, and 140 feet, respectively at the New Croton Aqueduct (aqueduct station numbers 322+00, 732+00, and 895+00) and 350 feet at the Delaware Aqueduct. The Catskill Aqueduct is not buried deeply at the proposed crossing location, and construction would place the pipeline about 2 feet above the aqueduct.

Millennium identified eight waterbodies as having recorded concentrations of contaminated sediments (see table 4.3.2-2). These contaminated sediments were reported at locations other than the proposed crossing. According to the 1997 U.S. EPA Report, "The Incidence and Severity of Sediment Contamination In Surface Water of the U.S.," the Lower Hudson River and Hackensack River watersheds are considered priority watersheds with the major sources of contaminants resulting from divalent metals in sewerage systems. Millennium conducted sediment contamination sampling at the crossing location in the Hudson River and Haverstraw Bay and found contaminants well below state standards (see section 4.3.4).

TABLE 4.3.2-2

Waterbodies Crossed with Recorded Contaminated Sediments

Waterbody	Milepost	Sampling Location	Contaminants
Olean Creek	111.2	Not available	Polycyclic aromatic hydrocarbons and organic carbon
Genesee River	137.3	4 miles upstream	Heavy metals, pesticides, semi-volatile organic compounds, and polychlorinated biphenols (PCBs).
Cohocton River	181.4	3 miles upstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.
Chenango River	249.8	4 miles downstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.
West Branch Delaware River	276.0	2 miles downstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.
East Branch Delaware River	287.0	1 mile downstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.
Neversink River	341.0	2 miles upstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.
Hudson River	387.9	130 miles upstream	Heavy metals, pesticides, semi-volatile organic compounds, and PCBs.

4.3.3 Lake Erie

The pipeline would cross a total of about 32.9 miles of Lake Erie within U.S. waters and 60.4 miles within Canadian waters.

Water quality in Lake Erie is primarily influenced by point and nonpoint sources of pollution in the U.S. and Canada. The primary constituent that affects water quality in the lake is phosphorous, which comes from both point sources such as municipal treatment plants, and nonpoint sources such as agricultural runoff. Increased levels of phosphorous can contribute to eutrophication of the water column, which is characterized by biological imbalances such as algal blooms and excessive weed growth. International controls on phosphorous input, enacted in the late 1970s, reduced phosphorous loading into Lake Erie by a total of 85 percent between 1972 and 1985 (International Trade Commission [ITC], 1987). Charlton et al. (1995)

reported that this decrease in phosphorous input has reduced the total phosphorous load to the lake by 50 percent.

Turbidity within Lake Erie is due to inorganic material and microorganisms suspended within the water column. Turbidity is generally highest in the late fall (up to 44.8 milligrams per liter [mg/l]; Rathke and Edwards, 1985), due to wave action associated with fall storms. The western portion of the lake also tends toward higher turbidity due to large sediment inputs from the Detroit, Maumee, and Portage Rivers and high algal productivity. During the summer months, stratification of the water column occurs as the upper layers of water are heated while cooler water settles to the bottom of the lake, causing suspended organic and inorganic materials to settle to the bottom. During this period, total suspended solids (TSS) may be as dilute as 1 mg/l throughout the water column (Raul Pelagos, Inc., 1997). However, the mean TSS concentration in the west, central, and eastern basins is 19.9, 6.6, and 5.3 mg/l, respectively (Bolsenga and Herdendorf, 1993). The highest turbidity level reported in near-shore waters is 263 mg/l (Great Lakes Laboratory, 1981).

Chemical constituents that may affect water quality within the lake include metals and toxic organic compounds. Open lake concentrations of cadmium, copper, iron, and selenium in the water have been observed in excess of objectives established in 1978 by the ITC. Most of these metals occur in the particulate phase; their levels are therefore influenced by both total input and resuspension of contaminated sediments. Notable organic toxins that have been found to exceed target concentrations of the Canadian Ministry of the Environment provincial water quality objectives include polychlorinated biphenols (PCBs) and dieldrin (Stevens and Neilson, 1989). Although both PCBs and aldrin (the biological precursor to dieldrin) were banned in the 1970s, their continued elevated levels may be a result of continued atmospheric deposition, contributions of runoff, and sediment resuspension.

The high biological productivity that characterizes Lake Erie may promote processing of heavy metals and other contaminants. Metals and hydrophobic organic components may be taken up by suspended organisms, diluted within the large biomass, and then buried as the organisms settle to the bottom of the lake. Metals within the water column also have a tendency to sorb to suspended particles and settle to the bottom.

To minimize the potential for sediment contamination, Millennium selected the pipeline route to avoid areas of fine recent sediment deposition and maximize the crossing of non-depositional areas (i.e., those with glacial till or coarser-grained sediment). This determination was based on a comprehensive review that concluded that elevated contaminant concentrations were likely to occur in the finer sediments of the depositional basins in the lake (Fitchko, 1997). Once the corridor was established, surficial sediment samples were collected along a grid system for the analysis of an indicator contaminant (e.g., mercury). In the 33 samples collected on the U.S. side of Lake Erie, mercury levels ranged from <0.04 to 0.19 micrograms per gram (µg/g). Mercury levels were below the detection limit of <0.04 µg/g in 26 of the 33 samples. These mercury concentrations were below the Ontario sediment quality guideline for lowest effect level of 0.2 µg/g and well below the U.S. EPA bulk chemical composition guideline for polluted sediment of greater than 1 µg/g. These levels in the surficial sediments represent natural (background) concentrations of mercury. Based on the low mercury levels, the concentrations of other chemical parameters were expected also to be low, indicating that sediment quality along the route corridor would likely not be a problem.

Subsequently, a comprehensive sediment quality sampling program was developed and submitted to the COE, Pittsburgh District, for review and comment. The program involved the collection of recent sediments (i.e., from the water/sediment interface to the interface with the underlying glaciolacustrine sediment) at five locations along the proposed route on the U.S. side of the lake including one at the Ripley landfall. Sufficient sediment volume was to be collected to facilitate bulk chemical composition analysis and elutriate testing (e.g., by washing away the lighter or finer particles). If little or no recent sediment were present, the glaciolacustrine sediment was to be collected for analysis. During sample collection, recent

sediments could not be discerned from the underlying sediments; as a result, the samples collected were composited with sediment depth for analysis.

The following parameters were analyzed: grain size (percent sand, percent silt, percent clay), percent loss on ignition, total organic carbon, total Kjeldahl nitrogen, ammonia, cyanide, metals, arsenic, mercury, oil and grease, pesticides/PCBs, chlorinated organics, polyaromatic hydrocarbons, acid and base extractables, and volatile priority pollutants. Sediment quality along the pipeline route on the U.S. side of Lake Erie has been shown to be generally acceptable. Based on its review of the analytical data, the COE indicated that elutriate testing of the sediment was not required.

In addition, the sediment core samples collected were subsampled at 3-centimeter (cm) intervals to a depth of about 1 foot for analysis of mercury as an indicator contaminant. This depth of sediment has been shown to represent the deposition of recent (post-1890) sediments in the central basin of Lake Erie. Mercury levels in the subsamples were consistently below the analytical detection limit of <0.063 to <0.074 µg/g, indicating that contaminants have not been buried by more recent uncontaminated sediments.

Surficial sediment samples collected along the pipeline corridor sampling grid near to the historic mercury "hotspot" northeast of Erie had mercury levels ranging between <0.04 and 0.19 µg/g, below the Ontario sediment quality guideline for lowest effect level of 0.2 µg/g and below the U.S. EPA bulk chemical composition guideline for polluted sediment of greater than 1 µg/g. Moreover, the composite core sample, as well as the core subsamples at 3-cm intervals to a depth of 33 cm, collected at Sampling Location 2 near the "hotspot," had mercury levels below the detection limit. Based on the sediment quality data, Millennium did not identify route variations (to avoid contaminated areas) or changes in construction methods (to minimize contaminant resuspension).

4.3.4 Hudson River/Haverstraw Bay

The Hudson River is a designated American Heritage River because of its important role in American History. This designation provides communities along the river with better access to existing programs and resources of the Federal government and encourages private funding of local efforts. The designation currently does not impose any other regulations or restrictions. According to the New York Natural Heritage Program (NYNHP), the project would be within or adjacent to a designated Significant Coastal Fish and Wildlife Habitat that is part of the state's Coastal Management Program (NYSDEC, 1999). This part of the river has been designated as EFH for red hake, winter flounder, windowpane, bluefish, Atlantic butterfish, fluke, and Atlantic herring. It also provides habitat for the federally endangered shortnose sturgeon and threatened bald eagle. [1/]

The pipeline would cross the Hudson River (MP 387.9) between Bowline Point in Haverstraw and the Veteran's Administration Hospital in Cortlandt, a crossing of about 2.1 miles. The crossing would be about 11.3 miles north of Nyack, New York, and the Tappan Zee Bridge, and would be within the portion of the river known as Haverstraw Bay. Haverstraw Bay varies in width from 2 to almost 4 miles and extends for about 6 miles along the Hudson River from Stony Point to Croton Point. At the proposed crossing location, it has a tidal range of about 3 feet, extensive shallow areas (15 feet or less), and a dredged navigation channel about 32 feet deep. The bay is brackish during much of the year, with salinities varying from 0 to 10 parts per thousand. Freshwater flow varies by season, with the highest inflow in the spring.

The saltwater/freshwater interface moves up and down the Hudson River in response to the volume of freshwater flow from the upstream portion of the river, and its location is highly dependent on the amount

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The EFH Assessment and Biological Assessment for the Millennium Pipeline Project were issued in January 20(

of precipitation within the watershed. Generally, the interface moves downstream from the vicinity of Newburgh Bay (about 20 miles north of Haverstraw Bay) in response to spring snowmelt runoff. In normal years, the interface would pass through Haverstraw Bay sometime in March or April. The downstream limit of this movement is generally near or downstream of the Tappan Zee Bridge (about 7 miles south of Haverstraw Bay). However, the NYSDEC indicated that the interface is unpredictable and can range from New York harbor in the spring to Poughkeepsie in the summer (a distance of about 70 miles). The NYSDEC further stated that there has not been a "normal" year on the Hudson River in the last 7 years (NYSDEC, 1999). After the high springtime runoff stops, the saltwater/freshwater interface gradually moves upstream as the volume of freshwater from the upper Hudson River gradually decreases. The interface generally passes through Haverstraw Bay again in May or June. By August, the interface normally reaches the vicinity of Newburgh Bay again. Summer and fall rainstorms may make the interface move downstream episodically, but the interface typically remains in the Newburgh Bay area until winter and the subsequent spring when the cycle is repeated.

At the proposed crossing location, the Hudson River has waters classified by the NYSDEC as saline salt water (SB). The best use for waters classified as SB are primary and secondary contact recreation and fishing. Waters classified as SB are also suitable for fish propagation (NYSDEC, 1994). However, there is a health advisory for fish and blue crab consumption due to the presence of heavy metals, pesticides, herbicides, semi-volatile organic compounds, and PCBs.

The approximate 200-mile-long stretch of the Hudson River from Hudson Falls to the Battery in New York City was placed on the Superfund's National Priority Site list in 1984. The designation was based on the discharge of an estimated 209,000 to 1.3 million pounds of PCBs by General Electric from two capacitor manufacturing plants in Hudson Falls and Fort Edward. The upper Hudson River (approximately 40 miles of the river between Hudson Falls and Troy, and about 105 miles north of the proposed crossing in Haverstraw Bay) is the major focus of investigations based on studies that identified 40 hot spots (e.g., sediments with greater than 50 parts per million of PCBs) and 5 remnant deposits (e.g., river sediments exposed when the level of the river was lowered due to the removal of the Fort Edward Dam in 1973). In 1976, all fishing was banned in the upper Hudson River, and commercial fishing of striped bass and several other species was banned in the lower Hudson River. In 1991, remediation was conducted in the upper Hudson River, and, in 1995, catch and release fishing was again allowed in the upper Hudson River. In December 2000, the U.S. EPA finished its Feasibility Study that included a proposed remedy for the upper Hudson River. The comment period on that study was recently extended to August 2001. To date, the U.S. EPA has not published its final findings.

PCB concentrations in the river vary considerably depending on the river's flow, the depositional characteristics of various reaches, and the distance to the source release. However, PCB concentrations tend to be relatively low in Haverstraw Bay, and no PCBs were detected in the samples collected by Millennium at the proposed crossing location.

Schnabel Engineering conducted sediment sampling for Millennium in the Hudson River near the crossing location (Schnabel Engineering, 1998). Arsenic, barium, cadmium, chromium, lead, mercury, and silver were detected in some of the sediment samples. Metal concentrations were highest in the upper 10 feet of sediment and in the western portion of Haverstraw Bay. The total chromium and lead are in water-soluble forms while the mercury is not in a water-soluble form. Ten different semi-volatile organic compounds (SVOCs) were detected in sediments from the western portion of the bay, and 1 SVOC was detected in sediments from the navigation channel. SVOCs were not detected in sediments from the eastern portion of the bay.

4.4 FISHERIES AND WILDLIFE RESOURCES

4.4.1 Fisheries

Surface waters that would be crossed by the Millennium Pipeline Project support a variety of fish species. Major fish species identified by Millennium and known to occur in the project area are listed in table 4.4.1-1, and fishery classifications for each waterbody that would be crossed are included in the table H1 in appendix H. The two largest waterbodies that would be crossed, Lake Erie and Haverstraw Bay in the Lower Hudson River, have perhaps the highest fish diversity of the waterbodies that would be crossed by the proposed pipeline. Lake Erie and Hudson River fishery resources are discussed separately in this section.

TABLE 4.4.1-1

Major Fish Species Known to Occur in the Project Area

Coldwater	Warmwater	Anadromous/Catadromous	Marine
Northern pike	Muskellunge	American shad	Bay anchovy
Rainbow trout	Yellow perch	Striped bass	Atlantic menhaden
Brown trout	Smallmouth bass	White perch	
Brook trout	White bass	Atlantic sturgeon	
Black nosed dace	Largemouth bass	Shortnose sturgeon	
Walleye	Bluegill	American eel	
Coho salmon	Black crappie	Blueback herring	
Chinook salmon	Lake herring	Alewife	
	Lake whitefish	Gizzard shad	
	Rainbow smelt	Tomcod	
	Emerald shiner		
	Spottail shiner		
	Fathead minnow		
	Channel catfish		
	Stonecat		
	Trout perch		
	Johnny darter		
	Freshwater drum		
	Carp		
	Bullhead		
	Redhorse		
	White sucker		
	Burbot		

Warmwater streams and rivers are typically slow moving waterbodies that are less oxygenated than coldwater streams with soft substrates of sand and silt. They are normally found in the flatter coastal plains, but may be found in low gradient plateau and mountain valleys or in reaches of rivers that have been impounded. Coldwater streams are typically fast moving, well-oxygenated, low temperature waterbodies with hard substrates of gravel, cobble, or rock. Based on preliminary consultations with the NMFS, FWS, and NYSDEC, and other New York state agencies, Millennium identified 95 perennial and 31 intermittent waterbodies as designated trout waters or streams suitable for trout spawning. One of the perennial waterbodies, Saw Mill River, would be crossed 11 times. Estuarine habitats support both fresh and saltwater species.

Waterbodies that sustain important coldwater fisheries resources include Chautauqua Creek (MP 43.0) and the Genesee (MP 137.3), Cohocton (MP 181.4), West Branch Delaware (MP 276.0), East Branch Delaware (MP 287.0), and Neversink (MP 341.0) Rivers. The Genesee and Neversink Rivers also sustain warmwater fisheries. Other rivers that support significant warmwater fisheries include the Susquehanna (MP 263.2) and Mongaup (MP 330.0) Rivers. The West and East Branch Delaware River and

other streams in the Delaware River watershed support recreational fisheries that attract anglers from many parts of the U.S. Organizations formed to protect and enhance fishery resources in New York include Trout Unlimited, Theodore Gordon Flyfishers, and the Delaware and Hudson Riverkeepers.

The Croton River would be crossed on the 9/9A Proposal (MP 396.8) within the area designated by the NYSDOS under the New York State Coastal Management Program as the Croton Bay Significant Coastal Fish and Wildlife Habitat; by the FWS as the Significant Habitats and Habitat Complexes of the New York Bight Watershed; and by the NMFS as a component of the Haverstraw Bay/Lower Hudson River EFH. This area includes the tidal portions of the river that provide a productive habitat for largemouth bass, striped bass, brown bullhead, carp, panfish, and other fish. The designated habitat includes an approximate 1-mile-long segment of the river (within the tidal reach of the Hudson River) and the approximate 1,200-acre shallow bay and mudflat area south of Croton Point. Upstream from there, the Croton River is a relatively large, warmwater stream, with a drainage area of over 375 square miles. Because most of the freshwater flow is diverted out of the Croton River for municipal water supplies, only the tidal portion of the river is included in the area of designated habitat.

The Croton River and Bay have been subjected to considerable habitat disturbances, including filling of wetlands for waste disposal, discharges of stormwater runoff, and industrial and residential development. The substrate of the Croton River in the vicinity of the proposed crossing appears to be composed primarily of silt and boulders. Tidal wetlands adjacent to the north side of the river are emergent wetlands dominated by common reed (*Phragmites australis*), an introduced nuisance plant species. Substrate within the wetlands appears to consist of silt.

Despite the significant habitat alterations affecting the area, tidal portions of the Croton River and Bay remain important as fish and wildlife habitats in the lower Hudson Valley. This area comprises one of the largest shallow bay areas in the lower Hudson River and is sheltered from strong river currents, and to some extent, from prevailing winds. Although no unusual concentrations of any fish or wildlife have been documented in the Croton River or Bay, it is a productive year-round habitat for resident fish species and serves as a resting, foraging, and nursery area for anadromous species. The lower portion of the Croton River is identified as an important local fishery for striped bass and is reported as being important habitat for largemouth bass, alewife, blueback herring, and carp.

The Croton River embayment is a component of the Haverstraw Bay/Lower Hudson River EFH as designated under the MSFCMA. EFH applies to species for which there are approved management plans. The NMFS has identified Atlantic butterfish, Atlantic herring, bluefish, red hake, summer flounder, windowpane, and winter flounder as species having EFH in the Croton River and Bay.

Lake Erie

Lake Erie, due to the geomorphology of its basin, has supported a diversity of fish species greater than any of the other Great Lakes. At least 138 species have been reported in the lake and its tributaries (Van Meter and Trautman, 1970). Compared to the 177 species of freshwater fish indigenous to all of Canada, populations of fish in Lake Erie are extremely diverse. The shallow nature of the lake, high primary productivity, and variety of habitats have led to high fish productivity.

The lake once supported a large native population of lake trout towards the turn of the century, but the effect of nearly 70 years of unregulated harvesting combined with over 100 years of progressively severe eutrophication has decimated the population. After 11 years of stocking selected strains of lake trout, the NYSDEC, Pennsylvania Fish and Boat Commission, FWS, and the National Biological Service have increased lake trout populations. However, attempts to collect young of the year and yearling lake trout have been unsuccessful in recent years (1994-1996) indicating low recruitment by natural reproduction. Potential

lake trout spawning habitat is known to occur along the south shore of Lake Erie from Dunkirk, New York, to Erie, Pennsylvania, and lake trout congregate on many of these sites in late fall. Spawning is generally expected to occur in shallow water (i.e., less than 40 feet). However, an historical deepwater (60 to 65 feet) spawning reef at Brocton Shoal near Dunkirk, New York, has been shown to provide excellent lake trout spawning habitat.

Lake Erie has also been stocked with coho salmon, chinook salmon, brown trout, and rainbow trout. Management of these fish has been more successful than of lake trout, contributing to a thriving recreational fishery. Walleye is another species with ecological, recreational, and commercial significance. The walleye population in the eastern basin appears stable and supports commercial and recreational fisheries in New York and Pennsylvania waters. In the eastern basin, the walleye stocks have remained stable despite the collapse and subsequent recovery of walleye stocks in the western basin.

Based on commercial trawl data in the central and eastern basin between 1989 and 1995, alewife, gizzard shad, rainbow smelt, white perch, yellow perch, walleye, and freshwater drum are the most abundant fish species present in Lake Erie (Prime et al., 1995). The use of gill nets in Pennsylvania's Lake Erie commercial fishery was banned after 1995 by statutory regulation, and only one fisherman elected to continue commercial fishing using trap nets. As a result, commercial exploitation rates for major fish species in Pennsylvania have been insignificant (i.e., less than 10 percent of the catch in 1995 and succeeding years [see table 4.4.1-2]). The primary fish species exploited commercially include yellow perch, catfish, white sucker, redhorse, and lake whitefish. Burbot are also exploited in the fall due to shoreward movement to the area of relatively shallow waters fished by the trap nets. Other species captured are bullhead, sheepshead, white perch, white bass, walleye, and carp. The economic values of the 1996, 1997, and 1998 commercial fishery landings in the Pennsylvania waters of Lake Erie are not available. Based on Ohio and Ontario Lake Erie commercial fishery value data, it is estimated that the catch value ranged from $14,000 to $17,000 (see table 4.4.1-2). Millennium did not identify any specific fishing grounds, either along the proposed route or in Lake Erie.

Walleye, yellow perch, salmon, trout, and smallmouth bass are the principal gamefish species caught by Lake Erie anglers. The majority of the lake angling activity is concentrated at four public launch sites: Walnut Creek Access Area, North East Access Area, Camp Marine, and East Avenue Boat Launch. The majority of the yellow perch and walleye fishing effort occurs in the central basin waters west of Presque Isle Peninsula. Fishing effort for smallmouth bass is concentrated in the nearshore area of eastern basin waters east of Presque Isle Peninsula. The nearest approach of the pipeline route to the Pennsylvania shoreline is more than 2 miles in water depths ranging from about 50 to 60 feet.

Rocky bottom substrates in the near shore environment of the landfall area provide spawning habitat for fish species including lake herring, lake whitefish, rainbow smelt, emerald shiner, spottail shiner, fathead minnow, channel catfish, stonecat, trout perch, white bass, smallmouth bass, rainbow darter, johnny darter, yellow perch, walleye, and freshwater drum (Raul Pegalos, 1997).

The unprotected Lake Erie shoreline is a high wave energy environment that precludes the establishment of vegetation, either emergent or submergent. Filamentous and mat-forming algae are present on hard substrates in limited amounts. Much of the pipeline route would be at depths below the photic zone, and the occurrence of attached aquatic vegetation is minimal.

TABLE 4.4.1-2

Annual Commercial Fish Harvest in Pennsylvania Waters of Lake Erie (pounds)

Species	1995	1996	1997	1998
Walleye	42,138	81	193	417
Yellow perch	30,754	5,340	7,398	5,281
White sucker	12,719	4,125	3,223	3,544
Redhorse	1,717	1,580	766	1,283
Carp	75	0	96	132
Catfish	351	6,848	3,806	2,125
Bullhead	23	872	626	972
Sheepshead	22,774	234	1,117	618
Burbot	30,945	2,262	8,910	8,963
White bass	32,892	235	1,628	701
White perch	4,461	96	386	113
Lake whitefish	169,747	2	1,597	3,496
TOTAL	**348,596**	**21,771**	**29,696**	**27,645**

Source: 1998 "Lake Erie Fisheries Status and Trends Report" prepared by the Pennsylvania Fish and Boat Commission.

Although no site-specific information is available on benthic organisms, a study by Dermott (1994) had a number of sample sites in the vicinity of the proposed pipeline. Commonly occurring organisms included nematode and tubificid worms, amphipods, molluscs, dipterans, and harpacticoid copepods. However, this study took place before the exotic zebra and quagga mussels were introduced around 1988 and 1992, respectively (Hebert et al., 1989, May et al., 1992). Holland (1993) states that zebra mussels decrease turbidity and plankton abundance by filtering and removing large amounts of suspended matter. This in turn alters food availability for zooplankton and other planktivores. The reduction of some phytoplankton taxa can be attributed to zebra mussel impacts on native size-selective, filter feeding crustacean zooplankters. Currently, quagga and zebra mussels have out-competed and significantly reduced populations of native clams and mussels (Dermott and Munawar, 1993).

Hudson River

Haverstraw Bay is the northernmost section of the lower Hudson River estuary. This productive estuary area is a regionally significant nursery and wintering habitat for a number of anadromous, catadromous, diadromous, and non-migratory fish species. The bay is a primary nursery and overwintering area for striped bass and supports a high percentage of the total North Atlantic striped bass population. There are 80 fish species regularly using the lower Hudson River estuary, including Federal and state-listed species (see section 4.6).

Haverstraw Bay between the Tappan Zee Bridge and Stony Point is a wide shallow section of the river where the fresh water from the upper river mixes with the marine water of the Atlantic Ocean, producing brackish water habitats in the 0 to 10 parts per thousand salinity range. Primary (submerged aquatic vegetation and phytoplankton) and secondary (zooplankton, invertebrates, and fish) biological productivity is very high in this extensive shallow water habitat, and the area serves as a major nursery and feeding area for anadromous and estuarine-dependent species. This area is a major nursery area for striped bass, white perch, tomcod, and Atlantic sturgeon that spawn elsewhere in the Hudson River. It is also a wintering habitat and summer feeding area for the federally endangered shortnose sturgeon.

In spring, American shad begin upstream spawning migrations in late March. In April, tomcod larvae from the previous winter's spawn move downstream from the reach of river that includes Haverstraw

Bay into the lower portion of the river between Yonkers and the Tappan Zee Bridge. Juvenile tomcod migrate upstream into the area between West Point and the Tappan Zee Bridge starting in April. Striped bass begin their spawning migration into the Hudson River in April, with spawning generally centered immediately upstream of Haverstraw Bay. Overwintering Atlantic sturgeon begin to disperse from the section of river that includes Haverstraw Bay and begin spawning migrations in April and May, passing through Haverstraw Bay on their way to spawning grounds upstream. White perch begin a general upstream spawning migration in May or June.

In summer, large numbers of striped bass larvae begin to arrive in Haverstraw Bay in June. They are generally present in Haverstraw Bay for the remainder of the year, although reported numbers decrease appreciably over time. White perch larvae also begin to arrive in large numbers in Haverstraw Bay during early summer. Blue crab migrate upstream through Haverstraw Bay during the summer. Shortnose sturgeon adults are dispersed throughout a large portion of the Hudson River, including the Haverstraw Bay area. Atlantic sturgeon adults migrate downstream through Haverstraw Bay following spawning. Tomcod juveniles remain in the area of the river between West Point and the Tappan Zee Bridge.

In fall, striped bass larvae, white perch larvae, and tomcod juveniles remain in Haverstraw Bay. In late fall, shortnose sturgeon juveniles and non-spawning adults begin to congregate in Haverstraw Bay. Adult tomcod also begin to arrive in the section of river between Poughkeepsie and the Tappan Zee Bridge to spawn. Juvenile tomcod remain in an area of the river that includes Haverstraw Bay.

In winter, shortnose sturgeon juveniles and non-spawning adults congregate in the deeper portions of Haverstraw Bay. Atlantic sturgeon juveniles also move into a section of the river that includes Haverstraw Bay. Tomcod spawn in the section of river between Poughkeepsie and the Tappan Zee Bridge. Juvenile tomcod migrate downstream to the portion of the river below the Tappan Zee Bridge. The NYSDEC also indicated that during the winter blue crab bury themselves in the sediments of Haverstraw Bay (NYSDEC, 1999).

Although there is a health advisory for fish and blue crab consumption due to the presence of pollutants (heavy metals, pesticides, herbicides, semi-volatile organic compounds, and PCBs), Hudson River water quality has improved considerably, contributing to an increase in some of the most historically important fisheries of the river, including striped bass and endangered shortnose sturgeon. See section 4.6 for additional information on endangered and threatened species. However, commercial fisheries of Atlantic sturgeon and American shad have been closed and curtailed, respectively, due to overfishing and anthropogenic sources of pollution.

Essential Fish Habitat

According to the NYNHP, Haverstraw Bay, including the Croton River embayment, is a designated Significant Coastal Fish and Wildlife Habitat (NYSDEC, 1999). The Secretary of Commerce has approved an EFH for species with Federal management plans since the DEIS for this project was reviewed. Although the designation process is not complete, the majority of these designations have been made. Designations for red hake, winter flounder, windowpane, bluefish, Atlantic butterfish, fluke, and potentially the Atlantic herring include habitats such as those found in Haverstraw Bay.

Pursuant to section 306(b)(2) of the MSFCMA, Federal agencies are required to consult with the NMFS regarding any action they authorize, fund, or undertake that may adversely affect EFH. An adverse effect has been defined in the MSFCMA as: "Any impact which reduces the quality and/or quantity of EFH. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions." The NMFS stated that the Hudson River crossing for this project may

adversely affect EFH, particularly in Haverstraw Bay. Pursuant to the MSFCMA, the FERC consulted with the NMFS on this project, and submitted to the NMFS a written assessment of the effects of this project on EFH. The EFH assessment included the following:

detailed description of the proposed action

an analysis of the effects, including cumulative effects, of the proposed action on EFH, the managed species, and associated species, such as major prey species including affected life history stages;

the FERC's determination of the effects of the action on H; and

proposed mitigation measures.

Pursuant to section 305(b)(4)(A) of the MSFCMA, the NMFS has reviewed the EFH assessment and provided the FERC with comments, and will provide EFH conservation recommendations. The following section is a description of the species, identified by the NMFS, with designated EFH in Haverstraw Bay.

Red hake (*Urophycis chuss*) – The red hake occurs in the Atlantic Ocean from the Gulf of St. Lawrence to North Carolina and is most abundant between Georges Bank and New Jersey. Red hake move into shallower waters to spawn in the spring and summer and move offshore to deep waters in winter. Spawning occurs between May and November. Red hake feed primarily on crustaceans, although some adult red hake also feed extensively on fish. Designated EFH in the Hudson River estuary for red hake includes larvae, juveniles, and adults.

Winter flounder (*Pleuronectes americanus*) – The winter flounder is distributed in the Atlantic Ocean from Labrador to Georgia and is most abundant from the Gulf of St. Lawrence to Chesapeake Bay. Winter flounder migrate relatively short distances into estuaries, embayments, and saltwater ponds in winter to spawn and then move into deeper water during summer. Winter flounder feed primarily on benthic invertebrates. Designated EFH in the Hudson River estuary for winter flounder includes eggs, larvae, juveniles, adults, and spawning adults.

Windowpane flounder (*Scophthalmus aquosus*) – The windowpane flounder is distributed in the Atlantic Ocean from the Gulf of St. Lawrence to Florida. This species inhabits large estuaries. Spawning occurs from April through December, with peak spawning occurring in May and October. Designated EFH in the Hudson River estuary for windowpane flounder includes eggs, larvae, juveniles, adults, and spawning adults.

Bluefish (*Pomatomus saltatrix*) – Bluefish are found in the Atlantic Ocean from Maine to Florida. They migrate north in the spring and south in the fall. Bluefish spawn during summer in the ocean water of the middle Atlantic. The larvae drift in offshore currents until they become juveniles, which then move into estuaries. Bluefish are voracious predators that feed on a wide variety of fish and invertebrates. Designated EFH in the Hudson River estuary for bluefish includes juveniles and adults.

Atlantic butterfish (*Peprilus triacanthus*) – The Atlantic butterfish is found in the Atlantic Ocean from Newfoundland to Florida, but is most abundant from the Gulf of Maine to Cape Hatteras. During the summer, they move north and inshore to feed and spawn between June and August. They move offshore and south in winter to avoid the cooler waters. The Atlantic butterfish is a small bony foodfish with a thin oval body and oily flesh. They are primarily pelagic and form loose schools that feed on small fish, squid, and crustaceans. Atlantic butterfish are preyed upon by many species including silver hake, bluefish, swordfish, and long-finned squid. Juvenile Atlantic butterfish associate with jellyfish during summer months to avoid

predators. Designated EFH in the Hudson River estuary for Atlantic butterfish includes larvae, juveniles, and adults.

Fluke (*Paralichthyus dentatus*) – Fluke (also called summer flounder) occur in the Atlantic Ocean from the southern part of the Gulf of Maine to South Carolina. Fluke concentrate in bays and estuaries from late spring through early autumn and then move offshore to spawn. Spawning may occur from autumn to early winter and larvae are transported toward coastal areas by prevailing water currents. Development of juveniles occurs mostly in bays and estuarine areas, most notably Pamlico Sound and Chesapeake Bay. The growth rate varies between the sexes and some females may live up to 20 years while males rarely live more than 7 years. Designated EFH in the Hudson River estuary for fluke includes larvae, juveniles, and adults.

Atlantic herring (*Clupea harengus*) – Atlantic herring occur in the Atlantic Ocean from Labrador to Cape Hatteras. Gulf of Maine herring migrate from summer feeding grounds along the Maine coast to southern New England and mid-Atlantic areas during winter. Spawning in the Gulf of Maine occurs in late August to October, beginning in northern locations and progressing south. Herring eggs are demersal and are generally deposited on gravel substrates. Incubation is temperature dependent, with hatching typically occurring within 7 to 10 days. Larvae metamorphose by late spring into juvenile herring that may form large aggregations in coastal waters during summer. Atlantic herring are not fully mature until 4 years old. Designated EFH in the Hudson River estuary for Atlantic herring includes larvae, juveniles, and adults.

Hudson River Sampling Program

In November 2000, Millennium conducted a site-specific sampling program to determine if there were any unique or special physical habitats or aquatic life conditions along the proposed pipeline crossing of the Hudson River. The results of this survey are summarized below and included as Attachment A-3 in appendix J (Millennium Pipeline Project, New York State Coastal Zone Consistency Determination).

Samples were collected from seven stations with the sample depth ranging from 9 feet to 38 feet. All stations were located on the pipeline route by global positioning satellite (GPS) coordinates. A total of 418 individual fish and crabs were collected representing 20 species. One shortnose sturgeon was collected near the east end of the route. No species with designated EFH in Haverstraw Bay were collected. White perch were the most prevalent species and accounted for 213 (51 percent) of all the individuals collected. Water quality samples (collected from the surface and bottom in shallow stations and from the surface, middle, and bottom in deep stations) showed temperature ranging from 12.4 to 13.0 degrees Centigrade, salinity ranging from 6.9 to 13.7 parts per thousand, and dissolved oxygen ranging from 7.8 to 9.2 milligrams per liter.

Benthic grab sampling produced low numbers of macroinvertebrates. Samples of the substrates showed that fine-grained materials, varying from loose silt to clay with some sand and a few oyster shells, predominated along the bottom. Qualitative sampling with a fine mesh sieve revealed a large number of oligocheate and polycheate worms that are abundant throughout Haverstraw Bay. Diver observations did not identify any unique habitat or features along the route.

4.4.2 Wildlife Resources

Wildlife species inhabiting the Millennium Pipeline Project area are those characteristic of deciduous and coniferous forests, and early successional, wetland, and riparian habitats of the northeastern U.S..

The pipeline would cross two major upland forest habitat types: the oak-hickory and maple-beech-birch (see section 4.5, Vegetation, and section 4.7, Wetlands, for additional description of the vegetative cover types). Forests provide a valuable source of food, cover, and denning and nesting habitat, which are

used by a variety of wildlife species that include reptiles such as the garter snake, black rat snake, and the eastern box and wood turtles. Representative mammal species found in forest habitats include the gray squirrel, eastern chipmunk, grey fox, racoon, and white-tailed deer, and a variety of birds such as the wood thrush, dark-eyed junco, red-eyed vireo, yellow-rumped warbler, rose-breasted grosbeak, and raptors including the red-shouldered hawk.

Early successional habitat is found at many locations along the proposed pipeline route and consists of fallow fields, agricultural land, hayfields, and existing powerline and pipeline rights-of-way. These areas are frequently disturbed by tilling, harvesting, and/or mowing practices, and vegetation is kept at an early successional stage (grasses and low growing shrubs). Successional habitats typically provide a source of food and nesting habitat for a variety of smaller wildlife species. Ground nesting birds, such as the eastern meadowlark, and burrowing mammals, such as the meadow vole, white-footed mouse, and short-tailed shrew, also benefit from the cover and food provided in these habitats. Larger wildlife species which prey on these smaller species are also attracted to these areas and include raptors such as the red-tailed hawk, and larger mammals such as the red fox. Other representative large mammal species associated with these habitats include the white-tailed deer and groundhog.

Wetland habitats along the pipeline route include palustrine forested, scrub-shrub, and emergent vegetation communities. The increased availability of water in these areas provides a more abundant and diverse habitat for a variety of resident and migratory wildlife species. Many wildlife species from other habitats use wetlands as a water resource; others use wetland habitats exclusively, and many fish, amphibians, aquatic reptiles, and some bird species are dependent on the water resource. Representative wildlife species that are highly dependent on wetlands for water or nesting include the red-spotted newt, bullfrog, box turtle, wood duck, green heron, beaver, and muskrat.

Many of the wildlife species associated with wetlands use riparian corridors for foraging, nesting and breeding, and cover. Numerous wildlife species also use the vegetation and cover provided by riparian corridors for dispersal and migration. The pipeline would cross many riparian systems, from small drainages (5 to 10 feet wide) to major waterbody crossings such as Olean and Cayuta Creeks and the Genesee, Susquehanna, and Mongaup Rivers. Often these riparian systems are associated with wetlands and are an integral, hydrologic component of the wetland system. Representative wildlife species that can be found in these riparian systems include the river otter, various waterfowl, northern water snake, northern leopard frog, and eastern painted turtle.

Because of the presence of steep bluffs and the absence of coastal wetlands at the Lake Erie landfall, there is limited foraging and nesting habitat for waterfowl along the shoreline's narrow cobble/gravel beaches. Ruddy turnstones, spotted sandpipers, least sandpipers, and sanderlings are occasional visitors to these areas. Nearshore waters provide foraging habitat for migratory diving waterfowl, although nesting habitat is not available. Representative common species include greater scaup, common goldeneye, common merganser, bufflehead, and canvasback. Presque Isle State Park, located about 20 miles to the west in Erie, has a diversity of aquatic habitats and provides foraging and breeding habitat for a large number of waterfowl and shorebirds.

The Mongaup Wildlife Management Area (WMA) would be crossed between MPs 323.8 and 330.2. This WMA is associated with the Mongaup River and is managed by the NYSDEC, Division of Fish, Wildlife, and Marine Resources. Bald eagle nesting and winter concentration areas are located along the Mongaup River (see section 4.6 for additional discussion of the bald eagle). The WMA also provides habitat for the timber rattlesnake and winter denning black bears.

The pipeline would cross 3,518 feet (0.7 mile) of the Doris Duke Wildlife Sanctuary (MPs 364.9 to 365.8) between the AT and State Route 17A in the Sterling Forest State Park. The sanctuary is managed

jointly by the NYSOPRHP and the PIPC, and was created during acquisition of the state park in 1998. The NYSOPRHP states that the Doris Duke Wildlife Sanctuary provides important wildlife habitat and has been designated to remain in a natural state.

About 151 bird species regularly use the lower Hudson River estuary. Overwintering waterfowl include mallard, American black duck, Canada goose, merganser, canvasback, common goldeneye, and scaup. The bald eagle is also known to overwinter in this area. A network of marshes behind Grassy Point (north of proposed crossing and adjacent to Haverstraw Bay) is one of the few wetland areas along the lower Hudson River. Locally significant numbers of waterfowl use the Hudson River/Haverstraw Bay (MP 387.9), the Croton River (MP 396.8) and Bay, and associated wetlands during spring and fall migration because these systems provide shelter and productive foraging. Fish populations in the Croton River may be important for pisciverous birds (e.g., osprey) during migration.

4.5 VEGETATION

Vegetation types that would be affected by the Millennium Pipeline Project include forest, agriculture, and open land (see table 4.8.1-1). The project would be within the eastern transitional and mixed deciduous forests and would cross two forest cover types: oak-hickory and maple-beech-birch (Kingsley, 1985; Sutton, et al., 1986). Much of the project area has been or is actively managed for agriculture.

The oak-hickory cover type is composed of tree species that are well adapted to warm, drier, mixed deciduous forests (Spur et al., 1973, Sutton et al., 1986). White, black, and Northern red oak and hickories including shagbark, mockernut, and bitternut are the dominant canopy species. Yellow poplar and black walnut are also commonly associated with this forest cover type. Tick trefoil, snakeroot, and clovers may form the herbaceous layer.

The maple-beech-birch forest cover type is common in moist, cool, temperate forests. This forest cover type is dominated by sugar maple, American beech, and yellow birch (Spur et al., 1973). Other canopy species include red maple, eastern hemlock, and white pine. The understory may include black cherry, white ash, striped maple, hemlock, and pine, and the herbaceous layer may include wild sarsaparilla, starflower, wood lily, and Canada mayflower.

In Westchester County along the 9/9A Proposal, forest land is mostly adjacent to highways and bicycle paths, in local or county parks, or in undeveloped forested parcels in otherwise relatively developed areas. Representative species in these areas include Northern red oak, yellow poplar, red maple, and sugar maple. In general, forested areas consist of pole-sized scrub and smaller second growth. However, mature trees with a 36- to 48-inch diameter at breast height are found along the Briarcliff-Peekskill Trailway bicycle path and Sprain Ridge Park.

Open land, including agricultural land and old clear cuts and fields, occurs within each of the forest cover types that would be crossed by the project. Agricultural lands include intensive and rotational crop land, hayfields, and pastures and are typically vegetated by annually planted and harvested corn, rotational legumes, grasses, and hedgerow shrubs. Old fields are typically vegetated with grasses, forbs, and shrub species. In Westchester County, open land primarily includes grassy highway shoulders, weedy vacant lots, and lawn areas adjacent to commercial and industrial buildings. Representative species include multiflora rose, bluegrasses, and goldenrod.

The Millennium Pipeline Project would cross a total of about 135.5 miles of forest (35 percent of the total pipeline), of which about 128.3 miles are upland hardwood/coniferous forests and about 7.2 miles are palustrine forested wetlands or forested wetlands mixed with other wetland cover types (see section 4.7 for further discussion of wetlands). About 87 percent of the land route would be adjacent to existing rights-

of-way, and most forested areas would be crossed adjacent to existing rights-of-way. However, two larger tracts of forest would be crossed on new right-of-way: one about 5.9 miles in length beginning at approximate MP 88.8 in Cataraugus County and one about 1.4 miles in length beginning at approximate MP 196.3 in Chemung County. Other vegetative cover types include agricultural land and hayfields (59.4 miles), and open land (154.9 miles).

In consultation with the NYNHP, Millennium identified a unique shale, cliff, and talus/hemlock-northern hardwood forest community, associated with the Chautauqua Creek Gorge, that would be crossed at about MP 43.0 in Chautauqua County. Dominant species include eastern hemlock, American beech, red maple, and oaks. Millennium also identified several other areas containing diverse vegetational communities between MPs 54.4 and 56.4 in Chautauqua County, and an old growth eastern hemlock forest between MPs 279.2 and 279.3 in Delaware County.

4.6 ENDANGERED AND THREATENED SPECIES

To comply with the requirements of section 7 of the ESA, we initially conducted informal consultation with the FWS and NMFS and reviewed rare and endangered species databases maintained by appropriate state agencies regarding the presence of federally listed or proposed endangered and threatened species and state-listed species in the vicinity of the project In addition, Millennium, as a non-Federal party, assisted the Commission in meeting section 7 requirements by conducting informal consultation with the FWS and NMFS, and by reviewing rare and endangered species databases maintained by the NYNHP.

In the event that a federally listed or proposed endangered or threatened species or its designated critical habitat occurs in the vicinity of a "major construction activity," the FERC must prepare a Biological Assessment (BA) to determine whether the proposed action would affect that species. If the BA determines that the proposed action would affect a federally listed or proposed species, then the FERC must enter into formal consultation and obtain a Biological Opinion from the FWS or NMFS before taking final agency action. The FERC issued its BA in January 2001, as summarized below.

The FERC initially determined that six federally listed or proposed species may occur in the vicinity of the proposed Millennium pipeline (see DEIS for the Millennium Pipeline Project issued April 1999). One of these species (the peregrine falcon) was delisted on August 25, 1999. Although the species is still listed by the state, it is not included in the BA. Another species (the federally threatened bald eagle) was proposed for delisting on July 4, 1999, but has not been delisted yet. The BA also addresses two federally endangered freshwater mussel species (the clubshell and Northern riffleshell) that the FWS identified in April 2000 as potentially occurring in the project area.

On May 9, 2000, Millennium amended its December 22, 1997, application to incorporate the 9/9A Proposal in Westchester County. The 9/9A Proposal was identified to address concerns of the PSCNY and ConEd about the originally proposed route along the ConEd powerline right-of-way. No additional federal species were identified along this route, although it was assumed that the shortnose sturgeon may also occur in the Croton River (see SDEIS for the Millennium Pipeline Project issued March 2001).

4.6.1 Federally Listed or Proposed Endangered and Threatened Species

Based on our consultations, we identified seven federally listed endangered or threatened species that could potentially occur in the vicinity of the Millennium Pipeline Project facilities (FWS, 1997, 1998, 1999; NMFS, 1997, 1998a, 1998b, 1999). Table 4.6.1-1 lists the federally listed species and the New York counties where they may occur in the project area. The following sections discuss ranges, distributions, habitats, reasons for decline, and probable locations of the federally listed species that potentially occur within the project area as presented in the BA.

Shortnose Sturgeon

The shortnose sturgeon was listed as a federally endangered species on March 11, 1967. It is a diadromous species that occurs only along the east coast of North America in tributary rivers to the Atlantic Ocean and is known to occur in the Hudson River between the George Washington Bridge in Manhattan and the Federal Lock and Dam in Troy, New York. The Hudson River provides spawning, seasonal foraging, and overwintering habitat for this species, and Haverstraw Bay (the location of the proposed crossing) provides seasonal foraging and overwintering habitat (NMFS, 1997). Habitat alteration, associated with pollution and dam construction in rivers flowing to the Atlantic Ocean, is the primary reason for the endangered status of this species. Other threats include incidental taking by commercial fishermen and channel dredging and disposal of materials. The shortnose sturgeon is also a state-listed endangered species in New York.

The shortnose sturgeon is a migratory fish with a complex life history. It is a benthic predator that feeds on macroinvertibrates during the summer months and prefers the oligohaline region of rivers, which contains the biologically productive saltwater/freshwater interface (Haley et al., 1996). The shortnose sturgeon inhabits estuaries and large coastal rivers, and moves upstream and downstream with the seasons. There have been inconsistent descriptions of shortnose sturgeon migratory behavior due to the varying habitat distributions used during the species' four life stages. The four life stages of the shortnose sturgeon are larval, juvenile, non-spawning adult, and spawning adult.

Research from other rivers shows that an individual adult may spawn once every three years, indicating that for any given year, the majority of the adults in the river are not spawning (Bain et al., 1995). From late fall until early April, the pre-spawning adults have been well documented to overwinter in a torpid state in the deep channel habitats of the Hudson River near Sturgeon Point (about river mile 86) and Kingston, New York (river mile 94) (Bain, 1997). In mid-April the spawning fish move upstream to the spawning grounds between Coxsackie, New York (river mile 120), and the Troy Dam at Troy, New York (river mile 153). Spawning occurs from mid-April to late May. Afterwards, the adults disperse downriver into the summer range between river miles 24 and 76, including the proposed crossing at river mile 35. From late spring until early fall, the adult fish are distributed in this summer range for feeding in the deep channel habitats of the freshwater and brackish parts of the estuary.

Spawning reportedly occurs primarily over gravel or cobble in areas of relatively fast water. Fertilized eggs adhere to the substrate. Hatching generally occurs within 7 to 10 days depending on water temperature. Larvae generally are reported to seek cover within the substrate. About 10 days following hatching, the larvae have developed mouths, eyes, and precursors to adult fins. During this time period, the larvae have begun to disperse downstream in the Hudson River. They are reported to occur primarily in fast, deep waters and have been associated with the spawning areas between Hudson River miles 120 and 153. Since the proposed crossing would be in the vicinity of river mile 35, construction activities would not directly affect spawning areas or larvae.

TABLE 4.6.1-1

Federally Listed Species That Potentially Occur in the Vicinity of the Millennium Pipeline Project

Common Name	Scientific Name	Status a/	Locations Where Species May Occur
Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	F-E, NY-E	Hudson and Croton Rivers, Rockland and Westchester Counties
Mollusks			
Dwarf wedge mussel	*Alismodonta heterodon*	F-E, NY-E	Neversink River, Orange County; East and West Branches of the Delaware River, Delaware County
Clubshell	*Pleurobema clava*	F-E	Cassadaga and Conewango Rivers or their tributaries, Cattaraugus County
Northern riffleshell	*Epioblasma torulose rangiana*	F-E	Cassadaga and Conewango Rivers or their tributaries, Cattaraugus County
Birds			
Peregrine falcon	*Falco peregrinus anatum*	b/, NY-E	All Counties
Bald eagle	*Haliaeetus leucocephalus*	F-T, NY-E	Chautauqua, Cattaraugus, Delaware, Sullivan, Orange, Rockland, and Westchester Counties
Reptiles			
Bog turtle	*Clemmys muhlenbergii*	F-T, NY-E	Sullivan, Orange, Rockland, and Westchester Counties
Plants			
Northern wild monkshood	*Aconitum noveboracense*	F-T, NY-T	Delaware, Sullivan, and Orange Counties

a/ F = Federal Endangered (E) or Threatened (T) Species
NY = New York Endangered (E) or Threatened (T) Species
b/ Federally delisted on August 25, 1999, and not included in the BA.

Less research has been performed for the juveniles and non-spawning adults of the shortnose sturgeon, and consequently, this portion of the population has been underestimated in past studies. The juvenile shortnose sturgeon prefer to remain above the saltwater/freshwater interface, but by late fall and early winter, most older juveniles occupy the same broad region of the Hudson River near Haverstraw Bay that the non-spawning adults inhabit (NMFS, 1998b).

The non-spawning adults summer in the same range as the spawning adults. As water temperature drops in late fall, the fish move to one of two wintering areas. Dovel et al. (1992) concluded that most adults overwinter near Kingston; however, subsequent river monitoring in late fall indicates that the non-spawning adults overwinter in the seasonally brackish waters near Haverstraw Bay (river miles 34 to 39) (Bain, 1997). In the spring, these fish migrate upstream and remain in the tidal portion of the river, primarily downstream of Kingston. The population of shortnose sturgeon likely to inhabit portions of Haverstraw Bay during the winter would be non-spawning adults and older juveniles.

Millennium has not performed any field surveys specifically for the shortnose sturgeon. However, monitoring data collected for electric utilities suggest that populations have been increasing in the Hudson River. To verify these findings, several studies have been conducted (Dovel et al., 1992 and Bain et al., 1995). These studies indicate that Hudson River populations of the shortnose sturgeon may have increased by more than 400 percent from the 1970s to the present (Dovel estimated 13,000 fish in the 1970s, and Bain estimated a 1995 population of about 55,000).

Dwarf Wedge Mussel

The dwarf wedge mussel is a small freshwater mussel inhabiting large streams and rivers that drain into the Atlantic Ocean and is known to occur in at least 20 streams and rivers along the Atlantic coast from New Hampshire to North Carolina (Strayer et al., 1996). However, the surviving populations in many of these locations are small. In New York, the dwarf wedge mussel occurs in the Neversink River in Orange County and has recently been found in the main stem of the Delaware River in Delaware County (FWS,2001a). The dwarf wedge mussel was listed as a federally endangered species on March 14, 1990. The primary threats to this mussel are associated with loss of suitable habitat from dam construction, water pollution, and sedimentation (Lowe et al., 1990). The dwarf wedge mussel is also listed as a state-endangered species in New York.

The dwarf wedge mussel inhabits large streams and rivers, and appears to prefer moderate current speeds (approximately 0.2 to 0.5 feet per second) and possibly locations in which current is spatially uniform (Strayer and Ralley, 1993). The dwarf wedge mussel is found in association with substrate that includes patches of fine sediments, although the species is apparently relatively intolerant of silt deposition. There is also data that indicates that the dwarf wedge mussel occurs primarily in softer waters containing lower concentrations of calcium (Strayer, 1993).

The dwarf wedge mussel is sexually dimorphic; individuals are either male or female, as opposed to some mussel species in which all individuals are hermaphroditic. The age of sexual maturity for the dwarf wedge mussel is not reported in the literature. However, the dwarf wedge mussel has an unusually short life span for a mussel with a maximum reported age for the species of about 10 years (Michaelson and Neves, 1995). Thus, it is likely that the species becomes sexually mature rather early. Although there is conflicting information in the literature concerning the specifics of the reproductive cycle, it is generally believed that males release gametes into the water column and these gametes are taken up by the females. The resulting fertilized cells are called glochidia which are retained by the female within a marsupium while they develop. Gravid females (containing glochidia) have been reported from early June to late August (Clarke, 1981) or from February to August (Johnson, 1970). Regardless of the actual time period, dwarf wedge mussels appear to brood the glochidia for a long period before releasing mature glochidia to the water column.

Once released to the water column, mature glochidia must attach to a host fish to continue development. The host fish species for the dwarf wedge mussel include mottled sculpin, johnny darter, and tessellated darter (Michaelson and Neves, 1995). The length of the association of the glochidia with fish has not been specifically identified, although this period typically lasts for several weeks for other mussel species. Following this period, the individual enters the velliger stage, where the mussel reenters the water column and settles to the substrate. The velliger begins to secrete a shell and develops into a juvenile mussel.

As with other mussel species, the dwarf wedge mussel feeds by filtering large quantities of water. Food particles are filtered out of the water and digested. Specific food of the dwarf wedge mussel is not reported. However, it is likely to consist of algae and small zooplankters that inhabit the water column.

The proposed crossing of the Neversink River is in the downstream portion of the reported extent of the dwarf wedge mussel habitat. The species is assumed to occur at the crossing location, since it has been

found upstream and downstream of the crossing. The Nature Conservancy (TNC) confirmed that the largest population of the dwarf wedge mussel in the state occurs at the proposed crossing location (TNC, 1998). Therefore, Millennium did not conduct surveys at the proposed crossing location. Millennium conducted surveys in the vicinity of the East and West Branches of the Delaware River at the proposed crossing locations in the Spring of 2001. No dwarf wedge mussels were found.

Clubshell and Northern Riffleshell

Clubshell

The clubshell was listed as endangered on June 18, 1992. This freshwater mussel inhabits loose, clean sand and gravel typically to a depth of 2 to 4 inches in small rivers and streams. Although it was historically widespread in the Ohio River basin and tributaries of western Lake Erie, the species has been extirpated in Alabama, Illinois, and Tennessee, and no longer occurs in a number of streams in its former range. Currently, this species is known to occur in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, West Virginia, and may be present in New York. In 1994, Strayer observed six old shells in Cassadaga Creek and noted that the species may be found elsewhere in Cassadaga and Conewango Creeks or their tributaries (Strayer, 1995). The FWS identified this species as potentially occurring within the project impact area in its letter to the COE on April 28, 2000 (FWS, 2000b). The reasons for the decline of the clubshell are varied but include both natural and human-induced disturbances. Principal factors include impoundments, loss of riparian vegetation, channelization, water pollution, sedimentation, natural predation, and the invasion of the exotic zebra mussel.

While food habits and reproductive biology of the clubshell are poorly understood, it is generally assumed that they parallel those of other freshwater mussels. In general, mussels feed by filtering planktonic organisms out of the water, and burrowing forms are known to feed on organic detritus found in the substrate. Clubshells are sedentary after the larvae metamorphosis stage, making them exceedingly vulnerable to predators and environmental degradation, particularly where the aggregation of fine sediments over routinely loose and well-aerated substrates can compromise the species' ability to breathe.

Reproduction for the clubshell requires a stable and consistent habitat with a healthy population of fish hosts to complete larval development. Males discharge sperm into the water and females downstream siphon in the sperm which fertilizes eggs stored in a gill pouch until the larvae hatch. When larvae are discharged into the water, they attach and form cysts on the gills or fins of a fish host. There is no information that suggests clubshell larvae target a specific species of fish. When the larvae's metamorphosis is complete, they fall back into the streambed as juvenile mussels.

Northern Riffleshell

The Northern riffleshell was listed as a federally endangered species on January 22, 1993. The Northern riffleshell is a freshwater mussel that inhabits an assortment of different stream communities but seems partial to substrates of firmly packed sand and/or gravel. The species is known to have occurred historically in the tributaries of the Ohio River, western Lake Erie, and the St. Clair and Detroit Rivers. Currently, it has been found only in short reaches of six streams in Kentucky, Michigan, Ohio, and Pennsylvania. Northern riffleshells are known to occur with clubshells. The reasons for the decline of this species can be attributed to a number of factors including channelization, impoundments, loss of riparian cover, water pollution, sedimentation, and invasion of the exotic zebra mussel in the lower Great Lakes region in the mid 1980s. Zebra mussels attach themselves to the shells of the Northern riffleshells and compete for space and available resources.

The Northern riffleshell depends on substrates that are relatively free of fine sediments since its siphon must remain exposed at the surface of the substrate to intake water and food. Like other bivalves, the Northern riffleshell uses calcium carbonate in the production of its shell which may explain the preference of some species in this subphylum for hard-water environments. The modification of substrate composition from deposition associated with dams and other impoundments is a leading cause of habitat loss for this species.

One of the adaptations of bivalves to a sedentary, filter-feeding life-style includes the loss of the head and radula. Cilia covering the gills filter suspended food from the water, create a current which helps transport food to the mouth, and sort filtered particles. Small particles are carried directly to the mouth, while larger particles are moved to the edges of the palps and gills. This rejected material is expelled from the body. Undigested wastes are moved through the anus and depend on the current of the water to function properly. When conditions of elevated fine sediment load persist, the internal digestive tract of mussels can become clogged as the system works to expel excess materials. Smothering from siltation may eliminate the mussel's ability to breathe, feed, and reproduce.

Similar to the clubshell, successful reproduction requires a stable and consistent environment with a healthy population of host fish for larvae development. Sperm discharged from the male makes its way to a pouch on the side of the female which holds the eggs. The zygote is then released into the current and finds its way to the operculum or fin of a host fish where it remains until undergoing metamorphosis into a juvenile mussel with a shell of its own. Northern riffleshells have the potential to live for up to 50 years.

The Millennium pipeline would cross Cassadaga Creek (MP 59.9) and seven of its tributaries between MPs 58.4 and 60.6, and five tributaries of Conewango Creek, including State Drainage Ditch, between MPs 72.9 and 74.3. Four of these waterbodies are categorized as intermittent and unsuitable for fish propagation and survival (MPs 59.2, 59.3, 72.9 and 73.0). Only two of these streams that could potentially support either the clubshell or Northern riffleshell would be crossed using an open cut construction technique (Cassadaga Creek, MP 59.9, and State Drainage Ditch MP 72.9).

Millennium conducted surveys of these two streams for these two mussel species in August 2000, using qualitative time visual searches with snorkel equipment and/or SCUBA gear. In Cassadaga Creek, 16 live individuals from six species of unionid mussels were found the vicinity of the proposed crossing location. No live or dead clubshell or Northern riffleshells were found. In State Drainage Ditch, only one live unionid mussel was found. No clubhsell or Northern riffleshells were found.

Bald Eagle

The bald eagle was federally listed as endangered within most of the U.S., including New York, on March 11, 1967. On July 12, 1995, the status of the bald eagle was changed to threatened within the lower 48 states. On July 4, 1999, a proposal to delist the bald eagle was announced, but it has not been delisted yet. The reasons for the decline of the bald eagle population are varied and include effects of organochlorine compounds on reproduction, effects of heavy metals and other toxicants, killing by humans, and general loss of habitat. Most of these threats continue to adversely affect bald eagle populations today, although organochlorine pesticides have been banned for use within the U.S., and indiscriminate killing of bald eagles is a federal crime. The bald eagle is also listed as a state-endangered species in New York.

The range of the threatened bald eagle is restricted to North America. Populations in Alaska and western Canada have been relatively stable through time. However, populations elsewhere exhibited gradual declines primarily due to loss of habitat until the 1940s. Following the development and widespread use of organochlorine pesticides, the populations within the lower 48 states dropped precipitously. Since the regulation of the use of organochlorine pesticides in the 1970s, the numbers of bald eagles have gradually

risen in most of the species' former range. In New York, a number of bald eagle nesting sites are presently known. In addition, bald eagles congregate during the winter at several sites within the state.

The life history of the bald eagle is well documented. Bald eagles nest in mature trees along oceans, lakes, rivers, and swamps. They generally prefer to nest in white pine, sycamore, red oak, or red maple trees. Bald eagle pairs exhibit a high degree of fidelity to nesting sites, often returning to the same nest year after year. Nesting in New York generally occurs in April, and fledging of the young generally follows in mid-to-late summer. Bald eagles feed primarily on fish. However, bald eagles will also take small mammals and birds, and feed opportunistically on carrion. Perching locations are generally located along the waterbodies where feeding activity takes place. Roosting locations are often found in the general vicinity of nesting locations. Bald eagles follow typical north-south seasonal migration patterns and winter in suitable habitats, mainly along wide rivers, from southern Canada southward.

Nesting activity in New York is presently occurring at the following locations:

near the east end of Lake Erie and in other western New York counties;
along the Lake Ontario shoreline and in the Finger Lakes region in the central part of the state;
along Lake Ontario and St. Lawrence River in the northern portion of the state;
in the central Hudson River Valley; and
along the West Branch Delaware River and the Delaware River in the eastern portion of the state.

Wintering areas include the Lake Ontario shoreline, the St. Lawrence River, the Hudson River Valley, the Delaware River valley, and major tributaries to the Delaware and Hudson (including the Croton River) Rivers. The pipeline would cross seven counties with known bald eagle nesting or wintering activity: Chautauqua, Cattaraugus, Delaware, Sullivan, Orange, Rockland, and Westchester Counties. Millennium has corresponded with the NYNHP, which indicates that the pipeline would be near seven known locations of bald eagle activity including habitats in the vicinity of Chautauqua Creek, Delaware River, Cannonsville Reservoir, Lebanon Lake, Mongaup River, Neversink River, Hudson River, and Croton River. The FWS has requested that specific location information be kept confidential.

Based on information received from the NYSDEC, the bald eagle activity in the vicinity of the pipeline at the Mongaup/Rio Reservoir location includes nesting, feeding, and overwintering. During field work in the spring of 1999, Millennium observed an active bald eagle nest near the West Branch Delaware River, about 2,500 feet from the pipeline. Activity at the Hudson River location includes feeding and roosting. At the remaining locations, no specific bald eagle activity occurs in the vicinity of the pipeline, but bald eagles are potentially present and any bald eagles found at these locations are most likely to be engaged in feeding, perching, or roosting activity.

Because the locations of bald eagle use areas are known, Millennium did not conduct surveys for the bald eagle. According to correspondence between Millennium and the NYSDEC, field surveys for the bald eagle have not been requested (NYSDEC, 1998b and 1998c). However, the FWS has recommended that Millennium contact the FWS and NYSDEC again in the fall of 2001, to determine if there are additional nests in the project area.

Bog Turtle

The bog turtle was listed as a federally threatened species on November 4, 1997. The primary reason for the listing of this species is its limited distribution due to its restrictive habitat requirements and

destruction of suitable habitat. The main threats to the species are habitat modification and destruction, and over-collecting for the pet trade. The bog turtle is also listed as a state-endangered species in New York.

The bog turtle occurs in two disjunct populations. The northern population originally occupied portions of western Pennsylvania and the Lake Ontario Plain and Finger Lakes region of New York. These areas generally no longer contain known populations of the species. The remaining northern population of the bog turtle occurs in a narrow band that includes western Massachusetts, western Connecticut, southeastern New York, southeastern Pennsylvania, New Jersey, northern Maryland, and northern Delaware. The southern population of the bog turtle inhabits the Appalachian Mountain region from southern Virginia to northern Georgia. Recent trends indicate that bog turtles are declining at many of the remaining locations within the northern population.

The bog turtle is a small, secretive turtle that spends much of its life in hibernation. Bog turtles excavate hibernacula by burrowing into soft mud and they hibernate at depths of 2 to 22 inches (Ernst et al., 1989). Muskrat burrows and meadow vole burrows may also be enlarged and used (Ernst et al., 1989). In New York, the bog turtle generally emerges from hibernation in mid-April, or when both air and water temperatures are generally above 50 degrees. Bog turtles generally feed upon insects, larvae of aquatic insects, snails, nematodes, millipedes, seeds, and carrion. Bog turtles may live 30 or more years.

Mating takes place in spring, either within the hibernaculum or shortly after turtles emerge from hibernation. Female bog turtles generally become sexually mature at 5 to 8 years of age, although females may not mate successfully every year. Eggs are laid within the wetland, but out of the water. In New York, eggs are deposited in early June, and nests are often found on sedge tussocks in strong sunlight. Eggs hatch in 42 to 56 days, and the young may overwinter near the nest. Adults return to the hibernaculum in October.

Bog turtles are rarely found far from wetlands and appear to require fairly specific habitat characteristics. The wetlands generally need a combination of herbaceous vegetation (including sedge tussocks), sparse to moderate shrub growth, a reliable source of water providing permanent saturation and some inundated areas, a mosaic of wetter and dryer areas, and soft mud and/or stony substrate (Chase et al., 1989).

Natural plant succession processes have been cited as having an adverse effect on bog turtles at certain sites. The species apparently requires exposure to fairly strong sunlight. Thus, seasonally or moderately grazed pastures have been identified as favorable habitat for the species since grazing prevents establishment of trees or dense shrubs. In addition, the introduction of exotic plant species into wetlands has been identified as having a possible adverse effect on bog turtles. In portions of New York, purple loosestrife and common reed (*Phragmites australis*) are common within wetlands.

In New York, historical records for bog turtles indicated they occurred in 17 counties, including near proposed project construction in Sullivan, Orange, Rockland, and Westchester Counties. The species is currently known to occur in Orange County, but no bog turtle populations are currently known to occur in Sullivan, Rockland, and Westchester Counties.

As a result of consultations with the FWS in April 1999, Millennium conducted field surveys in May and June 1999 of 18 wetlands within two segments of the right-of-way in Orange County where the FWS believed populations of bog turtles or their habitat may occur. Both segments are within the area where the pipeline would be removed and replaced in the same ditch. The 1999 field surveys indicated that the wetlands fell into three categories: wetlands that were too dry to provide suitable habitat for bog turtles; wetlands that contained streams or were within agricultural drainage ditches, but that were unsuitable for bog turtles due to the absence of appropriate vegetation and cover; and wetlands that were outside of the construction work area. In a subsequent field meeting, held in August 1999 with representatives of

Millennium WS, and NYSDEC, one suitable bog turtle habitat was identified in a portion of one forested wetland.

Northern Wild Monkshood

The northern wild monkshood was listed as a federally threatened species on April 26, 1978. The primary threat to and reason for the listing of this species is its limited distribution due to its highly restrictive habitat requirements (Read and Hale, 1988; Lowe et al., 1990). The northern wild monkshood is also listed as a state-threatened species in New York.

The species is known to occur in Iowa, Wisconsin, Ohio, and New York. In recent years, the number of known sites containing northern wild monkshood has increased substantially, primarily due to discovery of new sites in Wisconsin and Iowa (Kuchenreuther, 1996). The species appears to be relatively secure at this time. In New York, the northern wild monkshood is restricted to several locations in the Catskill Mountains.

The northern wild monkshood is a perennial member of the buttercup family. It is one of six species of monkshood found in North America. Northern wild monkshood grows from a tuberous rootstock, and propagation can occur from seed or from rootstock (Kuchenreuther, 1996). Healthy adult plants produce large numbers of seeds, and the propagation of individuals from rootstock occurs quite readily. Thus, the limited distribution of the species is believed to be due primarily to its very specific habitat requirements.

Northern wild monkshood is apparently a glacial relict species that requires microhabitats that are moister and cooler than adjacent areas (Kuchenreuther, 1996). In Iowa, Wisconsin, and Ohio, the species occurs on shaded talus slopes and cliffs. These locations are kept moist by seepage or melting of subterranean ice formed during winter. In New York, the species occurs at shaded, high altitude seepage springs and in streamside crevices (Dixon and Cook, 1990; Read and Hale, 1988). The common attribute of all these localities appears to be that they are moister than surrounding habitat. These localities are also cooler than surrounding habitat, but Kuchenreuther (1996) suggests that the preference for cooler locations is an artifact of the species' need to be kept moist. The cooler temperatures reduce the rate of evaporation of available moisture. Attempts to propagate or transplant northern wild monkshood have been relatively unsuccessful. If sufficient moisture is not present, viable adult plants are not produced or maintained.

In New York, northern wild monkshood is presently known to occur in four locations in Ulster County. An additional historic site in Chenango County apparently no longer exists. All of the locations in Ulster County are at altitudes in excess of 3,000 feet. Read and Hale (1988) judged that the probability of finding additional populations in New York was not high.

The northern wild monkshood is not known to occur within the project area. All of the known New York sites are at significantly higher elevations than those which occur along the proposed pipeline. In addition, the pipeline in most of Delaware, Sullivan, and Orange Counties would be in the lift and lay segment, where the construction work area consists largely of previously cleared pipeline right-of-way and lacks the shade required to produce and maintain the moist microclimate required by this species. Although the FWS indicated that the species may occur in the vicinity of the project in its original comments on the project, the FWS stated in its comments on the DEIS that the northern wild monkshood does not occur within the construction work area. Therefore, Millennium did not conduct surveys for this species.

4.6.2 Other Special Status Species

In addition to the federally listed endangered and threatened species, 17 other special status species may occur in the project area. These special status species include seven Federal species of concern and ten

state-listed endangered or threatened species. Table 4.6.2 lists the other special status species potentially occurring within the project area.

The Federal species of concern are the Blanding's turtle, Atlantic sturgeon, longhead darter, green floater, swollen wedge mussel, yellow lampmussel, and the bean villosa. The state-listed species are the Allegheny woodrat, timber rattlesnake, least bittern, lake chubsucker, heartleaf plantain, little-leaf tick-trefoil, northern wild comfrey, shrubby St. Johns-wort, tall tick-clover, and Torrey's mountain mint.

The Pennsylvania Natural Diversity Database and Pennsylvania Bureau of Fisheries reported that the cisco (*Coregonus artedii*), a Pennsylvania Extirpated species, is known to occur in the vicinity of the proposed route in Lake Erie. Although the status of the species is currently extirpated, the fishes of Pennsylvania are under review for reclassification. Since new occurrences of this species have been documented, the species has been proposed to be listed as endangered in Pennsylvania. The cisco is a rare pelagic fish of deep lakes and rivers and uses shallow rocky or gravel lake bottoms for spawning. To protect the cisco, potential spawning areas should be avoided. Adverse impacts on this species would be minimal since the Lake Erie shoreline would be directionally drilled.

Blanding's Turtle

Blanding's turtle is a Federal species of concern. It is also listed as a threatened species by New York. The major threats to Blanding's turtle are loss of wetland and pond habitat to development, development of shoreline areas, and loss of suitable nesting habitat. The FWS included the Blanding's turtle in its original list of species that may occur in the vicinity of the project in Orange, Rockland, and Westchester Counties. The NYSDEC indicated that all known locations for Blanding's turtle were well outside of the project area and that field surveys for the species would not be required (NYSDEC, 1998a).

Atlantic Sturgeon

The Atlantic sturgeon is a Federal species of concern and is known to occur in the Hudson River. Distribution and habitat requirements of this species are similar to those described for the shortnose sturgeon in section 4.6.1.

Longhead Darter

The longhead darter is a Federal species of concern. It is also listed as a species of concern by New York. The longhead darter is known to occur in the upper Allegheny River watershed. Within the project area, Great Valley Creek is the only stream where the presence of the species has been confirmed by FWS. The NYNHP did not indicate that the longhead darter was present in the project area.

TABLE 4.6.

Other Special Status Species That Potentially Occur in the Vicinity of the Millennium Pipeline Project

Common Name	Scientific Name	Status a/	Counties Where Species May Occur
Fish			
Atlantic sturgeon	*Acipenser oxyrinchus*	F-SC	Hudson River, Rockland and Westchester Counties
Lake chubsucker	*Erimyzon succetta*	NY-T	Orange County
Longhead darter	*Percina macrocephala*	F-SC, NY-SC	Cattaraugus County
Mollusks			
Green floater	*Lasmigona subviridis*	F-SC, NY-T b/	Chemung, Tioga, and Broome Counties, and Hudson River
Swollen wedge mussel	*Alasmidonta varicosa*	F-SC	Tioga, Broome, and Orange Counties
Yellow lampmussel	*Lampsilis cariosa*	F-SC	Tioga and Broome Counties
Bean villosa or rayed bean	*Villosa fabalis*	F-SC, NY-E b/	Chatauqua and Cattaraugus Counties
Birds			
Least bittern	*Irobrychus exilis)*	NY-	Westchester County
Mammals			
Allegheny woodrat	*Neotoma magister*	NY-E	Orange and Rockland Counties
Reptiles			
Blanding's turtle	*Emydoidea blandingii*	F-SC, NY-T	Orange, Rockland, and Westchester Counties
Timber rattlesnake	*Crotalus horridus*	NY-T	Sullivan, Broome, Delaware, and Orange Counties
Plants			
Heartleaf plantain	*Plantago cordata*	NY-T	Rockland Count
Little-leaf tick-trefoil	*Desmodiom ciliare*	NY-T	Westchester County
Northern wild comfrey	*Cynoglossum virginianum boreale*	NY-T	Steuben and Orange Counties
Shrubby St. Johns-wort	*Hypericum rolificum*	NY-T	Westchester County
Tall tick-clover	*Desmodium glabellum*	NY-T	Westchester County
Torrey's mountain mint	*Pycanthemum torrei*	NY-E	Rockland and Westchester Counties

a/ Status:
F = Federal
NY = New York
E = Endangered
T = Threatened
S(= Species of Concern

b/ Proposed for listing in New York.

The pipeline crossing of Great Valley Creek would be in an area that provides pool habitat with low current speed (about 0.5 feet per second). Substrate consists of silt and rubble with little sand or gravel. Water is generally less than 2 feet deep. Although the presence of silty substrate indicates that this reach of Great Valley Creek may not be optimum habitat, the observed characteristics of the stream in the vicinity of the proposed crossing are probably capable of supporting longhead darters.

Green Floater

The green floater, a mussel, is a Federal species of concern. It is not currently listed by New York although it is proposed for listing on the state threatened species list. The FWS reported that the green floater occurs in the Catatonk River in Tioga County and the Susquehanna River in Broome County (FWS, 1999). Historical records indicate it may also be present in Cayuta Creek, Catatonk Creek, and the Hudson River (Clarke, 1985). The NYNHP did not identify the green floater or its distribution.

The historical records (mid- to late 1950s) for the green floater in Catatonk Creek extend from the vicinity of the pipeline crossing downstream. Historical records for the green floater in the Susquehanna River were not found. The recorded location (late 1950s) for the green floater in Cayuta Creek was well north and upstream of the pipeline crossing. It is not known if more recent surveys for the species have been conducted or if the species still exists in these watersheds. The NYSDEC has recommended surveys for the mussel in Catatonk Creek since the creek would be open cut. The recorded location for the green floater in the Hudson River is well upstream from the pipeline crossing and no surveys were recommended. It is unlikely that the species would occur in the vicinity of the project area at Haverstraw Bay due to the habitat preferences of the species (e.g. streams with low to moderate current and sandy or gravelly substrates [Clarke, 1985]).

Swollen Wedge Mussel

The swollen wedge mussel is a Federal species of concern and is not listed by New York. The swollen wedge mussel has been reported in several waterbodies that would be crossed by the pipeline. These include Catatonk Creek in Tioga County, Chenango River in Broome County, and Neversink River in Orange County.

The reported distribution in Catatonk Creek is north of the pipeline crossing and immediately upstream of the confluence of Catatonk and Owego Creeks, south of the pipeline crossing. The reported location in the Chenango River is about 10 miles upstream of the proposed crossing. These are historical records from the late 1950s (Clarke, 1981), and it not known if more recent surveys for the species have been conducted or if the species still exists in this watershed. The NYNHP, the TNC, and the FWS have indicated that the swollen wedge mussel is in the Neversink River.

Yellow Lampmussel

The yellow lampmussel is a Federal species of concern but is not listed by New York. The FWS indicated that the yellow lampmussel is known to occur up- and downstream of the proposed crossing of Catatonk Creek in Tioga County and the Susquehanna River in Broome County (FWS, 1999). The NYNHP did not identify the yellow lampmussel or its distribution.

Bean Villosa

The bean villosa, or rayed bean, is a Federal species of concern. It is not currently listed by New York although it is proposed for listing on the state endangered species list. The FWS identified the bean villosa as potentially occurring in the Allegheny River and Olean Creek in Cattaraugus County and in

Cassadaga Creek in Chautauqua County near the pipeline crossing (FWS, 1999, 2001a). The NYNHP did not reference the bean villosa or its distribution. The NYSDEC has recommended surveys for this species at the crossing location since Olean Creek is currently proposed for an open cut.

State-Listed Species

The state-endangered Allegheny woodrat is known to occur in the vicinity of the proposed project in Orange and Rockland Counties, and the state-threatened timber rattlesnake is known to occur in Sullivan, Broome, Delaware, and Orange Counties. Millennium, in consultation with the NYSDEC, has identified 14 locations where den sites of the timber rattlesnake are known to occur in proximity to the pipeline (NYSDEC, 1998a, 1998c, 1998e). One den site in Sullivan County would be crossed by the pipeline. Since the den sites are known, the NYSDEC did not ask for additional surveys (NYSDEC, 1998a). The other state-endangered and -threatened species that possibly occur in the vicinity of the proposed project include the least bittern, lake chubsucker, and six plant species (see table 4.6.2-1).

4.7 WETLANDS

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (COE, 1987). Millennium used the 1987 COE Wetlands Delineation Manual to identify and delineate wetlands that would be crossed by the project.

Based on the COE wetland delineation and an evaluation of NWI maps, aerial photography, and NYSDEC-regulated freshwater wetland maps, the pipeline would cross a total of 673 wetlands for a total crossing length of 41.4 miles, or 11 percent of the total length of the pipeline on land (see table I1 in appendix I). No wetlands would be affected by the proposed aboveground facilities. The COE has not completed verification of all of the wetland delineations and would require its third-party inspector complete this review.

The majority of wetlands that would be crossed by the pipeline are freshwater palustrine wetland types, including palustrine forested wetlands (PFO), scrub-shrub wetlands (PSS), and emergent marshes and wet meadows (PEM). Palustrine wetlands systems include all nontidal wetlands that are dominated by trees, shrubs, emergent herbaceous plants, and emergent mosses or lichens (Cowardin et al., 1979). Although Haverstraw Bay and other estuarine environments, such as those associated with the Croton River, that would be crossed by the pipeline may be subject to tidal flows, no vegetated tidal wetlands were identified along the pipeline route. In addition to vegetated wetlands, several palustrine open water habitats (POW) would be crossed by the pipeline. Open water habitats are often found in association with submerged or emergent wetland vegetation.

About 7.2 miles (17.4 percent) of the affected freshwater wetlands are forested wetlands or mixtures of forest and other wetland types that are predominantly forested. The forested wetlands that would be crossed by the pipeline are dominated by tree species including red maple, green ash, eastern cottonwood, yellow birch, and white pine. Shrub species in these forested wetlands include highbush blueberry, northern arrow wood, witch-hazel, American elder, black willow, and red-osier dogwoods. Sensitive fern, giant goldenrod, and spotted touch-me-not are typical herbaceous species.

About 4.1 miles (9.9 percent) of the affected freshwater wetlands are scrub-shrub, and 29.1 miles (70.3 percent) are emergent, or mixtures of these cover types with other wetland types. Common species in the shrub layer of these wetlands include northern arrow wood, highbush blueberry, silky dogwood, witch-hazel, silky willow, hawthorn, and immature trees and saplings. Typical emergent wetland species include

sensitive fern, broad-leaved cattail, wool-grass, sedges, and soft rush. About mile (2.4 percent) of open water habitat would be crossed.

Of the total wetlands that would be crossed, 57 wetland crossings (with a total crossing length of 6.7 miles) would be through NYSDEC-regulated wetlands (see table 4.7-1). The 9/9A Proposal would cross through the buffer zone of five NYSDEC-regulated wetlands:

Wetland H-3 (MPs 396.3 to 396.4 and MPs 396.6 to 396.8). The first crossing would include the southeastern portion of the parking lot for the railroad station at Croton-on-Hudson. The second crossing would be along the abandoned railroad on the north bank of the Croton River.
Wetland O-18 (MPs 400.0 to 400.4). This wetland is west of State Route 9A, while the proposed pipeline and construction work space would be along the east shoulder of the road.
Wetland O-24 (MP 400.5 to MP 400.6). Both the wetland and the construction work area are east of State Route 9A.
Wetland O-16 (MPs 402.3 to 402.5 and MPs 402.8 to MP 403.1). This wetland is east of State Routes 9A/100, while the pipeline and the construction work area would be on the west shoulder of the road.
Wetland O-9 (MPs 402.5 to 402.6). Both the wetland and the construction work area would be west of State Routes 9A/100.

Several wetlands that would be crossed by the proposed pipeline contain the noxious weeds purple loosestrife, phragmites, and Japanese knotweed. Millennium documented purple loosestrife in wetlands in Broome, Orange, Rockland, and Westchester Counties and phragmites in wetlands in Chautauqua, Steuben, Chemung, Tioga, Orange, Rockland, and Westchester Counties. Millennium identified Japanese knotweed in several wetlands, primarily in Cattaraugus and Broome Counties. Purple loosestrife thrives on disturbed, moist soils, often invading after some type of construction activity. Purple loosestrife forms dense brushlike stands, out competes native plants, and has little or no value to wildlife. A mature plant can produce as many as 2.5 million seeds annually. Seeds may be transported along waterways or in mud picked-up by tires or footwear. The plant is also able to resprout from roots and broken stems that fall to the ground or into the water. A few individual plants can build up an extensive seed bank capable of survival in the soil several years before germinating.

Phragmites, or common reed, is a tall perennial wetland plant that thrives within a range of habitat conditions including sunny wetland habitats and elevated areas of brackish and freshwater marshes. It also thrives on disturbed or polluted soils located along roadsides, ditches, and dredged areas. Phragmites spreads to uninhabited areas by sprouting from rhizome fragments or from seeds. New stems grow upright from the rhizome in the spring and spread horizontally in all directions during the growing season. After the growing season, the leaves die and fall off leaving only a dead brown vertical shoot. The accumulation of dead leaves and stems and the extensive rhizome system inhibit the growth of native plant species.

Japanese knotweed is a herbaceous perennial plant that can grow up to 10 feet in height. It thrives in various moist open habitats along riverbanks, wetlands, roadways, and on hillsides and disturbed areas. Japanese knotweed has a deep root system and emerges from rhizomes in the early spring and undergoes rapid growth to form a dense, homogenous stand. The rhizomes are able to regenerate from small fragments that are generally transported to new areas by water or by movement of soils. The deep root system and dense, homogenous stands allow Japanese knotweed to out compete native plant species.

TABLE 4.7-1

NYSDEC-Regulated Wetlands Crossed

County	Approximate Milepost	NWI Classification a/	NYSDEC-Regulated Wetland Number	Crossing Length (ft)
Chautauqua	45.1	PSS	SH-10	414
	47.1	PEM/PSS	WF-2	601
	47.9	PSS/PEM	HF-5	792
	49.3	PSS/PEM	HF-4	484
	49.4	PSS/PEM	HF-4	484
	56.9	PFO/PEM	EC-5	178
	59.8	PFO/PEM	EC-18,EC-2	4,676
	60.8	PFO/PEM	EC-2	606
	60.9	PFO/PEM	EC-2	1,158
Cattaraugus	72.4	PEM	KE-5	598
	72.6	PEM/PFO	KE-5	1,686
	72.9	PEM	KE-5	257
	73.0	PEM	KE-5	632
	73.2	PEM/PSS	KE-5	4,477
	78.5	PFO/PEM	RA-7	205
	81.4	PEM	RA-4	522
	81.6	PFO/PEM	RA-4	463
	114.9	PEM	PV-12	163
	115.0	PEM	PV-12	144
	115.0	PEM	PV-12	450
Steuben	173.6	PEM/PSS/POW	RB-8	281
	176.7	PSS/PEM	CB-4	157
Chemung	198.5	PEM/PSS	HH-2	60
	198.5	PSS/PEM	HH-2	450
	206.5	PEM/PSS	ER-1	292
Broome	240.7	PSS/PEM	ME-4	370
	249.8	PFO/PEM	CC-12	505
	249.9	PFO	CC-12	465
Delaware	292.1	POW/PEM	FE-14	505
Sullivan	304.3	PEM	CA-13	59
	304.4	PFO	CA-13	182
	317.9	POW/PEM	LH-55	260
	318.9	PEM/PFO	EL-2	250
	319.0	PEM/PFO	EL-2	170
	320.7	PEM/PFO	EL-21	1,091
	321.4	PSS/PEM	EL-22	239
	321.5	PEM/PSS	EL-22	264
	322.0	PEM/PFO	EL-34	125
	322.2	PEM/PFO	EL-34	212
	322.3	PEM	EL-34	588
	323.8	PEM/PSS/PFO	HL-28	376
	326.0	PEM	HL-43	343
Orange	334.5	PEM	PN-9	629
	335.1	PEM/PSS/PFO	PN-14	663
	337.1	PEM/PSS	PN-23	281
	337.5	PEM/PFO	PN-26	,145
	343.4	PEM/PSS/PFO	UN-1	476
	344.3	PEM/POW	OT-33	752
	349.6	PFO	UN-18	85
	353.1	PSS/PEM	PI-13	135
	354.2	PEM	PI-15	246
	355.5	PEM	PI-21	346

TABLE 4.7-1 (cont'd)

County	Approximate Milepost	NWI Classification a/	NYSDEC-Regulated Wetland Number	Crossing Length (ft)
Orange (cont'd)	362.0	PEM	WR-27	417
	362.1	PEM	WR-27	202
	362.4	PEM	WR-27	403
	362.6	PEM/PSS	WR-27	1,041
	367.4	POW	SL-3	2,057
TOTAL			**57 wetland crossings**	**35,112 (6.7 miles)**

a/ Classification: P = Palustrine
EM = Emergent
FO = Forested
SS = Scrub-shrub
OW = Open water

4.8 LAND USE, RECREATION, AND PUBLIC INTEREST AREAS

4.8.1 Land Use

The Millennium Pipeline Project would include 32.9 miles of pipeline in Lake Erie and 383.8 miles of pipeline in 12 counties in New York for a total of 416.7 miles of pipeline construction. Table 4.8.1-1 tabulates the miles of land and open water, shown by current use, that would be crossed.

Of the land segment, the predominant land use is open land (about 154.9 miles, or 40 percent of the land crossed), including pasture, open fields, and herbaceous wetlands. Other land uses that would be crossed include forest (135.5 miles, 35 percent), agriculture (59.4 miles, 15 percent), industrial/commercial land (17.6 miles, 5 percent), open water (3.8 miles, 1 percent), and residential land (5.6 miles, 1 percent). The remaining 7.0 miles of pipeline would cross land classified by Millennium as "other," which includes roads in which the pipeline would be placed in Westchester County. Some of these roads are in residential areas.

Forest land that would be crossed includes undeveloped private parcels, commercial forest stands used for timber production, and areas managed by the NYSDEC for reforestation. Millennium identified:

- nine parcels of private land used for hardwood timber production totaling about 1.5 miles (MPs 51.9 and 55.2 in Chautauqua County; MPs 79.8, 89.5, 102.9, and 107.6 in Cattaraugus County; MP 119.6 in Allegany County; and MPs 155.5 and 185.7 in Steuben County);

- three parcels of pine plantations totaling 0.3 mile (MP 106.6 in Cattaraugus County; and MPs 252.5 and 252.6 in Broome County); and

- nine parcels of state reforestation land totaling about 4.9 miles (MPs 62.9 to 66.7 in Chautauqua County; MPs 91.4 to 91.9 in Cattaraugus County; and MPs 152.3 to 156.1 and MPs 183.5 to 184.6 in Steuben County). See table 4.8.3-1.

Millennium also identified one location where the pipeline would cross a Christmas tree farm for about 0.2 mile in Broome County (MP 248.0), and two areas of sugar bush (sugar maple tree) stands in Cattaraugus County (MPs 98.0 to 99.0) and Chemung County (MPs 213.6 to 214.0).

Agricultural lands that would be crossed by the pipeline are primarily used for the production of corn and hay. Special agricultural lands that would be crossed include:

- about 0.2 mile of orchard (MP 46.5) adjacent to the Niagara Mohawk and Tennessee rights-of-way in Chautauqua County;

- about 0.6 mile of a wetland plant nursery (MP 48.5) adjacent to the Columbia right-of-way in Chautauqua County; and

- about 2.1 miles of organic muckland sod and vegetable crop farms (between MPs 350.0 and 354.0) in Orange County (see section 4.2.1).

No vineyards would be crossed by the pipeline. The NYSDA&M has commented that as much as 20 percent of the land classified as open land may be improved land used for agricultural purposes.

TABLE 4.8.1-

Land Use Crossed by the Millennium Pipeline

State/County	Forest a/ (mi)	(%)	Agriculture b/ (mi)	(%)	Open c/ (mi)	(%)	Industrial/ Commercial d/ (mi)	(%)	Residential e/ (mi)	(%)	Water f/ (mi)	(%)	Other g/ (mi)	(%)	Total (mi)
Pennsylvania/New York															
Lake Erie	0.0	0%	0.0	0%	0.0	0%	0.0	0%	0.0	0%	32.9	100%	0.0	0%	32.9
New York															
Chautauqua	15.8	41%	9.7	25%	13.1	33%	0.1	0%	0.3	1%	0.1	0%	0.0	0%	39.1
Cattaraugus	24.3	54%	9.1	20%	10.5	23%	0.7	2%	0.2	2%	0.1	0%	0.0	0%	44.9
Allegany	16.2	52%	5.4	17%	8.6	28%	0.3	1%	0.4	1%	0.0	0%	0.0	0%	30.9
Steuben	20.5	47%	13.6	31%	8.5	20%	0.2	1%	0.3	1%	0.1	0%	0.0	0%	43.2
Chemung	13.8	55%	4.1	16%	7.2	28%	0.0	0%	0.0	0%	0.1	0%	0.0	0%	25.2
Tioga	10.7	49%	3.8	17%	7.1	32%	0.1	0%	0.3	1%	0.1	0%	0.0	0%	22.1
Broome	17.6	47%	4.9	13%	13.5	36%	0.4	1%	0.7	2%	0.4	1%	0.0	0%	37.5
Delaware	7.1	31%	0.8	4%	14.4	63%	0.0	0%	0.1	0%	0.2	1%	0.0	0%	22.6
Sullivan	1.2	4%	2.7	8%	29.7	85%	0.6	2%	0.4	1%	0.3	1%	0.1	0%	35.0
Orange	3.2	8%	5.3	13%	28.1	70%	1.2	3%	1.4	4%	0.3	1%	0.6	1%	40.1
Rockland	2.3	23%	0.0	0%	5.9	56%	0.5	4%	0.3	3%	1.3	12%	0.2	2%	10.5
Westchester	2.8	9%	0.0	0%	8.3	25%	13.5	41%	1.2	4%	0.8	2%	6.1	19%	32.7
Land Subtotal:	135.5	35%	59.4	15%	154.9	40%	17.6	5%	5.6	1%	3.8	1%	7.0	2%	383.8
TOTAL:	**135.5**	**33%**	**59.4**	**14%**	**154.9**	**37%**	**17.6**	**4%**	**5.6**	**1%**	**36.7**	**9%**	**7.0**	**2%**	**416.7**

a/ Includes upland forest and forested wetlands.
b/ Includes active cropland, vegetable fields, and hayfields.
c/ Includes open land, pasture, and scrub-shrub and emergent wetlands.
d/ Includes all other land, including roads, railroads, and commercial and industrial land.
e/ Includes existing residential lawns and driveways.
f/ Includes water crossings over 100 feet, including Lake Erie (32.9 miles) and the Hudson River (2.2 miles).
g/ Includes roads in which the pipeline would be placed.

About 335.0 miles of the pipeline on land (87 percent) would be constructed adjacent to or within existing rights-of-way. The remaining 49.4 miles of pipeline on land and the 32.9 miles of pipeline in Lake Erie would be constructed on new right-of-way.

The 9/9A Proposal would be installed within U.S. Route 9 for 2.1 miles, State Route 9A for 4.3 miles, and bicycle paths for 9.6 miles between MPs 391.2 and 416.6. Between MPs 402.7 and 405.4, the pipeline would be installed within the bicycle path that parallels the ConEd powerline. Throughout this 2.7-mile-long segment, the bicycle path is between 0 and 500 feet from the edge of the ConEd powerline right-of-way.

The southbound lanes of U.S. Route 9 and State Route 9A are a designated evacuation route for the Indian Point Nuclear Power Plant that is about 2.3 miles northwest of MP 391.2. Between MPs 401.6 and 404.0, about 2.4 miles of the 9/9A Proposal would be adjacent to the southbound lane of State Routes 9A and 100.

The 9/9A Proposal would involve a 6.2-mile-long crossing of the coastal zone as identified by the New York Division of Coastal Programs and Waterfront Revitalization (MP 391.2 to 397.4). The crossing would include that segment along the Hudson River from the start of the 9/9A Proposal to about 1 mile south of the Croton River crossing.

A total of 3.6 acres would be required for the construction of the aboveground meter stations, including the metering and regulation facilities (0.5 acre for the Wagoner Station, 1.5 acres for the Ramapo Station, and 0.9 acres for the Mount Vernon Station Facility) and the Union Center Regulator Station (0.7 acre). The Wagoner Station would be constructed in an isolated forested area adjacent to Columbia's Milford Compressor Station. The Ramapo Station would be constructed in a rural residential area on the site of the existing facility, which would be modified to interconnect with the new 36-inch-diameter pipeline (see table 2.1-1). The Mount Vernon Station would occupy an urban site within an existing parking lot. The Union Center Regulator Station would be constructed within and adjacent to the permanent right-of-way in a mostly open area.

4.8.2 Existing and Planned Residential and Commercial Development

Millennium estimates that a total of 221 residences would be within 50 feet of the construction work area (e.g., construction right-of-way and extra work area) (see table 4.8.2-1). Millennium has identified only one residence, in Chautauqua County, that would be less than 25 feet from the construction work area. Four residences were identified within 50 feet of the construction work area for the 9/9A Proposal between MPs 399.8 and 400.8.

Between MPs 417.3 and 421.8, the pipeline would cross through the congested urban areas of the Cities of Yonkers and Mount Vernon in Westchester County. There are an estimated 81 buildings, including single family homes, apartment buildings, and commercial buildings, in this segment. For the majority of this crossing, Millennium proposes to install the pipeline within the city streets. Beginning at about MP 417.2, the pipeline would turn east from the ConEd powerline to parallel the Sprain Brook Parkway to the Central Park Avenue exit and the beginning of Palmer Road. Tuckahoe Road and the Catskill Aqueduct would be crossed by this segment. For about 0.5 mile, the pipeline would be installed in Palmer Road between Central Park Avenue and the Palmer Road crossing of the Sprain Brook Parkway. This is a residential neighborhood consisting primarily of larger single family homes. The pipeline would then follow the Sprain Brook Parkway across Kimball Avenue to Dewitt Avenue and the intersection of Dewitt and Desmond Avenues. The pipeline would be installed in Desmond Avenue to the intersection with Midland Avenue, and then in Midland Avenue to the Cross County Parkway. This segment is a mix of single family homes and apartment buildings.

The pipeline would cross under the Cross County Parkway and continue in Bronx River Road for about 0.3 mile before turning east to the Bronx River Parkway. This segment includes a small service/retail area, a high density residential neighborhood, and the Bronx River Park and Scotti Field. After crossing under the Bronx River Parkway, the pipeline would be installed adjacent to the east side of the parkway for about 0.4 mile before turning east, to cross the Bronx River, the Conrail railroad tracks, and a commercial trucking parking area, to MacQuesten Parkway in Mount Vernon. The pipeline route would turn southeast following MacQuesten Parkway to Oak Street then it would turn southwest following Oak Street past the Hamilton Elementary School to Lincoln Avenue. It would turn south on Lincoln Avenue, then east on Valentine Street for about 2½ blocks where it would turn south passing through 2 parking lots before crossing the railroad tracks and continuing southeastward along South 7th Avenue to West 4th Street where the pipeline would turn to the southwest at West 4th Street. It would continue along West 4th Street to the terminus near the intersection with South 8th Avenue passing near the Greater Centennial African Methodist Episcopal Zion Church and the Mount Vernon Neighborhood Health Center.

In Mount Vernon, most of the pipeline would be within roads. The Mount Vernon Station would be located within the parking lot near the intersection of South 8th Avenue and West 4th Street. Much of the land use along the route in Mount Vernon is residential, some of which is in high rise apartments. In Mount Vernon, much of the existing utility infrastructure is located under the streets.

To date, Millennium has identified a total of 231 septic systems located on properties that would be crossed by the construction work area for the pipeline (see table 4.8.2-2).

Millennium identified three planned residential developments that would be crossed by the pipeline

a planned 5-lot residential subdivision between MPs 90.3 and 90.9 in Little Valley (Cattaraugus County);
a residential community planned by the Sterling Forest Corporation between MPs 364.9 and 368.0 in Warwick and Tuxedo (Orange County); and
a proposed 794-unit subdivision, Avalon Green, between MPs 410.1 and 410.4 in Greenburgh (Westchester County).

A planned golf course development would also be crossed between MPs 142.4 and 142.5 in Andover (Allegany County). None of these developments are currently under construction.

No planned residential or commercial developments were identified along the 9/9A Proposal, although some owners are considering expansion within commercial properties (see section 5.8.2). Since the 9/9A Proposal would closely parallel highways and bicycle paths for much of its length, and these properties are public property, it is unlikely that additional commercial or industrial development would occur in these areas. In other areas where survey permission was obtained, and based on discussions with the landowners, the pipeline alignment was placed to avoid conflict with potential future development of the property. Many of these alignments are near property lines, along the edge of parking lots, or down existing access roads through the property.

While the pipeline would not cross any planned commercial or industrial developments, it would affect about 17.6 miles of existing commercial/industrial areas. Millennium has stated that no business, commercial, or retail structures would be displaced by the project. About 41 percent of the industrial/commercial land that would be crossed is in Westchester County, including the 9/9A Proposal which would involve construction within 50 feet of 33 businesses (see table 4.8.2-3 for the location of the businesses).

TABLE 4.8.2-1

Residences Within 50 feet of the Construction Work Area

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Chautauqua	34.8 (2)	Cattaraugus	90.0 (2)	Allegany	122.8	Steuben	158.4
	36.9		95.0		124.0		176.1
	46.6		100.1		124.2		185.4
	62.4		108.4		129.8		185.5
	67.6		111.4		136.4		186.0
	68.0		111.5		146.3		187.5
	69.8						189.9
							190.6
Subtotal							
Chemung	195.2	Tioga	220.7	Broome	239.1	Delaware	276.1
	204.1		221.5		249.6 (2)		284.5
	204.2		226.7		251.0		284.8
			228.3		254.7		295.4 (2)
			230.5		255.7		
			230.6		256.8		
					257.9		
					258.0		
					258.2		
					259.2		
					259.4		
					260.1		
					260.2		
					264.3		
					264.5		
					269.4		
					273.7		
Subtotal	**3**		**6**		**18**		

TABLE 4.8.2-1 (cont'd)

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Sullivan	303.7	Orange	333.6		383.6 (2)	Westchester	399.8
	309.9		339.5		383.7		399.9
	310.4		339.9		384.1		400.8 (2)
	312.7		340.0 (4)		384.2		419.2-421.8
	312.8 (2)		340.1		385.9 (2)		(81)
	313.2		340.3 (2)		386.1		
	314.2		340.4		386.3		
	315.0		340.6		386.4 (6)		
	316.4		343.2				
	322.5		343.6 (2)				
			345.1				
			345.6				
			347.9				
			348.4				
			354.0				
			355.8				
			356.0				
			356.1				
			356.2				
			356.3				
			356.7				
			357.1 (2)				
			358.6 (2)				
			360.3 (5)				
			360.4				
			361.0				
			364.0				
			364.1				
			364.2				
			364.3				
			364.6 (3)				
			364.7				
			368.1 (3)				
			368.2				
Subtotal	**11**		**49**		**15**		**85**

GRAND TOTAL: 221 residences

NOTE: Numbers in parentheses ( ) indicate number of residences at that location.

TABLE 4.8.2-2

Septic Systems Located on Properties Crossed by the Construction Work Area

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Chautauqua	36.9	Cattaraugus	76.5	Allegany	123.5	Steuben	152.3
	41.0		90.0		123.9		[illegible]
	42.4		100.0		124.0		[illegible]
	43.6		111.2		124.3		157.4 (2)
	49.6		115.4		126.8		158.1
	61.4				127.9 (2)		178.3 (4)
	63.3				129.6		181.9
	66.1				129.8		181.3
	67.6				135.1		185.4
	68.0				136.4		185.5
					137.6		185.0 (2)
					138.8		186.4
					140.7		186.5 (2)
					140.8		186.0 (2)
					141.0		190.1
					143.0		
					147.2		
Subtotal:	10		5		18		22
Chemung	192.9	Tioga	226.7	Broome	243.9 (2)	Delaware	276.1
	193.8		230.3		244.3 (2)		277.0 (2)
	194.9		230.4		244.6 (3)		277.8
	195.2		231.2 (2)		250.9 (6)		284.4 (2)
	199.7		237.8 (2)		251.0 (2)		284.8
	200.5				253.1 (2)		285.6
	203.9				253.7 (2)		286.0
	204.3 (2)				254.7		287.5
	204.4 (3)				255.7		295.4
	207.6				255.9 (2)		296.1
	211.0				256.0 (2)		
	212.3				256.2		
	214.1 (2)				257.8 (2)		
					257.9 (4)		
					258.1		
					[illegible] (3)		
					[illegible] (5)		
					258.[illegible] (4)		
					[illegible] (7)		
					[illegible]		
					259.[illegible] (3)		
					260.[illegible] (2)		
					269.[illegible]		
Subtotal	17		7		60		12

TABLE 4.8.2-2 (cont'd)

County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost	County	Approximate Milepost
Sullivan	301.1	Orange	339.9	Rockland	373.4	Westchester	None
	302.6		340.0		383.7		
	303.8		340.3 (2)		383.8		
	305.2		340.5 (3)		384.1		
	307.5		341.5 (2)		384.7		
	309.9		343.1		384.8		
	310.4 (2)		343.4		384.9 (2)		
	311.7 (2)		343.5				
	312.7 (2)		343.6				
	314.3 (2)		344.1				
	315.3		344.8				
	316.6		345.6				
	318.8		347.9				
			348.3				
			348.4				
			355.9				
			356.0 (2)				
			356.1 (2)				
			356.3 (2)				
			356.7 (3)				
			357.1 (2)				
			358.0				
			358.1				
			358.6				
			358.7				
			358.8				
			359.7				
			360.3 (3)				
			363.9				
			364.0 (2)				
			364.2 (2)				
			364.3 (4)				
			364.4				
			364.6 (3)				
			368.0				
			369.3				
Subtotal	**17**		**55**		**8**		**0**

GRAND TOTAL: 231 septic systems

NOTE: Numbers in parentheses ( ) indicate number of septic systems at that location.

TABLE 4.8.2-3

Businesses within 50 feet of the Construction Work Area of the 9/9A Proposal

Name	Approximate MPs	Distance from Construction Work Area (ft)	Distance from Pipeline Centerline (ft)
Conrail	394.8	27	46
Max Finkelstein, Inc.	395.5	37	50
Metro Enviro, Inc.	395.7	33	48
Village of Croton-on-Hudson	396.2	31	56
Shop-Rite	396.4	25	47
Coca Cola	407.8	7	167
Perbar Associates (2 buildings)	408.8	27, 49	68, 63
Rini's Restaurant; Current Solutions, Inc.	409.0	33	51
999 Software.com; Herrs Snack Foods; Hardwood Flooring, Inc.; Brennan Restaurant Builder & Eq; Colortone; A.R.M. Roofing Co.	409.1	25-44	36-66
Custom Architectural Products; Launder Centers; Digital Ink Ltd.; S&L Land Development; J&B Auto Body; AT&T Wireless	409.2	29-42	45-68
Wonder Bread Bakery Outlet	409.3	47	75
Ardsley Bus Corp.; Giampiccolo Auto Body	412.4	41, 31	63, 56
The Selecto Corp.	412.6	27	30
Ardsley Acres Motel	412.7	48	52
Akzo Nobel (2 buildings)	413.2, 413.3	48, 39	51, 75
Alvin Last, Inc.	413.5	30	47
Purdue	413.9	27	83
Lockheed Martin (2 buldings)	416.4, 416.5	49, 27	66, 42

4.8.3 Recreation and Public Interest Areas

The Millennium Pipeline Project would cross various recreational and public interest areas including designated scenic river segments, hiking trails, state reforestation areas, private recreation club land, and various state, county, and city/town land. Table 4.8.3-1 identifies each area that would be crossed and the current use of that area.

Designated Scenic and Recreational Waterbodies

The pipeline would be in Lake Erie between MPs 0.0 and 32.9 and would cross the Hudson River and Haverstraw Bay between MPs 387.9 and 390.1. Both Lake Erie and Hudson River/Haverstraw Bay support recreational and commercial fisheries, and provide opportunities for boating and other water-based recreational activities (see section 4.4.1 for additional discussion of fisheries in Lake Erie and the Hudson River).

The pipeline would cross three river segments listed on the NRI (Chautauqua Creek [MP 43.0], the Cohocton River [MP 181.4], and the Wallkill River [MP 350.7]) and three river segments designated as study rivers by the NYSDEC for potential inclusion in the New York State Wild, Scenic and Recreational Rivers System (Genesee River [MP 137.3], the West Branch Delaware River [MP 276.0], and the East Branch Delaware River [MP 287.0]). The NRI is maintained by the National Park Service (NPS) and identifies rivers, segments of rivers, and sometimes their tributaries, that have met the criteria of the National Wild and Scenic River Act. The listing includes designated rivers and those proposed for further study, also referred to as proposed candidate rivers. Although river eligibility requirements vary somewhat between the nationwide and state inventories, individual rivers may be included in either the nationwide or state inventory, or both.

The Upper Delaware Scenic and Recreational River is a 73.4-mile-long segment of the river designated by Congress in 1978 as part of the National Wild and Scenic Rivers System. It was established to protect the outstanding scenic, recreational, geologic, fish, wildlife, historic, and cultural resources of this section of the Delaware River, and to protect its water quality and provide for its enjoyment by present and future generations. A landward boundary was established to satisfy the resource protection requirements set for in the Wild and Scenic River Act and in Special Statutory Provisions for the Upper Delaware. The corridor area to be conserved consists of 55,474.5 acres of which the NPS presently owns about 30 acres. Annual visitation to the Upper Delaware Scenic and Recreational River is about 300,000 people. The mainstem and West and East Branches of the Delaware River support a well-developed fishery-based tourist economy.

State and Local Parklands

State and local open space areas that would be crossed by the pipeline would include the Catherine Valley Trail and Soaring Eagles/Mark Twain State Park and Golf Course (MPs 198.5 to 199.2), the Village of Port Dickinson Community Park (MPs 250.0 to 250.2), the Sterling Forest State Park (MPs 364.9 to 366.1), and the Sterling Forest Ski Area (MPs 366.1 to 367.3). In addition, the pipeline would cross the Palisades Interstate Park, which includes a chain of parks extending for 38 miles along the western shore of the Hudson River in New York and New Jersey. Separate individual units within the Palisades Interstate Park system that would be crossed include the Sterling Forest State Park, Harriman State Park (MPs 369.9 to 375.7), and High Tor State Park (MPs 385.0 to 385.3). The pipeline would also cross Kakiat Park, a 353-acre Rockland County park (MPs 375.7 to 376.6).

In Westchester County, the pipeline would cross five parks (Senasqua Town Park, Van Cortlandt Manor, Old Croton Aqueduct State Historic Park, West Rumbrook Park, and Sprain Ridge Park). Senasqua Town Park is a small park on the east bank of the Hudson River in Croton-on-Hudson and would be crossed within the road. Van Cortlandt Manor, a National Historic Landmark that is managed by the Historic Hudson Valley Group, would be crossed on the abandoned U.S. Route 9 right-of-way. The Old Croton Aqueduct State Historic Park would be crossed along State Route 9A, and the West Rumbrook Park would be crossed along the abandoned railroad right-of-way. Nearly all the Sprain Ridge County Park crossing would be within paved and dirt roads. In addition, the City of Yonkers' Comprehensive Plan includes plans to construct a small parking lot at the Grassy Sprain Reservoir dam (approximate MP 416.8) to allow boat access to the reservoir.

Recreational Trails

Numerous recreational trails would be crossed by the pipeline including the New York State Southern Tier Bike Tour route and Bike Centennial route at MPs 78.3 (Axeville Road), 81.7 (Pigeon Valley Road), and 84.5 (State Route 242); the Finger Lakes Trail at MPs 86.8, 87.0, and 91.9; the Catharine Valley Trail at MP 198.5; and the AT at MP 363.6. Other trails that would be crossed include those within the Harriman State Park and various public properties that are part of the North County, South County, and Briarcliff-Peekskill Trailways bicycle paths (see table 4.8.3-1).

Golf Courses

The Scenic Farms Golf Course (MP 352.3) would be crossed in Orange County on new right-of-way. No fairways or tees associated with the Soaring Eagles/Mark Twain State Park and Golf Course (MP 198.5) would be crossed.

TABLE 4.8.3-1

Recreation and Public Interest Areas Crossed

County	Approximate Milepost	Area Name	Use of Area
Chautauqua	0.0 - 32.9	Lake Erie	Recreational water body. Activities include boating, fishing, and other water based recreational activities.
	42.9	Village of Westfield Chautauqua Gorge and Chautauqua Creek	Chautauqua Creek is listed on the NRI for its scenic qualities and diversity of views which are related to stream channel variation, topographic variation, and the variety of land uses and vegetative cover. The designated reach begins upstream of the proposed crossing at the State Route 20 bridge in Westfield and extends 11 miles downstream to Putnam Road. The NRI describes this segment as flowing through a deeply incised gorge, known as The Gulf. Adjacent banks are owned by the Village of Westfield.
	62.9 - 66.7	State of New York Reforestation Land	Four parcels. NYSDEC-managed lands purchased to bring idle and abandoned farmlands back into timber production. Open to public for recreation use.
Cattaraugus	78.3	Southern Tier Bike Route/Axelville Road	Bicycle route following existing roadways.
	81.7	Southern Tier Bike Route/Pidgeon Valley Road	Bicycle route following existing roadways.
	82.6	Little Valley Rod & Gun Club	Private recreation facility.
	84.5	Southern Tier Bike Route/Little Valley Road	Bicycle route following existing roadways.
	84.5 - 84.6	Buck N Bass Rod and Gun Club	Private recreation facility.
	86.2 - 86.3	State of New York	Miscellaneous use, undeveloped.
	86.8	Finger Lakes Trail/North Country National Scenic Trail	The main Finger Lakes Trail is 552 miles long and connects the Catskill Mountains with the Allegany Mountains by passing through areas of the Southern Tier of New York. Many sections of the Finger Lakes Trail are official segments of the North Country National Scenic Trail (Finger Lakes, 1998).
	87.0	Finger Lakes Trail/North Country National Scenic Trail	See above at MP 86.8
	87.5 - 87.6	State of New York	Miscellaneous use, undeveloped.
	91.4 - 91.9	State of New York Reforestation Land	See above at MP 62.9.
	91.9	Finger Lakes Trail/North Country National Scenic Trail	See above at MP 86.8
	100.0 - 100.2	Alpine Sportsman Club	Private recreation club.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Cattaraugus (cont'd)	101.8 - 102.9	Twin Rock Gun Club	Private recreation club.
Allegany	121.8 - 122.0	East Lovejoy Sportsmans Club	Private recreation club.
	136.4 - 136.9	Educational Foundation of Alfred, Inc.	Private recreational facility.
	137.3	Genesee River	NYSDEC-designated study river that is proposed for addition to the New York State Wild, Scenic, and Recreational Rivers System. The study segment extends from the Pennsylvania state border north to Letchworth State Park and includes the proposed crossing.
	146.7 - 146.8	Andover Rod & Gun Association	Private recreational facility.
Steuben	152.3 - 156.1	State of New York Reforestation Land	Three parcels. See above at MP 62.9.
	167.7 - 168.1	Tracy Creek Club, Inc.	Private recreation club.
	173.5 - 174.1	Purple Island Wildlife Refuge	Private recreational facility. Tours provided to the public.
	181.4	Cohocton River	Listed on the NRI for its recreational boating opportunity including both flatwater and seasonal Class I areas, unique geologic features, and fishery resources including self-sustaining populations of brook and brown trout. The proposed crossing would be within the designated reach of river.
	183.5 -184.6	State of New York Reforestation Land	See above at MP 62.9.
	186.3 - 186.4	Corning Fish & Game Club	Private recreation club.
	187.6	Town of Corning	Public open space.
	188.3	Steuben County	Public open space.
Chemung	198.5	Catherine Valley Trail/Chemung Canal (undeveloped)	This trail, a converted railroad bed and canal towpath, connects the Soaring Eagles/Mark Twain State Park Golf Course with Watkins Glen State Park. Trail is owned by the NYSOPRHP.
	198.5 - 199.2	Soaring Eagles/Mark Twain State Park and Golf Course	State park containing a public 18-hole golf course with clubhouse, driving range, and restaurant. The park is open from April to November, with bow hunting during hunting season. Golf course area would not be crossed. Crossing would be in an area with several multi-use trails.
	201.7 - 201.8	Chemung County	Public open space.

TABLE 4.8.3-1 (cont'd)

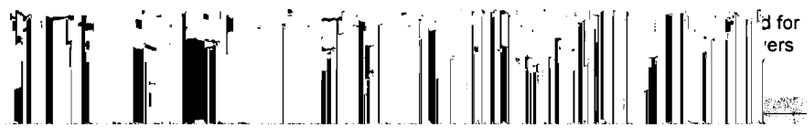
County	Approximate Milepost	Area Name	Use of Area
Chemung (cont'd)	206. 206.5	Chemung County Rod and Gun Club	Private recreation club.
Tioga	224.2 - 224.4	Tioga County	Public open space.
Broome	250.0	The Conservation Fund	Open space.
	250.0 - 250.2	Village of Port Dickinson Park	Public open space providing passive and active recreation facilities including picnicing, trails, ball fields, and a tennis court. Village also maintains a pavillion with public bathrooms.
	250.5	Village of Port Dickinson	Undeveloped property along Phelps Creek.
Delaware	275.8	Delaware County Soil and Water Conservation District	Public conservation land.
	276.0	West Branch Delaware River	
	285.9	Town of Hancock	
	287.0	East Branch Delaware River	The East Branch Delaware River upstream to the Downsville Dam has been designated for study as a potential addition to the New York State Wild, Scenic and Recreational Rivers System. Also, part of the Upper Delaware Scenic and National River System.
	287.9 - 288.1	F Troop Ltd.	Undeveloped open space.
	288.1	Melrose Sportsmen Inc.	Private recreation club.
	288.1 - 288.2	F Troop Ltd.	Undeveloped open space.
	290.2 - 290.9	Gee Brook Club LLC	Leased hunting lands.
	290.9 - 291.5	Somerset Club	Private recreation club.
	291.5 - 292.6	Tomar Mountain Gun Club, Inc.	Three parcels. Private recreation club.
	294.2 - 294.8	Falcon Gun and Rod Club, Inc.	Private recreation club.
	297.1 - 297.5	Gun and Rod Holding Corporation	Private recreation club.
Sullivar	310.8 - 311.7	Stony Brook Hunting Club, In	Two parcels. Private recreation club.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Sullivan (cont'd)	317.3 - 320.2	Ten Mile River Reservation (Boy Scouts of America)	Two parcels. Managed by the Greater New York Council of the Boy Scouts of America. This reservation in the Catskill Mountains encompasses nearly 14,000 acres along the Delaware River. Facilities are available for both weekend and week-long use, with activities including camping, hiking, canoeing, rafting, fishing, and skiing.
	320.7 - 322.9	Excelsior Sportsman Club	Two parcels. Private recreation club.
	323.8 - 330.2	Mongaup WMA	Four parcels. Conservation land managed by the NYSDEC for protection of raptor nesting and winter concentration areas along the Mongaup River.
	331.0 - 331.4	The Forestburg Scout Reservation	Managed by the Monmouth Council of the Boy Scouts of America. This reservation encompasses 1,200 acres and includes the 55-acre Burnt Hope Lake.
Sullivan/Orange	331.9 - 333.6	Hartwood Club, Inc.	Two parcels. Private recreation club.
Orange	333.6 - 333.8	Little Acres Hunting Club	Private recreation club.
	335.3 - 336.9	Cahoonzie Club, Inc.	Private recreation club.
	340.3	County of Orange	Undeveloped public land.
	345.2 - 345.4	Town of Greenville	Undeveloped parcel.
	349.8 - 349.9	State of New York, Mental Retardation	Public health facility.
	350.7	Wallkill River	Listed on the NRI for its hydrologic characteristics (one of the last remaining sparsely developed representative free-flowing rivers in the section) and botanic values (over one-third of the segment is dominated by wetlands, the extent of which is uncommon to the section). This 14-mile-long segment extends from Merritts Island New York area to Hamburg, New Jersey.
	352.3	Scenic Farms Golf Course	Public golf course.
	358.1 - 358.5	Breakaway Trails, Inc.	Private recreation club. Undeveloped parcel.
	360.4 - 360.8	Town of Warwick	Public open space.
	360.8	Warwick Sports Center, Inc.	Private recreation club.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Orange (cont'd)	363.5 - 363.7	NPS, Appalachian Scenic Trail (AT)	The AT extends for more than 2,160 miles through 14 states from central Maine to northern Georgia. Along its route, the AT crosses eight national forests, six units of the national park system, and about 60 state park or game lands. In 1968, the National Trails System Act designated the AT as the first national scenic trail. Portions of the AT are listed on the NRHP. The proposed crossing would occur north of the ridgeline of Bellvale Mountain in Orange County on land recently acquired by the N PS.
	364.9 - 366.1	Sterling Forest State Park	Two parcels with public open space and forested parkland. The park includes nearly 17,000 acres of land between the AT and Harriman Park that was purchased in 1998 and is jointly managed by the NYSOPRHP and PIPC. Includes the Doris Duke Wildlife Sanctuary between MPs 364.9 and 365.8.
	366.1 - 367.3	Sterling Forest Corp. Ski Area	Private in-holding within the Sterling Forest. The ski area currently has 7 trails and 4 double chair lifts.
Orange/Rockland	369.9 - 375.7	Harriman State Park	Two parcels. Harriman State Park is the second-largest park in the New York parks system, with 31 lakes and reservoirs, 200 miles of hiking trails, three beaches, two public camping areas, a network of group camps, miles of streams and scenic roads, and vistas and vantage points. Major recreational facilities include lakes (Welch, Lake Sebago, Lake Tiorati and Silvermine), the Anthony Wayne Recreation Area, Sebago Cabins and Beaver Pond Campgrounds. Trails that would be crossed include Ramapo-Dunderberg, Torne Mt. Ivy, Kakiat, and Suffern-Bear Mountain. Area jointly managed by NYSOPRHP and PIPC.
Rockland	375.7 - 376.6	Rockland County Kakiat Park	A 353-acre Rockland County park providing opportunities for hiking, fishing, and picnicking.
	383.7 - 383.9	Town of Clarkstown	Public open space. Undeveloped parcel.
	385.0 - 385.3	High Tor State Park	Day use facility for picnicking, swimming and hiking. Area jointly managed by NYSOPRHP and PIPC.
	386.2	Village of West Haverstraw	Public open space. Undeveloped parcel.
	387.5 - 387.6	Village of West Haverstraw	Public open space. Ball fields, developed recreation facilities.
Rockland/ Westchester	387.9 - 390.1	Haverstraw Bay/Hudson River	Open water recreation area. Boating and wildlife viewing.
Westchester	390.1 - 391.3	U.S. Veterans Hospital	The Franklin D. Roosevelt Veterans Administration Hospital provides tertiary care in acute and chronic psychiatry. Inpatient and outpatient services are supported by fully equipped laboratory and treatment facilities.
	394.3 - 395.3	Senasqua Town Park	A 30-acre site bounded by the Hudson River on the west and the Metro North/Amtrak railroad on the east. Originally owned by Seprieo Associates an used as an asphalt batching facility. Currently owned by Croton-on-Hudson and Beaverkill Conservancy.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Westchester (cont'd)	396.5 - 396.8	Van Cortlandt Manor	National Historic Landmark. NRHP eligible.
	397.4 - 397.4	Old Croton Aqueduct State Historic Park	National Historic Landmark. NRHP eligible.
	397.0 - 401.3 401.6 - 401.9 401.8 - 404.1 404.0 - 404.1 406.8 - 406.9 409.1 - 410.1 410.1 - 411.3 411.6 - 413.5	Briarcliff-Peekskill Trailway North County Trail Briarcliff-Peekskill Trailway North County Trail Briarcliff-Peekskill Trailway South County Trail South County Trail South County Trail	Paved bicycle/pedestrian path located primarily on an abandoned railroad right-of-way. The bicycle paths extend for 36.2 miles through Westchester County and include 22.1 miles of the North County Trailway from Eastview north to the Putnam County border. The 14.1 miles south of Eastview to the Bronx is planned to be developed in sections as the South County Trailway.
	410.1 - 410.1	West Rumbrook Park	Crossed along the abandoned railroad right-of-way on the edge of the park.
	414.6 - 416.1	Sprain Ridge Park	278 acre county park. Facilities include playground, swimming, picnicking, hiking/walking, refreshments, wheelchair accessible.
	416.6 - 416.6	Sprain Brook Parkway	Road crossing.
	416.8	Grassy Sprain Reservoir dam	Under consideration in the City of Yonkers Comprehensive Plan as a small parking lot to allow boat access to the reservoir.
	420.4 - 420.7	Westchester County Bronx River Park	Developed recreation including ball fields. Includes Scotti Field at MP 420.4.

Boy Scouts of America

Two properties managed by the Boy Scouts of America would be crossed by the pipeline: the Ten Mile River Boy Scout Reservation, managed by the Greater New York Council of the Boy Scouts of America, between MPs 317.3 and 320.2; and the Forestburg Scout Reservation, a property belonging to the Monmouth Council of the Boy Scouts of America, between MPs 331.0 and 331.4.

Hazardous Waste Sites

Millennium identified 15 locations where the pipeline would cross sites with the potential for hazardous waste or contaminated soils (see table 4.8.3-2).

TABLE 4.8.3-2

Potential Hazardous Waste Sites Crossed

County	Town	Approximate Milepost	Description
Cattaraugus	Little Valley	88.2	Little Valley Site
Allegany	Wellsville	137.4	Sinclair Refinery
Steuben	Erwin	182.4	Integrated Die Manufacturing Facility, Specialty Cellular Ceramics Plant, Corning, Inc., and Dresser Rand Company
Broome	Union	244.5	Joseph G. Abissi Property
	Kirkwood	253.9	Classic Cleaners, NYSDOT, Frito Lay, Auburn Sewage Treatment, and Rose Ready Mix
Rockland	West Haverstraw	386.7	Special Touch Cleaners
Westchester	Croton-on-Hudson	395.7	Atro Collision Center, South River Side Avenue
	Croton-on-Hudson	395.8	J&E Service Station, South River Side Avenue
	Croton-on-Hudson	396.2	Harmon Parking, Gateway Plaza
	Elmsford	409.0	Sylvania Lighting Services, West Main Street
	Elmsford	409.2	Mr. Stripper of Westchester, Saw Mill River Road
	Elmsford	409.2	Clubertson Restoration, North Central Avenue
	Elmsford	409.3	Amoco, North Central Avenue
	Elmsford	409.5	Continental Baking Co., South Central Avenue
	Ardsley	412.8	OCG Microelectronic Materials, Saw Mill River Road

4.9 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the Commission to take into account the effect of its undertakings (including issuance of certificates) on properties that are listed on the NRHP or that meet the criteria for listing on the NRHP, and to afford the ACHP an opportunity to comment on the undertaking, as appropriate. Millennium, as a non-Federal party, is assisting the Commission in meeting its obligations under section 106 and the ACHP's regulations, set forth in 36 CFR 800.

The Commission has also discussed executing a Programmatic Agreement (PA) with the New York SHPO, NPS, and ACHP to fulfill the Commission's obligations under section 106. The parties are in favor of a PA, and those discussions are continuing.

Millennium has completed initial cultural resources surveys of the Lake Erie and Hudson River water crossings, most of the land segment of the pipeline route and extra work areas, pipe storage/contractor yards,

and access roads as described below. These surveys were conducted in consultation with the New York and Pennsylvania SHPOs during 1997 and 1998, and are summarized in a final report that was filed with the FERC and the SHPOs in November 1998 (NYSHPO, 1997a, 1997b, 1998a, 1998b, 1998c, 1998d, 1998e, 1999a; 1999b; PA SHPO, 1998a, 1998b, 1998c, 1998d). In 1999, surveys were conducted on the mainline and access roads that had not been surveyed previously, geomorphological deep testing was conducted at high and medium probability locations, and Phase II testing was conducted at some of the sites identified in the 1997 and 1998 surveys. The results of the 1997, 1998, and 1999 surveys are summarized in the following section.

Millennium completed the cultural resources overview and background review for the 9/9A Proposal. In addition, a cultural resources walkover survey of the construction right-of-way, extra work areas, and access roads was conducted in May and June 2000, except for approximately 1 mile where access was denied on five properties. A total of 44 cultural resources were discussed in the report. Of the 44 resources, 35 were either not eligible for the NRHP or were outside of the right-of-way, 4 areas require additional deep testing, 4 areas would require monitoring during construction (including 1 where access was denied), and 4 areas were not assessed because access was denied. The 9/9A Proposal would also cross the New Croton Aqueduct, a NRHP-eligible property, three times at MPs 401.2, 410.3, and 413.8. However, the Aqueduct is at the depths of 93, 40, and 140 feet, respectively, at these locations. We and the New York SHPO believe that pipeline construction and operation would not affect the New Croton Aqueduct.

Table 4.9-1 identifies tracts where cultural resource surveys are still pending.

TABLE 4.9-1

Tracts Where Cultural Resource Surveys Are Pending

County	Number of Tracts	Approximate Milepost	Total Feet	Total Miles
Chautauqua	6	--	4,120	0.8
Cattaraugus	13	--	13,630	2.6
Allegany	6	--	14,695	2.8
Steuben	7	--	11,375	2.2
Chemung	8	--	10,880	2.1
Tioga	1	--	2,275	0.4
Broome	10	--	2,335	0.4
Delaware	5	--	9,624	1.8
Sullivan	14	--	13,790	2.6
Orange	16	--	13,300	2.5
Rockland	21	--	7,855	1.5
Westchester	5	--	--	1.0
TOTAL	112	--	103,879	20.7

Table 4.9-2 lists the sites identified during the 1997, 1998, 1999, and 2000 surveys; and table 4.9-3 summarizes the sites requiring additional cultural resources investigations.

1997 and 1998 Surveys

Lake Erie and the Hudson River

The marine geophysical survey in Lake Erie was conducted over a 410-foot-wide corridor centered on the pipeline in Pennsylvania and New York. One sonar anomaly was identified and was interpreted as either cultural or natural debris. Millennium did not recommend further investigation.

The marine geophysical survey in the Hudson River was conducted within a 1,000-foot-wide corridor centered over the pipeline and resulted in the identification of 15 sonar anomalies. These have been interpreted as representing either cultural or natural material or debris associated with historical to recent occupations along the Haverstraw shoreline. Millennium recommended additional investigation to verify the identification of these anomalies.

Land Surveys

Millennium surveyed most of the overland portion of the pipeline route, with the exception of 25.4 miles where access was denied or where surveys are still pending. The surveyed route includes line changes identified in table 3.4-1, and the line changes at the Lake Erie landfall (Wiley Road) and Union Center, with the exception of the ones at Pine Island and I-284, and segments of Union Center and Beers Hill. The survey focused on a 150-foot-wide study corridor centered on the proposed pipeline, with the following exceptions:

a 150- to 200-foot-wide study corridor was used at all overland stream, road, railroad, canal, and aqueduct crossings;
a 100- to 200-foot-wide study corridor was used for all overland routes within powerline rights-of-way in Allegany, Broome, Rockland, and Westchester Counties; and
a minimum of an 18-foot-wide study corridor was used on the North County Trailway in Westchester County.

The surveys also included:

94 of the 247 temporary access roads identified in appendix D;
21 of the 23 pipe storage/contractor yards identified in appendix B4;
an inventory of architectural structures within 0.25 mile of the project;
deep testing at stream and river crossings; and
the Wagoner and Ramapo Stations.

The surveys did not include remote blowdown locations, the remote cathodic protection rectifier beds, the Mount Vernon Station, the entire site for the Union Center Regulator Station, or locations in Westchester County where the pipeline would be in city streets (MPs 417.3 to 421.8). In this area in Westchester County, in consultation with the SHPO, Millennium proposes to develop a series of street scape descriptions of the lots on both sides of the affected streets in Yonkers and Mount Vernon. Millennium is currently waiting for permission from the city to perform the photographic surveys.

TABLE 4.9-2

Sites Identified During the 1997 through 1999 Cultural Resource Surveys

County	Oil/Gas Related Sites	Structures	Parks, Hunt Clubs, Gun Clubs	Rail-roads	Historic Roadways and Street-scapes	Quarries	Graves and Cemeteries	Historic Isolates	Historic Scatters and Dumps	Canals	Pre-historic/ Historic Sites	Pre-historic Isolates	Pre-historic Scatters	TOTAL
Chautauqua		14		3				7	11		8	12	14	70
Cattaraugus	3	6		4					15		2	9	12	57
Allegany	6	6						1	12		1	2		30
Steuben		15		3			2	6	8		2	2		38
Chemung		7		2							7	3		26
Tioga	1	6						10	11			4		35
Broome	1	20						20	34		8	11	5	102
Delaware						3						2	2	21
Sullivan		17	2					4	10			2		38
Orange	2	23	3	5					12		4	10	4	66
Rockland			2						4					14
Westchester				2	8									16
TOTAL	15	128	8	24	10	3		55	129	4	36	59	37	513

TABLE 4.9-3

Properties Requiring Additional Cultural Resources Investigations

County	Site Number	Site Type	Comments
Chautauqua	CHA-323	Prehistoric site	–
	CHA-324	Prehistoric site	–
	CHA-201	Historic well	–
raugus	CAT-106	Scatter	–
	CAT-108	Scatter	–
	CAT-195	Scatter	–
	CAT-250	Scatter/foundation	–
	CAT-244	Scatter	–
	CAT-008	Genesee Canal/Erie Railroad	NRHP eligible. Provide work plan.
	CAT-111/121	Dump	–
	CAT-9830	Historic site/foundation	–
Allegany	ALL-213	Dam/reservoir	
	ALL-291	Scatter/foundation	
Chemung	CHE-9901	Chemung Canal	NRHP eligible. Provide work plan.
	CHE-174/319	Scatter	–
	CHE-173/317	Scatter	
	TIO-9842	Well/scatter	
Broome	BRO-010	Chenango Canal	NRHP eligible. Provide work plan.
	BRO-104	Scatter	–
	BRO-006/154	House/dump	Monitor for possible graves.
	BRO-117	Prehistoric site	–
	BRO-9931	Scatter	–
	BRO-212	Prehistoric site	
	BRO-171	Structures/dump	
	BRO-300	Well	
Delaware	DEL-501	Spinghouse	
	DEL-500	Structure	
	DEL-122	Scatter	
Sullivan	SUL-161	Foundation	
	SUL-9801	Bridge/mill remains	
Orange	ORA-502	Industrial complex	–
	ORA-001/503	Delaware and Hudson Canal	NRHP eligible. Provide work plan.
	ORA-300	Mill and dam	–
	ORA-9935	Scatter	–
	ORA-9936	Prehistoric site	–
	ORA-9937	Scatter	–
	ORA-9901/9943	Agricultural complex	–
	ORA-9902	Farm land	–
	ORA-9903	Railroad	
	ORA-9931	Scatter	
	ORA-9938	Scatter	–
	ORA9942	Scatter	–
	ORA-505	Scatter	–
	ORA-021	Appalachian Trail	NRHP eligible. Provide work plan.
	ORA-181	Foundation	–
	ORA-9904	Allis Trail/Harriman State Park	NRHP eligible. Provide work plan.
	ORA-9830	Foundation	
Rockland	ROC-001	Harriman State Park	–
	ROC-009	Palisades Parkway	NRHP listed. Provide work plan
	ROC-102	Well	–
	ROC-101/500	Industrial site/Hudson River targets	

TABLE 4.9-3 (cont'd)

County	Site Number	Site Type	Comments
Westchester	WES-002	Franklin D. Roosevelt VA Hospital	NRHP eligible. Provide work plan.
		Furnace Brook crossing	Deep testing
	WES-029	Residence No. 3, Warren Road	Access denied
		Finklestein's Goodyear-Metro Environmental	Access denied. Archeological monitoring for areas under pavement
	WES-025	Van Cortlandt Manor	NRHP eligible. NHL-Provide work plan
	WES-020	Pumping Station, Croton River Road	NRHP eligible. Additional work to assess effects.
	WES-004	Old Croton Aqueduct Historic District	NRHP-listed, owned by NYSOPRHP, NHL-Provide work plan.
	WES-026	Residence No. 5, State Route 9A	Access denied
		Pocantico River crossing	Deep testing
		Railway/Trailway segment, east of Briarcliff Manor railroad	Archeological monitoring under pavement
	–	Pocantico River crossing	Deep testing
	WES-9801/104	North County Trailway, abandoned railroad	Assess trailway for eligibility
	–	Crossings of Saw Mill River and tributaries	Deep testing at various locations to be determined
		Elmsford Fairview Industrial Park, 3 bore pits	Archeological monitoring under pavement
	–	Parcel in Elmsford	Access denied
	WES-002	V. Everitt Macy Park, Saw Mill River Parkway Bridge, south of dam at Woodland Lake	NRHP eligible. Additional work to assess effects
	WES-001	Concrete foundation remains	NRHP eligible. Additional work to assess effects
	WES-201	Alvin Last, Inc. parking lot	Fence and avoid
	–	Sprain Ridge Park	Archeological monitoring under pavement
		Lockheed Martin facility	Evaluate park as a whole for NRHP eligibility
	WES-031	Bronx River Parkway Reservation	Access denied
	WES-003	Bronx River Parkway (Parkway Variation)	NRHP eligible. Provide work plan. Monitor during construction.

Millennium's 1997 and 1998 surveys resulted in the identification of 482 cultural resources ranging from isolated prehistoric and historic artifacts to complex stratified prehistoric sites and architectural resources. Of the 357 non-structural cultural resources, 10 prehistoric and 20 historic sites, and 1 site with both prehistoric and historic components, were recommended for additional identification level surveys. In addition, 13 prehistoric, 20 historic, and 8 sites with both prehistoric and historic components were recommended for further testing to determine their potential to meet NRHP eligibility criteria. Of the 125 inventoried structures, Millennium recommended additional surveys for 7 structures and more detailed investigation for 3 structures to determine their potential to meet NRHP eligibility criteria. Ten of the properties were previously evaluated as eligible for or are already listed in the NRHP. The remaining non-structural and structural cultural resources were determined not eligible for the NRHP.

Millennium would avoid impact on active railroad berms by boring underneath them. At inactive railroads, Millennium proposes to open cut the railroad bed and then restore the berms to their original appearance. The New York SHPO indicates that it would consider these actions as no effect, and the Commission agrees (NYSHPO, 1998d).

Millennium's deep testing program examined stream and river crossings by categorizing all crossings as having low, moderate, or high probability to contain potentially significant cultural resources. Millennium completed surveys on 13 low probability areas, and 39 moderate and high probability areas, and recommended 13 areas for further testing. Surveys are still pending for 20 areas.

Surveys of the Wagoner and Ramapo Stations did not result in the identification of any cultural resources. Background research was completed for the Mount Vernon Station, but the survey results have not been reported.

1999 Surveys

Between May and August 1999, Millennium completed surveys of 2.76 miles of mainline and reroutes, including those in the black dirt area in Orange County. All of the mainline surveys were in Steuben, Broome, Delaware, Sullivan, and Orange Counties. Work completed is as follows:

54 access roads were surveyed;

the background and literature review of the 1999 proposed Bronx River Parkway Variation (Parkway Variation) was completed;

27 sites identified in the 1997 and 1998 surveys as requiring supplemental survey were revisited;

geomorphological deep testing was completed at 7 high and medium probability locations, and systematic geoarcheological coring was completed across the black dirt area in Orange County;

additional field work (Phase II survey) was completed at 27 sites identified in the 1997 and 1998 surveys as requiring additional cultural resources investigation (4 sites in Chautauqua County, 4 sites in Cataraugus County, 3 sites in Allegany County, 2 sites in Chemung County, 1 site in Tioga County, 10 sites in Broome County, 2 sites in Delaware County, and 1 site in Sullivan County).

The results of these surveys indicated that:

Of the 27 site revisits, 1 site is recommended for additional field work, 3 sites should be avoided or subjected to additional field work, and 1 site requires an informant interview.

The new surveys identified: a remnant of the Chemung Canal (potentially eligible for listing on the NRHP), 6 sites that require additional field work, 1 site that requires deep testing, 3 sites that may be components of a proposed Wallkill Valley Drainage Ditch District (sites need additional work to determine their integrity), and 6 isolated finds.

Although further surveys of the Bronx River Parkway are not recommended, archeological monitoring of construction is recommended if construction would exceed the depth of the parkway.

Of the 27 sites where additional field work (Phase II) was completed, 2 sites in Broome County, 1 site in Chautauqua County, 3 sites in Cattaraugus County, and 1 site in Allegany County were determined to be potentially eligible for the NRHP. If all of these are determined to be eligible and cannot be avoided, treatment plans would be required.

2000 Surveys

Millennium completed the cultural resources overview and background review for the 9/9A Proposal. In addition, a cultural resources walkover survey of the construction right-of-way, extra work areas, and access roads was conducted in May and June 2000, except for approximately 1 mile where access was denied on five properties. A total of 44 cultural resources were discussed in the report. Of the 44 resources, 35 were either not eligible for the NRHP or were outside of the right-of-way, 4 areas require additional deep testing, 4 areas would require monitoring during construction (including 1 where access was denied), and 4 areas were not assessed because access was denied. The November 13, 2000, comments of the New York SHPO are included in table 4.9-3.

The 9/9A Proposal would also cross the New Croton Aqueduct, a NRHP-eligible property, three times at MPs 401.2, 410.3, and 413.8. However, the Aqueduct is at the depths of 93, 40, and 140 feet, respectively, at these locations. We and the New York SHPO believe that pipeline construction and operation would not affect the New Croton Aqueduct.

Unanticipated Discovery Plans

Millennium prepared and filed Unanticipated Discovery Plans with its application to address inadvertent discoveries of cultural resources, including human remains, during construction of the project. These initial plans have been reviewed by the FERC and the New York and Pennsylvania SHPOs and are acceptable.

Native American Consultation

In December 1997 and March 1998, Millennium wrote to Native American groups resident in, or with traditional ties to, the project vicinity and requested assistance in identifying traditional cultural properties that may be affected by the project. Groups contacted include the Seneca Nation, the New Jersey Commission of American Indian Affairs on behalf of the Ramapo, and the Delaware Executive Committee. Millennium has responded to a request from the Natural and Cultural Resource Manager of the Seneca Nation to provide additional mapping and text information about the project.

In response to comments received during the DEIS public comment meetings, Millennium recontacted the Seneca Nation in July 1999 to determine if land parcels in the vicinity of its reservation lands

would be affected. The Seneca Nation was awarded claim to certain parcels near Cuba Lake as a result of a recent court case (Seneca Nation of Indians v. State of New York, Docket Nos. 99-6003 and 99-6005, May 17, 1999). Millennium met with the Seneca Nation in September 1999 to discuss routing and stream crossing methods. The proposed project would not cross any lands of the Seneca Nation.

In August 1999, in response to a request from the ACHP, Millennium also contacted the Oneida. Cayuga, and Onondaga Nations. No responses have been received to date.

4.10 SOCIOECONOMICS

The Millennium Pipeline Project would be in 12 counties in New York. The affected counties range from those which are relatively undeveloped, such as Chautauqua, Steuben, and Delaware Counties, New York, to those that are more urban, such as Rockland and Westchester Counties, New York. Table 4.10-1 summarizes selected socioeconomic statistics for the project area.

In 2000, population density, an indication of the extent of development, ranged from a low of 33 persons per square mile (Delaware County) to a high of 2,133 persons per square mile (Westchester County). Total population ranged from 48,055 to 923,459 persons in these same counties. Within Westchester County, total population ranges from municipalities with 4,269 persons (Ardsley) to a high of 196,086 persons (Yonkers) and 68,381 persons (Mount Vernon). Counties with the largest growth over the 10-year period between 1990 and 2000 included Sullivan County (+6.8 percent), Rockland County (+8 percent), and Orange County (+11 percent). The substantial population increase in Orange County is attributed to improved access that allowed it to become a suburb of New York City. Population decreased over the 10-year period in Chautauqua County (- 1.5 percent), Allegany County (- 1.1 percent), Tioga County (- 1.1 percent), Steuben County (- 0.4 percent), and Cattaraugus County (- 0.3 percent). Population in the remaining counties either remained about the same or increased by between 1.5 and 5.6 percent.

Employment in the project area is generally good with 2000 unemployment rates ranging from a low of 3 percent (Rockland and Westchester Counties) to a high of 6.7 percent (Allegany County). In 1997, industries that employ the work force vary across the project area with most of the employed work force fairly evenly distributed in the manufacturing and wholesale and retail trade. In 1997, the most acreage in farms was in Steuben (348,971 acres), Chautauqua (224,921 acres), Allegany (157,744 acres), and Delaware (183,677 acres) counties. The counties with the least acreage in farms was Rockland County (561 acres).

In 1997, median household income ranged from a low of $31,051 in Chautauqua County to a high of $55,040 in Westchester County. Affected counties that were below the state-wide median household income of $36,369 included Chautauqua ($31,051), Cattaraugus ($31,348), Allegany ($31,291), Steuben ($33,732), Chemung ($33,988), Broome ($35,340), Delaware ($30,362), and Sullivan ($33,123).

In 2000, housing vacancy rates in the project area averaged 8.4 percent and ranged from a low of 2.8 percent (Rockland County) to a high of 12.3 percent (Sullivan County). Generally, the rural counties have higher vacancy rates because of the many hunting and recreational cabins that are vacant during the off season. The most vacant housing units were in Westchester County (12,303 units), Sullivan (17,069 units), and Chautauqua (10,385 units) counties. The fewest vacant housing units were in Rockland County (2,298 units) and Tioga County (1,685 units).

A wide range of public services and facilities is offered throughout the project area. The more urbanized areas offer full-service law enforcement and fire districts, schools, hospitals, emergency response services, water and sewer services, road and bridge departments, solid waste disposal, recreation programs, library systems, and social services. Rural communities typically offer fewer services and facilities in part due to the lower, more dispersed populations and limited revenues. Larger urban areas near the project

include Mayville and Jamestown/Falconer (Chautauqua County), Salamanca and Olean (Cattaraugus County), Wellsville (Allegany County), Painted Post/Corning (Steuben County), Horseheads and Elmira (Chemung County), Owego (Tioga County), Binghamton (Broome County), Deposit (Broome and Delaware Counties), Hancock (Delaware County), Port Jervis (Orange County), West Haverstraw (Rockland County), and Briarcliff Manor, Mount Pleasant, Elmsford, Yonkers, Mount Vernon, and others (Westchester County).

TABLE 4.10-1

elected Demographic Statistics

	New York	Chautauqua County	Cattaraugus County	Allegany County	Steuben County	Chemung County	Tioga County	Broome County
2000 land area (square miles)	47,214	1,062	1,309	1,030	1,393	408	519	707
2000 total population	18,976,457	139,750	83,955	49,927	98,726	91,070	51,784	200,536
Percent change (1990 to 2000)	5.5%	-1.5%	-0.3%	-1.1%	-0.4%	3	-1.1%	5
2000 persons per square mile	402	132	64	49	71	223	100	284
2000 civilian labor force	8,992,282	65,739	39,740	22,823	48,540	43,061	26,242	97,109
Employment	8,488,590	62,609	37,210	21,283	46,182	40,976	25,377	93,861
Percent unemployed	5.6%	4.8%	6.4%	6.7%	4.9%	4.8%	3.3%	3.3%
1997 median household income	$36,369	$31,051	$31,348	$31,291	$33,732	$33,988	$38,503	$35,340
1997employees by economic sector								
Manufacturing	785,891	13,084	5,341	2,919	8,070	9,098	5,055	20,429
Wholesale trade	414,249	2,171	979	235	366	1,667	250-499	2,500-4,999
Retail trade	805,208	7,096	4,190	1,646	4,526	5,963	1,205	11,881
1997 number of farms	31,757	1,557	946	724	1,295	313	497	511
Land in farms, acres	7,254,470	224,921	85,804	157,744	348,971	59,272	109,356	85,804
2000 total housing units	7,679,307	64,900	39,839	24,505	46,132	37,745	21,410	88,817
Occupied housing units	7,056,860	54,515	32,023	18,009	39,071	35,049	21,410	80,749
Vacant housing units	622,447	10,385	7,816	6,496	7,061	2,696	1,685	8,068
Percent for sale	9.5%	7.0%	7.9%	6.2%	10.2%	16.8%	16.7%	14.7%
Percent for rent	25.5%	17.1%	12.8%	7.5%	15.2%	40.8%	24.5%	39.5%
Percent seasonal/recreational	37.8%	56.5%	62.3%	75.2%	54.4%	9.4%	21.3%	15.8%
Vacancy rate, rental	4.6%	9.6%	10.9%	9.4%	9.3%	9.2%	8.6%	10.1%
2000 persons per household	2.61	2.45	2.52	2.53	2.49	44	2.60	2.37

TABLE 4.10-1 (cont'd)

	Delaware County	Sullivan County	Orange County	Rockland County	Westchester County
2000 land area (square miles)	1,446	970	816	174	433
2000 total population	48,055	73,966	341,367	286,753	923,459
Percent change (1990 to 2000)	1.5%	6.8%	11%	8%	5.6%
2000 persons per square mile	33	76	418	648	2,133
2000 civilian labor force	20,602	30,932	156,730	144,110	442,296
Employed	19.620	29,394	151,816	139,781	428,.824
Percent unemployed	4.8%	5%	3.1%	3%	3%
997 median household income	$30,362	$33,123	$46,446	$58,362	$55,040
1997employees by economic sector					
Manufacturing	4,386	500-999	10,000-24,999	10,739	18,797
Wholesale trade	278	688	5,000-9,999	5,606	31,486
Retail trade	1,810	2,842	17,131	11,601	46,984
997 number of farms	717	311	624	21	91
Land in farms, acres	183,667	58,067	94,771	561	7,528
2000 total housing units	28,952	44,730	122,754	94.973	349,445
Occupied housing units	19,270	27,661	114,788	92,675	337,142
Vacant housing units	9,682	17,069	7,966	2,298	12,303
Percent for sale	4.8%	4.4%	15%	18.3%	15.1%
Percent for rent	5.9%	7.2%	21.5%	32.9%	34.2%
Percent seasonal/recreational	79.5%	78%	27.8%	16.5%	22%
Vacancy rate, rental	11%	12.3%	4.3%	2.8%	3%
2000 persons per household	2.39	2.50	85	3.01	2.67

SOURCE: U.S. Bureau of the Census: 1990 U.S. Census and County and City Data Book, 1994.
U.S. Bureau of the Census: 2000 U.S. Census (http://www.census.gov)
USDA, National Agricultural Statistics Service, 1997 Census of Agriculture - County Data