

4.0 AFFECTED ENVIRONMENT

4.1 Geology

Physiography

The Millennium Pipeline Project would be within the Erie Lowlands, Allegheny Plateau, Hudson Mohawk-Lowlands, Hudson Highlands, Newark Lowlands, and Manhattan Prong 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 predominately 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 Prong from approximate MP 387.0 to the pipeline's terminus at MP 422.4 in Mount Vernon. The Manhattan Prong is a landscape of rolling hills and valleys that closely mirrors the underlying metamorphic bedrock. 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.

Areas where blasting may be required are listed in Table 4.1.1-1

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). 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, crushed and dimension stone are the primary mineral resources.

TABLE 4.1.1-1
Locations Where Blasting May Be Required

Physiographic Province	County	Bedrock <5 Feet Below Surface 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
Manhattan Prong	Westchester	390.1 - 390.5
		390.9 - 391.0
		391.7 - 391.9
		393.9 - 394.3
		394.6 - 394.7
		395.2 - 395.5
		399.1 - 399.4
		402.3 - 402.4
		415.9 - 417.7
420.7 - 421.0		
421.1 - 421.3		

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
Allegany	112.2 - 112.5	Country Club oil field
	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
Steuben	146.5 - 148.6	East Independence gas storage
	152.6 - 152.9	Greenwood gas storage field
Tioga	168.2 - 172.5	Rathbone gas field
	224.4	Reclaimed sand and gravel pit
Broome	228.4 - 228.5	Abandoned sand and gravel pit
	264.5 - 264.5	Active sand and gravel pit
	269.7	Abandoned bluestone quarry
	272.9 - 273.0	Active quarry
Delaware	273.6 - 273.6	Abandoned quarry
	279.0	Historic quarry
	279.9	Historic quarry
Sullivan	280.1	Historic quarry
	301.6	Historic quarry
	Storage Yard 84	Historic quarry

4.1.3 Geologic Hazards

Geologic hazards that can effect underground pipelines and appurtenant facilities include seismicity, 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 Mesena, New York in 1944. Three other large earthquakes of Modified Mercalli Intensity VII (Rockaway Beach [1884], Attica [1929], Warrensburg [1931]) have also been documented. 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.). This analysis is supported by a report prepared for Columbia which includes a detailed analysis of the seismic potential of the Ramapo fault (Quittmeyer, 1986). Millennium would acquire Columbia's existing pipeline in this area.

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 U.S. Geological Survey (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. Since 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.

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 pipelines are minimal. Millennium identified shallow carbonate rock formations that may be susceptible to karst 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, sensitive paleontological resources would not be crossed by the pipeline. No unique resources have been identified within the Millennium project area.

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 addresses soil-related limitations associated with the construction of shallow excavations which directly relate to pipeline trenching and include: 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.

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 effect 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. This area would be crossed between approximate MPs 350.0 and 354.0 in Orange County. This area has an extremely high water table with organic deposits reaching 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). Millennium has not yet received a response from Steuben County. 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 expected to be affected by the project.

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 and cathodic protection rectifier beds). Soil characteristics for launcher/receivers, over pressure protection facilities, and mainline valves are similar to those previously discussed for the pipeline. Soil characteristics associated with three proposed measuring facilities include 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 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 fifteen major aquifer systems, including seven NYSDEC recognized primary aquifers and five 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; the Lower Cassadaga Valley Aquifer Protection Area (MPs 56.6 to 65.2); and the 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).

In addition, the pipeline would cross five 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), one between MPs 396.6 and 399.7 (New Croton Reservoir watershed), and one between MPs 412.4 and 417.9 (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 which 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 five to ten 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 (two 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.

TABLE 4.3.1-1

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
Elery 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 - 268.4	Clinton Street-Ballpark Sole Source Aquifer	51.6
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			
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	18.1
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	14.5
Rockland			
Ramapo	377.1 - 377.4	Ramapo Primary Aquifer	0.4
Ramapo	378.8 - 378.9	Ramapo Primary Aquifer	0.2
Westchester			
Cortlandt	395.5 - 395.7	Croton Primary Aquifer	0.2
Ramapo Station			
Ramapo, New York		Ramapo River Basin Sole Source Aquifer	<0.1
Wagoner Station			
Milford Township, Pennsylvania		NJ Coastal Plain Aquifer	<0.1

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 crossed by the pipeline are discussed below.

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 since 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, and 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 would also be 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).

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). Only one public community water supply, Windsor Oaks Property Owners Association (near MP 394.6), was identified by Millennium as being 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
Chatauqua	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
Sub-Total	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					
Sub-Total	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	Orange	339.9	Rockland	373.4	Westchester	None
	303.9		340.0 (2)		383.5		
	304.8		340.4 (2)		383.7 (2)		
	305.2		340.5		383.9		
	306.3 (2)		340.6 (2)		384.2		
	307.4 (2)		341.5 (2)		384.7		
	307.5		343.1		384.8		
	309.9		343.3 (2)		384.9		
	310.4 (2)		343.4		385.0		
	311.1		343.5				
	311.7		343.6				
	312.7		344.1				
	312.8 (2)		345.6				
	313.2		347.9				
	314.1		348.3 (2)				
	314.3		356.0 (3)				
	315.2		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				
Sub-Total	21		55		10		0

GRAND TOTAL: 235

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

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. 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.

4.3.2 Surface Water

The Millennium pipeline would cross Lake Erie, and a total of 295 perennial and 192 intermittent waterbodies in New York (see appendix F). These crossings include 20 major waterbody crossings (waterbodies, including lakes and ponds, that are greater than 100 feet wide at point of crossing), 243 intermediate crossings (waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at point of crossing), and 225 minor crossings (waterbodies less than or equal to 10 feet wide at point of crossing). All of the waterbody crossings are in New York, except for the 32.9-mile-long Lake Erie crossing, which is mostly in Pennsylvania state waters (see section 4.3.3). Of the 20 major waterbody crossings, 15 would be rivers or streams (including the Genesee, Cohocton, Chenango, Susquehanna, West and East Branch Delaware, and Hudson Rivers; Mongaup River/Rio Reservoir; and Olean, Owego, Callicoon, Pochuk, and Wheeler Creeks), 3 would be lakes (Lake Erie, and Furnace Brook and Teatown Lakes), 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 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 designated as trout (T) or trout spawning (TS) streams. 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 116 trout or trout spawning streams would be crossed by the pipeline and are identified in the table in appendix F.

Eight 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 Hackensack/Passaic River, Hudson River, and Long Island Sound basins due mostly to urban development. 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
Allegheny River Basin	83.9	123	2
Genesee River Basin	23.2	24	1
Susquehanna River Basin	117.4	146	5
Delaware River Basin	74.6	97	4
Hudson River Basin	41.1	54	2
Hackensack/Passaic River Basin	18.8	21	4
Long Island Sound	14.4	8	0
TOTAL	417.3	488	20

The pipeline would cross four waterbodies within 3 miles of active public water intakes

Belson Creek at MP 38.1 (about 2.6 miles upstream of the supply intake for the Alford Reservoir);

Olean Creek at MP 111.2 (about 1.6 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); and

Indian Kill Tributary at MP 367.0 (about 0.2 miles upstream of the community water intake for Indian Kill).

The pipeline would also cross under two aqueducts: the abandoned New Croton Aqueduct (MP 398.4), and the active Catskill Aqueduct (MP 418.8). Of the two, only the Catskill Aqueduct currently conveys water to the New York City public water system from the Ashokan, Neversink, Rondout, Pepacton, and Cannonsville Reservoirs. The pipeline would parallel the Catskill Aqueduct between MPs 399.7 and 401.6, at a minimum distance of about 210 feet.

Seven waterbodies were identified by Millennium as having recorded concentrations of contaminated sediments (see table 4.3.2-2). According to the 1997 EPA Report, "The Incidence and Severity of Sediment Contamination In Surface Water of the United States," 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.

TABLE 4.3.2-2

Waterbodies with the Potential for Contaminated Sediments at the Crossing Location

Waterbody	Milepost	Sampling Location	Contaminants
Genesee River	137.3	4 miles upstream	Heavy metals, pesticides, semi-volatile organic compounds, and 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 the 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 which 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 of 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).

Other constituents which may affect water quality within the lake include metals and toxic organic compounds. Open lake concentrations of cadmium, copper, iron, and selenium have been observed in excess of international objectives. 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 which have been found to exceed target concentrations include polychlorinated biphenols (PCB) 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 which 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.

Fitchko (1997) surveyed a 10-kilometer-wide study corridor across the non-depositional Long Point-Erie sill in order to determine the sediment quality along the proposed route, using mercury as the indicator contaminant. The concentration of total mercury in 73 of the 93 sediment samples collected were below the Ontario Ministry of the Environment LEL sediment quality guideline of 0.2 µg/g and the EPA (1977) bulk chemical composition guideline for polluted sediments of greater than 1µg/g. These concentrations represent natural background concentrations of mercury in Lake Erie. Sediment core samples at nine locations along the proposed route were also collected for analysis of conventional parameters, heavy metals and organic contaminants. Most parameters were below their respective sediment quality guidelines; table 4.3.3-1 identifies those parameters that exceeded the sediment quality guidelines.

TABLE 4.3.3-1
Exceedances of Sediment Quality Guidelines From Testing of the Proposed Route in Lake Erie

Parameter	Ontario MOE Guidelines	EPA Sediment Pollution Guidelines Classification
Organic carbon	All exceeded	--
Total phosphorus	All exceeded	6 of 9 exceeded
Total Kjeldahl nitrogen	4 of 9 exceeded	1 moderately, 1 heavily polluted
Ammonia nitrogen	--	6 of 9 moderately polluted 1 heavily polluted
Oil and grease	1 exceeded	--
Arsenic	1 exceeded	6 of 8 moderately polluted 1 heavily polluted
Manganese	4 of 9 exceeded	4 of 8 moderately polluted 4 of 8 heavily polluted
Nickel	5 of 9 slightly exceeded	2 moderately polluted

Source: Beak International, Inc., 1999.

4.3.4 Hudson River/Haverstraw Bay

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 2.2 miles. This portion of the river is known as Haverstraw Bay and has a tidal range of about 3 feet. 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.

The Hudson River is classified as an estuary at the proposed crossing location and contains waters classified by the NYSDEC as SB. Waters classified as SB are saline and their best uses 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.

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.

Haverstraw Bay is the widest section of the estuary and has extensive shallow areas (15 feet or less) and a dredged navigation channel about 35 feet deep. The bay is brackish during much of the year, with salinities varying from 0 to 10 parts per thousand. Freshwater flows are seasonal, with the highest inflow in the spring. According to the 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).

4.4 FISHERIES AND WILDLIFE RESOURCES

4.4.1 Fisheries

Surface waters 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. Fishery classifications for each waterbody crossed are included in the table in appendix F.

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. The pipeline would cross 116 perennial and intermittent streams and rivers that are designated as trout or trout spawning streams. Estuarine habitats support both fresh and saltwater species.

The two largest waterbodies crossed, Lake Erie and Haverstraw Bay in the Lower Hudson River, have perhaps the highest fish diversity of the waterbodies crossed by the proposed pipeline. The 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	Marine
Rainbow trout	Northern pike	American shad	Bay anchovy
Brown trout	Muskellunge	Striped bass	Atlantic menhaden
Brook trout	Yellow perch	White perch	
Coho salmon	Walleye	Atlantic sturgeon	
Chinook salmon	Smallmouth bass	Shortnose sturgeon	
	White bass		
	Largemouth bass		
	Bluegill		
	Black crappie		
	Lake herring		
	Lake whitefish		
	Rainbow smelt		
	Emerald shiner		
	Spottail shiner		
	Fathead minnow		
	Channel catfish		
	Stonecat		
	Trout perch		
	Johnny darter		
	Freshwater drum		

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 Branches Delaware River also support recreational fisheries.

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.

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 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.

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 with 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.

Rocky bottom substrates in the nearshore 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 occurs at depths below the photic zone and the occurrence of attached aquatic vegetation is minimal.

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 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

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), the 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.

Haverstraw Bay is a vast open area containing extensive shallow water along its western side. Over this relatively shallow bay, freshwater and saltwater mix to produce brackish waters. This portion of the river is one of the most important fish and wildlife habitats in the Hudson estuary and provides spawning, nursery, foraging, and/or overwintering grounds for many anadromous and marine species, such as striped bass, shortnose sturgeon, American shad, white perch, Atlantic sturgeon, the bay anchovy, Atlantic menhaden, and blue crab. According to the NYNHP, it is a designated Significant Coastal Fish and Wildlife Habitat (NYSDEC, 1999).

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. Mammal species found in forest habitats include the gray squirrel, eastern chipmunk, grey fox, 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 pipeline route and consists of fallow fields, agricultural land, hayfields, and existing powerline 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 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. Wildlife species that are highly dependent on wetlands for water or nesting include the red-spotted newt, bullfrog, 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. 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. 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.

Waterfowl concentration areas, that are primarily used by waterfowl during spring and fall migration, occur along the Hudson River/Haverstraw Bay (MP 387.9) and Croton River (MP 395.3). Migration and staging habitats within these river systems contain productive foraging, and are often associated with coastal and estuarine areas, large river systems, and large lakes adjacent to agricultural

regions. Haverstraw Bay area includes a designated Significant Coastal Fish and Wildlife Habitat (NYSDEC, 1999).

The Mongaup Wildlife Management Area (WMA) would be crossed between MPs 323.9 and 330.1. 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).

4.5 VEGETATION

Vegetation types 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.

Open land, including agricultural land and old clear cuts and fields, occur within each of the forest cover types 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, forbes, and shrub species.

The Millennium Pipeline Project would cross a total of about 135.8 miles of forest (33 percent of the total pipeline), of which about 130.3 miles are upland hardwood/coniferous forests and about 5.5 miles are palustrine forested wetlands or forested wetlands mixed with other wetland cover types (see section 4.7 for further discussion of wetlands). About 90 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 Cataaugus 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 (165.6 miles).

In consultation with the New York Natural Heritage Program (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.

ENDANGERED AND THREATENED SPECIES

To comply with the requirements of Section 7 of the ESA, we have conducted informal consultation with the FWS and NMFS, and have 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, is assisting 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.

The FWS and NMFS have commented on the endangered and threatened species that may potentially occur in the project area (FWS, 1997, 1998, 1999; NMFS, 1997, 1998a, 1998b, 1999). To date, the FWS and NMFS have not completed their review of the project and have directed Millennium to initiate consultations. The FWS further indicated that a BA may be required for the project since it is a major construction activity involving a Federal action (FWS, 1999) (see section 5.6 for discussion of the BA). Although the NMFS has indicated that portions of the project (e.g., Haverstraw Bay) may be within areas designated as Essential Fish Habitat under the Magnuson-Stevens Fishery Management Act legislation, the status of this legislation is still pending. To date, Millennium has conducted no surveys for federally- or state-listed species.

Federally-Listed or Proposed Endangered and Threatened Species

Based on these consultations, we identified three federally endangered and three federally threatened species that possibly occur in the project area. The three endangered species are the shortnose sturgeon, dwarf wedge mussel, and the peregrine falcon. The three federally threatened species are the bald eagle, bog turtle, and northern wild monkshood.

The six federally-listed species and the New York counties where they may occur along the project are listed in table 4.6.1-1. A discussion of the species ranges, distributions, habitats, reasons for decline, and probable locations along the project route, is provided below.

Shortnose Sturgeon

The endangered shortnose sturgeon is an diadromous species that is known to occur in the Hudson River in the vicinity of the pipeline crossing at MP 387.9. The shortnose sturgeon is a benthic predator that feeds on macroinvertebrates during the summer months, preferably near the oligohaline region of the river, containing 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. The reasons for the endangered status in its range are primarily due to impoundments and pollution which have resulted in substantial loss of habitat. Dredging and disposal of materials are current threats to this species.

Although the shortnose sturgeon is a federally endangered species, monitoring data collected for electric utilities suggest that populations have been increasing. 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 more than 400 percent from the 1970s to the present (Dovel estimated 13,000 fish in the 1970s and Bain estimates a present [1995] population of about 55,000).

TABLE 4.6.1-1

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

Species	Status ^{a/}	Locations Where Species May Occur
<u>Fish</u>		
Shortnose sturgeon <i>Acipenser brevirostrum</i>	F-E, NY-E	Hudson River, Rockland and Westchester Counties
<u>Mussels</u>		
Dwarf wedge mussel <i>Alismodonta heterodon</i>	F-E, NY-E	Neversink River, Orange County
<u>Birds</u>		
Peregrine falcon <i>Falco peregrinus anatum</i>	F-E, NY-E	All Counties
Bald eagle <i>Haliaeetus leucocephalus</i>	F-T, NY-E	Chautauqua, Broome, Delaware, Sullivan, and Orange Counties
<u>Reptiles</u>		
Bog turtle <i>Clemmys muhlenbergii</i>	F-T, NY-E	Sullivan, Orange, Rockland, and Westchester Counties
<u>Plants</u>		
Northern wild monkshood <i>Aconitum noveboracense</i>	F-T, NY-E	Sullivan and Delaware Counties
F-E = Federal Endangered Species F-T = Federal Threatened Species NY-E = New York Endangered Species		

The Hudson River provides overwintering and spawning habitat for this species (NMFS, 1997). There have been inconsistent descriptions of shortnose sturgeon migratory behavior due to the varying habitat distributions used during the four life stages of the shortnose sturgeon. The life stages of the shortnose sturgeon includes spawning adults, non-spawning adults, juveniles, and larvae. The larvae have been associated with deep waters and strong currents in the spawning areas between river miles 120 and 153. Since the proposed crossing is in the vicinity of river mile 35, construction activities would not directly affect spawning areas or larvae.

Research from other rivers indicates 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. 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.

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, 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.

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 juveniles occupy the same broad region of the Hudson River near Haverstraw Bay that the non-spawning adults inhabit (NMFS, 1998c). The population of shortnose sturgeon likely to inhabit portions of Haverstraw Bay during the winter construction period would be non-spawning adults and older juveniles.

Dwarf Wedge Mussel

The endangered dwarf wedge mussel is known to occur near the proposed crossing of the Neversink River (MP 341.0) in Orange County. This mussel is usually found in shallow water (less than five feet deep) along shores made of firmly packed aggregates of gravel, sand, cobble, and small rocks. The lower Neversink River supports one of the last remaining populations of the dwarf wedge mussel in New York (NYSDEC, 1997a, 1997b, 1999; TNC, 1998). Millennium confirmed the presence of this mussel species in the vicinity of the proposed crossing of the Neversink River through data from the NYSDEC and TNC. The reasons for the mussel's decline are primarily due to impoundments and water pollution.

Peregrine Falcon

The endangered peregrine falcon is a transient throughout New York, but is becoming reestablished as a breeding species in the state and nationwide due to a FWS recovery program which has been reintroducing captive young into their native ranges. The FWS has proposed delisting the peregrine falcon as an endangered species because of the success of this program. Although this bird species could possibly occur as a transient or nesting species in the vicinity of the project, there are no records of the peregrine falcon inhabiting the project area. The peregrine falcon inhabits open country, usually along rivers and near lakes and the seacoast, and migrates primarily along the coast. Decline of the peregrine falcon has been due to primarily lowered reproduction and adult mortality from the accumulation of pesticides.

Bald Eagle

The threatened bald eagle could possibly occur as a transient, winter resident, or nesting bird along the proposed route. The bald eagle is a rare nesting bird in the state and nests near undisturbed large lakes or reservoirs, in marshes and swamps, and along rivers. Nests are usually in trees, but are also on cliffs. Bald eagles usually return to the same nesting area each year and some pairs may maintain as many as five different nests within a 1-mile radius. The pipeline would cross a large bald eagle winter concentration area in the Mongaup Valley WMA in Sullivan County between MPs 323.9 and 330.1. The bald eagle is known to nest within the Mongaup WMA. According to correspondence between Millennium and the NYSDEC, field surveys for the bald eagle within the WMA have not been requested since nesting locations are known (NYSDEC, 1998b, 1998d).

Reasons for the past decline of bald eagle populations include habitat destruction, pesticides, and human disturbance. Due to the success of the bald eagle recovery program, including the reintroduction of captured young into its former range, the listing of the bald eagle was recently changed from endangered to threatened in the lower 48 states.

Bog Turtle

The threatened bog turtle may occur in the project area, where it is known to occur in Sullivan, Orange, Rockland, and Westchester Counties (approximate MPs 298.1 to 422.4). Preferred habitat includes sphagnum bogs, swamps, and clear, slow-moving meadow streams with muddy bottoms. It is rare or extirpated in many regions of New York where it commonly occurred. Habitat loss and degradation from wetland draining and alteration, and illegal collection for the commercial pet trade have contributed to its decline throughout its range. The NYSDEC stated that no surveys for the bog turtle would be required since there are no areas where the pipeline would have important impacts on the bog turtle (NYSDEC, 1998a).

Northern Wild Monkshood

The threatened northern wild monkshood could possibly occur in the project area in Sullivan and Delaware Counties (approximate MPs 275.4 to 333.0). It is found along streambanks, talus slopes, and cold woods in central and east central New York. The FWS indicated that this plant species may occur in the vicinity of the project (FWS, 1998). Its current status is due to the loss and modification of its habitat.

4.6.2 Other Special Status Species

In addition to federally endangered and threatened species, fourteen other special status species may occur in the project area (see table 4.6.2-1). These special status species include six Federal species of concern and nine species identified as state-listed endangered or threatened species. These species were identified from the same sources used to identify federally-listed endangered and threatened species.

The Federal species of concern are the Blanding's turtle, Atlantic sturgeon, longhead darter, green floater, swollen wedge mussel, and yellow lampmussel. Although the FWS identified the bean villosa (*villosa fabalis*) as a Federal species of concern, we have found no record of this species in New York although it is listed as potentially occurring in Ohio. The state-listed species are the Allegheny woodrat, timber rattlesnake, lake chubsucker, heartleaf plantain, little-leaf tick-trefoil, northern wild comfrey, shrubby St. Johns-wort, tall tick-clover, and Torrey's mountain mint.

The Blanding's turtle occurs in Orange, Rockland, and Westchester Counties, New York. The NYSDEC, which lists this turtle as threatened in the state, stated that there were no areas where the pipeline should have important impacts on this species and that surveys would not be required (NYSDEC, 1998a). The longhead darter is known to occur in the Allegheny River drainage (Smith, 1985). The three freshwater mussels are known to inhabit the Hudson, Susquehanna, and Delaware River drainage systems (Peckarsky et al, 1990). The swollen wedge mussel, which is also listed as endangered in New York, is known to inhabit the Neversink River in Orange County.

TABLE 4.6.2-1

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

Species	Status ^{a/}	Counties Where Species May Occur
<u>Mammals</u>		
Allegheny woodrat <i>Neotoma magister</i>	NY-E	Orange and Rockland Counties
<u>Reptiles</u>		
Blanding's turtle <i>Emydoidea blandingii</i>	F-SC, NY-T	Sullivan, Orange, Rockland, and Westchester Counties
Timber rattlesnake <i>Crotalus horridus</i>	NY-T	Sullivan, Broome, Delaware, and Orange Counties
<u>Fish</u>		
Atlantic sturgeon <i>Acipenser oxyrinchus</i>	F-SC	Hudson River, Rockland and Westchester Counties
Lake chubsucker <i>Erimyzon succetta</i>	NY-T	Orange County
Longhead darter <i>Percina macrocephala</i>	F-SC, NYSC	Cattaraugus County
<u>Mussels</u>		
Green floater <i>Lasmigona subviridis</i>	F-SC	Steuben and Broome Counties
Swollen wedge mussel <i>Alasmidonta varicosa</i>	F-SC, NY-E	Orange County
Yellow lampmussel <i>Lampsilis cariosa</i>	F-SC	Tioga and Broome County
<u>Plants</u>		
Heartleaf plantain <i>Plantago cordata</i>	NY-T	Rockland County
Little-leaf tick-trefoil <i>Desmodium ciliare</i>	NY-T	Westchester County
Northern wild comfrey <i>Cynoglossum virginianum boreale</i>	NY-T	Steuben and Orange Counties
Shrubby St. Johns-wort <i>Hypericum rolificum</i>	NY-T	Westchester County
Tall tick-clover <i>Desmodium glabellum</i>	NY-T	Westchester County
Torrey's mountain mint <i>Pycnanthemum torrei</i>	NY-E	Rockland and Westchester Counties

^{a/} **Status:**
 F = Federal
 NY = New York

SC = Species of Concern
 E = Endangered
 T = Threatened

The state endangered Allegheny woodrat is known to occur in the vicinity of the 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 close 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 project include the lake chubsucker and 6 plant species.

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. Where access was unattainable, wetlands were identified from available FWS National Wetlands Inventory (NWI) maps, recent aerial photography, and NYSDEC regulated freshwater wetland maps. About 18 percent of the wetlands along the pipeline route were identified by map and aerial photo interpretation.

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 vegetated wetlands for a total crossing length of 41.4 miles, 11 percent of the total length of the pipeline on land (see table G1 in appendix G). Of this amount, 55 wetland crossings (with a total crossing length of 6.3 miles) would be through NYSDEC-regulated wetlands (see table 4.7-1).

The majority of wetlands that would be crossed by the pipeline are freshwater palustrine vegetated 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 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 associated with submerged or emergent wetland vegetation.

About 5.5 miles (13 percent) of the affected freshwater wetlands are forested wetlands or mixtures of forest and other wetland types that are predominantly forested. The forested wetlands 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 arrowwood, witch-hazel, American elder, black willow, and red-osier dogwoods. Sensitive fern, giant goldenrod, and spotted-touch-me-not are typical herbaceous species.

About 4.0 miles (10 percent) of the affected freshwater wetlands are scrub-shrub and 31.3 miles (76 percent) are emergent, or mixtures of these cover types with other wetland types. Common species in the shrub layer of these wetlands include northern arrowwood, 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, purple loosestrife, sedges, and soft rush. In addition, about 0.6 mile (1 percent) of open water habitat would be crossed.

TABLE 4.7-1

NYSDEC-Regulated Wetlands

County	Approximate Milepost	NWI Classification g/	NYSDEC-Regulated Wetland Number	Crossing Length (ft)
Chautauqua	45.1	PSS	SH-10	414
	47.0	PEM/PSS	WF-2	530
	47.9	PSS/PEM	HF-5	792
	49.3	PSS/PEM	HF-2	484
	49.4	PSS/PEM	HF-2	484
	56.9	PEM/PFO	EC-5	178
	59.8	PEM	EC-18,EC-2	4,189
	60.7	PEM	EC-2	1,631
Cattaraugus	72.4	PEM	KE-5	598
	72.6	PEM/PFO	KE-5	1,686
	72.9	PEM	KE-5	257
	78.3	PEM/PSS	RA-7	1,289
	81.4	PEM	RA-4	522
	115.0	PEM	PV-12	612
Steuben	173.6	PEM/PSS/POW	RB-8	281
	176.5	PEM	CB-4	105
	176.7	PEM	CB-4	157
Chemung	198.5	PEM	HH-2	615
	206.4	PEM/PSS	ER-1	664
Broome	240.7	PSS/PEM	ME-4	445
	249.8	PEM/PSS	CC-12	505
	249.9	PFO	CC-12	465
Delaware	292.1	PEM	FE-14	505
Sullivan	304.3	PEM	CA-13	59
	304.4	PFO	CA-13	182
	308.4	PEM	DA-2	211
	316.9	PEM/PFO	LH-54	314
	317.9	PEM/POW/PFO	LH-55	339
	318.9	PFO	EL-2	692
	320.7	PFO/PEM	EL-21	1,091
	321.4	PSS/PEM	EL-22	239
	321.5	PEM/PSS	EL-22	264
	322.0	PEM/PFO	EL-34	817
	322.3	PEM	EL-34	588
	323.7	PEM/PSS/PFO	HL-28	376
	326.0	PEM	HL-43	343
	Orange	334.5	PFO/PSS/PEM	PN-9
335.1		PFO/PSS/PEM	PN-14	663
337.1		PEM/PFO	PN-23	281
337.5		PEM/PFO	PN-26	1,145
343.4		PEM/PSS/PFO	UN-1	476
344.3		PSS/PEM	OT-33	752
349.6		PFO	UN-18	27
352.4		PEM	PI-13	147
354.2		PEM	PI-15	246
355.5		PEM	PI-21	346
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
362.8		PEM/PSS	WR-27	165
367.4		POW	SL-3	2,057

TABLE 4.7-1 (cont'd)

County	Approximate Milepost	NWI Classification ^{a/}	NYSDEC-Regulated Wetland Number	Crossing Length (ft)
Westchester	397.8	SS	0-3	179
	404.3	PEM	0-9	706
	404.4	PEM	0-9	593
TOTAL			55 wetland crossings	33,398 (6.3 miles)

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

Several wetlands, located primarily east of MP 354.0, contain the noxious weed purple loosestrife. Purple loosestrife thrives on disturbed, moist soils, often invading after some type of construction activity. Purple loosestrife forms dense brushlike stands, usurping water while forcing out 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.

No wetlands would be affected by the aboveground facilities.

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 384.4 miles of pipeline in 12 counties in New York for a total of 417.3 miles of pipeline. Table 4.8.1-1 tabulates the miles of land and open water crossed by current use. Of the land segment, the predominant land use is open land (about 165.6 miles, or 43 percent of the land crossed) and includes pasture, open fields, and herbaceous wetlands. Other land uses crossed include forest (135.8 miles, 35 percent), agriculture (59.4 miles, 16 percent), industrial/commercial land (9.2 miles, 2 percent), open water (4.4 miles, 1 percent), and residential land (4.4 miles, 1 percent), with the remaining 5.6 miles of pipeline crossing land classified by Millennium as "other" that include roads in which the pipeline would be placed in Westchester County.

Forest 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 totalling 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 totalling about 5.2 miles (MPs 62.9, 63.5, and 65.7 in Chautauqua County; MP 91.2 in Cattaraugus County; and MPs 152.5, 155.8, 156.0, and 183.8 in Steuben County) (also 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).

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 right-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

TABLE 4.8.1-1
and Use Crossed by the Millennium Pipeline

State/County	Forest a/		Agriculture b/		Open c/		Industrial/ Commercial d/		Residential e/		Water f/		Other g/		Total (mi)	Adjacent to existing Right-of-Way	
	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)	(mi)	(%)		(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	0.0	0%
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	32.4	83%
Cattaraugus	24.3	54%	9.1	20%	10.5	23%	0.7	2%	0.2	2%	0.1	0%	0.0	0%	44.9	28.6	64%
Allegany	16.2	52%	5.4	17%	8.6	28%	0.3	1%	0.4	1%	0.0	0%	0.0	0%	30.9	26.0	84%
Steuben	20.5	47%	13.6	31%	8.5	20%	0.2	1%	0.3	1%	0.1	0%	0.0	0%	43.2	43.2	100%
Chemung	13.8	55%	4.1	16%	7.2	28%	0.0	0%	0.0	0%	0.1	0%	0.0	0%	25.2	23.0	91%
Tioga	10.7	49%	3.8	17%	7.1	32%	0.1	0%	0.3	1%	0.1	0%	0.0	0%	22.1	21.9	99%
Broome	17.6	47%	4.9	13%	13.5	36%	0.4	1%	0.7	2%	0.4	1%	0.0	0%	37.5	37.2	99%
Delaware	7.1	31%	0.8	4%	14.4	63%	0.0	0%	0.1	0%	0.2	1%	0.0	0%	22.6	21.7	96%
Sullivan	1.2	4%	2.7	8%	29.7	85%	0.6	2%	0.4	1%	0.3	1%	0.1	0%	35.0	35.0	100%
Orange	3.2	8%	5.3	13%	28.1	70%	1.2	3%	1.4	4%	0.3	1%	0.6	1%	40.1	39.2	98%
Rockland	2.3	23%	0.0	0%	5.9	56%	0.5	4%	0.3	3%	1.3	2%	0.2	2%	10.5	8.4	80%
Westchester	3.1	9%	0.0	0%	19.0	57%	5.1	15%	0.0	0%	1.4	4%	4.7	4%	33.3	30.4	91%
Land Sub-Total:	135.8	35%	59.4	16%	165.6	43%	9.2	2%	4.4	1%	4.4	1%	5.6	2%	384.4	347.0	90%
TOTAL:	135.8	33%	59.4	14%	165.6	40%	9.2	2%	4.4	1%	37.3	9%	5.6	1%	417.3	347.0	83%

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 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.

According to cross-sections provided by Millennium in appendix C, about 347.3 miles of the pipeline on land (90 percent) would be constructed adjacent to or within existing rights-of-way. The remaining 37.1 miles of pipeline on land and the 32.9 miles of pipeline in Lake Erie would be constructed on new right-of-way.

A total of 2.9 acres would be required for the construction of 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. 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 removed. The Mount Vernon Station would occupy an urban site within an existing parking lot.

4.8.2 Existing and Planned Residential and Commercial Development

Millennium estimates that 217 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). Eighty-one residences are in Westchester County where the pipeline would be placed within the streets, and one residence in Chautauqua County would be less than 25 feet from the construction work area. Millennium also identified 231 septic systems located on properties 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.

While the pipeline does not cross any proposed commercial or industrial developments, it does affect about 9.3 miles of existing commercial/industrial land use. Millennium has stated that no business, commercial, or retail structures would be displaced by the project. About 55 percent of the industrial/commercial land that would be crossed is in Westchester County.

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	8		7		6		8
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		5

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	Rockland	383.6 (2)	Westchester	419.2-422.4
	309.9		339.5		383.7		(81)
	310.4		339.9		384.1		
	312.7		340.0 (4)		384.2		
	312.8 (2)		340.1		385.9 (2)		
	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		81

GRAND TOTAL: 217 residences

NOTE: Numbers in parens () 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		154.2
	42.4		100.0		124.0		157.2
	43.6		111.2		124.3		158.4 (2)
	49.6		115.4		126.8		178.1
	61.4				127.9 (2)		181.8 (4)
	63.3				129.6		181.9
	66.1				129.8		185.3
	67.6				135.1		185.4
	68.0				136.4		185.5
					137.6		186.0 (2)
					138.8		186.4
					140.7		186.6 (2)
					140.8		190.0 (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		
					258.2 (3)		
					258.7		
		259.2 (5)					
		259.8 (4)					
		260.1 (7)					
		269.4					
		273.7 (3)					
		275.1 (2)					
		275.2					
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				
Sutotal	17		55		8		0

GRAND TOTAL: 231 septic systems

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

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 crossed and the current use of that area.

Designated Scenic and Recreational Waterbodies

The pipeline would be in Lake Erie between MP 0.0 and 32.9. The lake is a recreational fishery, and provides opportunities for boating and other water-based recreational activities (see section 4.4.1 for additional discussion of fisheries in Lake Erie). 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]).

State and Local Parklands

State and local open space areas crossed by the pipeline would include the Soaring Eagles/Mark Twain State Park and Golf Course (MP 198.5), the Village of Port Dickinson Community Park (MP 250.1), and the Sterling Forest Ski Area (MP 366.4). In addition, the pipeline would cross the Palisades Interstate Park (MP 367.7), which includes a chain of parks extending for 38 miles along the west 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 Harriman State Park (MP 369.7) and High Tor State Park (MP 385.1). The pipeline would also cross Kakiat Park, a 353-acre Rockland County park (MP 375.9).

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 86.9, 87.0 and 92.0; the Catharine Valley Trail at MP 198.5; and the Appalachian National Scenic Trail (AT) at MP 363.6. Other trails that would be crossed include those within the Palisades Interstate Park (the Suffern-Bear Mountain Trail [MP 375.9]), those within Harriman State Park, and those in Westchester County.

Golf Courses

Only one golf course, the Elmwood Country Club, would be crossed between MPs 411.5 and 411.8. The Elmwood Country Club leases land from ConEd for the golf course and the pipeline would be entirely within the ConEd powerline 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.

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 318.1 and 319.7; 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.

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.
	43.0	Chautauqua Creek/ Chautauqua Gorge	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.
	62.9 -66.5	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	Bicycle route following existing roadways.
	81.7	Southern Tier Bike Route	Bicycle route following existing roadways.
	84.5	Southern Tier Bike Route	Bicycle route following existing roadways.
	84.4 - 84.6	Buck N Bass Rod and Gun Club	Private recreation facility.
	86.9	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
	91.3 - 91.9	State of New York Reforestation Land	See above at MP 62.9.
	92.0	Finger Lakes Trail/North Country National Scenic Trail	See above at MP 86.8
Allegany	99.8 - 100.1	Alpine Sportsman Club	Private recreation club.
	101.8 - 102.9	Twin Rock Gun Club	Private recreation club.
	121.9 - 122.0	East Lovejoy Sportsmans Club	Private recreation club.
	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.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Steuben	152.3 - 155.9	State of New York Reforestation Land	3 parcels. See above at MP 62.9.
	167.7 - 168.0	Tracy Creek Club, Inc.	Private recreation club.
	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	Four parcels. 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	This trail, a converted railroad bed, connects the Soaring Eagles/Mark Twain State Park Golf Course with Taughannock Falls State Park. Trail is managed by the Town of Horseheads.
	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 restaraunt. The park is open from April to November, with bow hunting during hunting season. Golf course area would not be crossed.
	206.1 - 206.4	Chemung County Rod and Gun Club	Private recreation club.
Tioga	228.2 - 228.3	Tioga County	Public open space.
Broome	249.9 - 250.0	The Conservation Fund	Open space.
	250.1 - 250.2	Village of Port Dickinson	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.
	250.4 - 250.5	Village of Port Dickinson	Undeveloped property along Phelps Creek.
Delaware	275.8 - 275.9	Delaware County Soil and Water Conservation District	Public conservation land.
	276.0	West Branch Delaware River	The West Branch of the Delaware River upstream to the Cannonsville Dam has been designated for study as a potential addition to the New York State Wild, Scenic and Recreational Rivers System.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area	
Delaware (cont'd)	287.0	East Branch Delaware River	The East Branch of the 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.	
	287.8 - 288.1	F Troop Ltd.	Undeveloped open space.	
	288.1	Melrose Sportsmen Inc.	Private recreation club.	
	290.2 - 290.9	Gee Brook Club	Leased hunting lands.	
	292.5 - 292.6	Tomar Mountain Gun Club, Inc.	Private recreation club.	
	294.1 - 294.8	Falcon Gun & Rod Club, Inc.	Private recreation club.	
	297.1 - 297.5	Gun & Rod Holding Corporation	Private recreation club.	
	Sullivan	310.8 - 311.8	Stony Brook Hunting Club, Inc.	Private recreation club.
		318.1 - 319.7	Ten Mile River Reservation	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 or rafting, fishing, and skiing.
		320.7 - 322.4	Excelsior Sportsman Club	Private recreation club.
323.9 - 330.1		Mongaup WMA	3 crossings of conservation land managed by the NYSDEC for protection of raptor nesting and winter concentration areas along the Mongaup River.	
Orange	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.	
	331.9 - 333.0	Hartwood Club, Inc.	Private recreation club.	
	333.6 - 333.9	Little Acres Hunting Club	Private recreation club.	
	335.3 - 336.9	Cahoonzie Club, Inc.	Private recreation club.	
	338.0 - 338.4	Red Rock Hunting Club	Private recreation club.	
	340.3	County of Orange, Dept. Of Finance	Undeveloped parcel.	
	345.2 - 345.4	Town of Greenville	Undeveloped parcel.	
	349.8 - 349.9	State of New York, Mental Retardation	Public health facility.	

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
Orange (cont'd)	350.7	Walkill 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.
	358.1 - 358.6	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.
	363.6	Appalachian National Scenic Trail	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 along the ridgeline of Bellvale Mountain, north of Greenwood Lake in Orange County, on land recently acquired by the National Park Service.
	366.4 - 366.7	Sterling Forest Ski Area	Private in-holding within the Sterling Forest. The ski area currently has 7 trails and 4 double chair lifts.
	Rockland	367.7 - 376.4	Palisades Interstate Park/Harriman State Park
371.5		Ramapo-Dunderberg Trail	Hiking trail within the Palisades Interstate Park.
371.8		Torne Mt. Ivy Trail	Hiking trail within the Palisades Interstate Park.
373.2		Kakiat Trail	Two crossings of hiking trail within the Palisades Interstate Park.
376.0		Suffern-Bear Mountain Trail	Hiking trail within the Palisades Interstate Park.
375.9 - 376.6		Kakiat Park	A 353-acre Rockland County park providing opportunities for hiking, fishing, and picnicking.
383.7 - 384.1		Town of Clarkstown	Public open space. Undeveloped parcel.
385.1 - 385.6		High Tor State Park	Day use facility for picnicking, swimming and hiking.
386.6		Village of West Haverstraw	Public open space. Undeveloped parcel.

TABLE 4.8.3-1 (cont'd)

County	Approximate Milepost	Area Name	Use of Area
	387.4 - 387.5	Village of West Haverstraw	Public open space. Ball fields, developed recreation facilities.
Westchester	390.1 - 391.2	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.
	395.3 - 395.5	Old Croton Trail/Croton Gorge Park	4 crossings of the trail that extends from the Croton Dam to the Bronx on existing powerline right-of-way. The trail is on top of the abandoned old Croton Aqueduct, which carried water from the Croton Reservoir system to New York City.
	396.7 - 397.0	Cliffdale/Teatown Trail, Briarcliff/Peekskill Trailway, Northwest Trail	The Teatown Lake Reservation consists of 740 acres and includes several hiking trails, a 33-acre lake, streams, scenic gorge, hardwood swamps, and other natural areas. The Briarcliff Peekskill Trailway is a 12-mile linear park which runs north from the town of Ossining to the Blue Mountain Reservation in Peekskill.
	397.0	Unnamed Trail	Hiking Trail.
	397.	Lakeside Trail	Hiking Trail.
	397.2	Lakeside Trail	Hiking Trail.
	397.2 - 397.9	Back 40 Trail	Hiking Trail within electric transmission corridor.
	399.8	North County Trailway	Paved bicycle/pedestrian path located primarily on railroad right-of-way lands. The right-of-way extends for 36.2 miles through Westchester County and includes 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.
	405.2 - 408.0	North County Trailway	See above at MP 399.8.
	409.5	Westchester County Park	Undeveloped open space.
	411.5 - 411.8	Elmwood Country Club	Private golf club.
	412.8	Secor Woods Park	Developed recreation facilities including ball fields and tennis courts.
	415.3 - 418.0	Sprain Ridge Park	278 acre county park. Facilities include Playground, swimming, picnicking, hiking/walking, refreshments, wheelchair accessible.
	420.4	Bronx River Park	Developed recreation including ball fields.

Hazardous Waste Sites

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

County	Town	Approximate Milepost	Description
Allegany	Wellsville	137.4	Sinclair Refinery
Steuben	Erwin	182.4	The EPA database indicates that 10 hazardous waste sites exist at this location including the 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	The EPA database indicates that 8 distinct hazardous waste sites exist at this location including Classic Cleaners, New York State DOT, Frito Lay, Auburn Sewage Treatment, and Rose Ready Mix.
Rockland	West Haverstraw	386.7	Special Touch Cleaners
	Haverstraw	387.8	Anthony Morina Homeowners Association.

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. 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.

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 (NY SHPO, 1997a, 1997b, 1998a, 1998b, 1998c, 1998d, 1998e, 1999; PA SHPO, 1998a, 1998b, 1998c, 1998d).

Lake Erie and the Hudson River

The marine geophysical survey in Lake Erie was conducted over a 410-foot-wide overlapping corridor on either side of the pipeline in Pennsylvania and New York. One target 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 targets. 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 targets.

Land Surveys

To date, Millennium has 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 B3;
- 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, or locations in Westchester County where the pipeline would be in city streets (MPs 417.3 to 422.4). In this area in Westchester County, in consultation with the SHPO, Millennium proposes to develop a series of streetscape 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 4.9-1 identifies tracts by county where initial cultural surveys are still pending.

To date, Millennium's surveys resulted in the identification of 482 cultural resources ranging from isolated prehistoric and historic artifacts to complex stratified prehistoric sites and architectural resources (see table 4.9-2). 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. Eight 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. Table 4.9-3 summarizes by county sites where additional surveys are recommended.

TABLE 4.9-1

Tracts Where Cultural Resource Surveys Are Pending

Facility	Number of Tracts	Approximate Milepost	Total Feet	Total Miles
Pipeline				
Chautauqua County	6	--	4,120	0.8
Cattaraugus County	13	--	13,630	2.6
Allegany County	6	--	14,695	2.8
Steuben County	7	--	11,375	2.2
Chemung County	8	--	10,880	2.1
Tioga County	1	--	2,275	0.4
Broome County	10	--	2,335	0.4
Delaware County	5	--	9,624	1.8
Sullivan County	14	--	13,790	2.6
Orange County	16	--	13,300	2.5
Rockland County	21	--	7,855	1.5
Westchester County	NA	417.3	--	5.7
TOTAL	107	--	103,879	25.4

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 (NY SHPO, 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.

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 and comments from the New York and Pennsylvania SHPOs, and the FERC have been incorporated into a revised plan that was filed, along with the final report on cultural resources surveys, with the Commission and the SHPOs in November 1998.

TABLE 4.9-2

Sites Identified during the Cultural Resource Surveys

County	Oil/Gas Related Sites	Structures	Parks, Hunt Clubs, Gun Clubs	Railroads	Historic Roadways and Street-scapes	Quarries	Graves and Cemeteries	Historic Isolates	Historic Scatters and Dumps	Canals	Pre-historic/Historic Sites	Prehist. Isolates	Prehist. Scatters	TOTALS
Chautauqua	1	12		3				7	10		8	11	14	66
Cattaraugus	3	6		4			--	5	13		2	8	12	53
Allegany	6	6		1			--	1	12		1	2		29
Steuben		15		3			2	6	8		2	2		38
Chemung		7	1	2					5		7	3		25
Tioga	1	6		1				10	11		2	4		35
Broome	1	20		1			1	19	33	1	8	11	4	99
Delaware		7				3		1	5			1	2	19
Sullivan	1	17	2	1			1	4	10			2		38
Orange	2	22	1	5	1			1	8	1		8	2	51
Rockland		5	2	1	1	--	--	--	4					13
Westchester		2		2	8				2		1	1		16
TOTAL	15	125	6	24	10	3	4	54	121	2	31	53	34	482

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TABLE 4.9-3

Sites which are Recommended for Additional Cultural Resources Investigation ^{a/}

County	Prehistoric/ Historic Sites	Prehistoric Sites ^{b/}	Historic Sites ^{c/}	Structures
Chautauqua	1-T	1-I ; 4-T	1-I ; 4-T	--
Cattaraugus	--	4-I ; 3-T	3-T	--
Allegany	--	--	1-I ; 3-T	2-T
Steuben	--	--	--	--
Chemung	2-T	--	1-I	1-I
Tioga	--	--	2-I	1-T
Broome	5-T	1-I 4-T	3-I ; 4-T	--
Delaware	--	1-T	2-T	3-I
Sullivan	--	--	1-I ; 1-T	--
Orange	--	3-I ; 1-T	5-I ; 1-T	3-I
Rockland	--	--	3-I ; 1-T	--
Westchester	1-I	1-I	3-I ; 1-T	--
TOTAL	1-I ; 8-T	10-I ; 13-T	20-I ; 20-T	7-I ; 3-T

^{a/} I = Identification level survey; T = Testing or study to determine if NRHP-eligible.

^{b/} Historic sites include: oil/gas-related sites; parks, hunt, and gun clubs; railroads; historic roadways; quarries; graves and cemeteries; historic isolates and scatters.

^{c/} Prehistoric sites include prehistoric isolates and scatters.

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. Millennium states that it would file any additional correspondence received from Native American groups contacted about the project.

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 4.11-1 summarizes selected socioeconomic statistics for the project area.

In 1995, population density, an indication of the extent of development, ranged from a low of 33 persons per square mile (Delaware County, New York) to a high of 37,324 persons per square mile

(Westchester County, New York). Counties with the largest growth over the 15-year period between 1980 and 1995 included Sullivan County (+8 percent), Orange County (+25 percent), and Rockland County (+7.2 percent). The substantial population increase in Orange County is attributed to improved access which allowed it to become a suburb of New York City. Population decreased over the 15-year period in Chautauqua County (- 4.2 percent), Allegany County (- 0.9 percent), and Broome County (- 5.7 percent). Population in the remaining counties either remained about the same or increased by between 1 and 6 percent.

Employment in the project area is generally good with 1995 unemployment rates ranging from a low of 3.4 percent (Tioga County) to a high of 7.0 percent (Allegany County). In 1993, industries that employ the workforce vary across the project area with most of the employed work force fairly evenly distributed in the manufacturing, wholesale and retail trade, or services industries. The eight counties west of Broome County are generally oriented towards manufacturing, with the exception of Chemung County. Chemung County and the remaining counties east of Broome County are generally more oriented towards the service and trade industries. In 1990, agriculture accounted for 30 to 40 percent of the total county land use in Chautauqua, Steuben, and Tioga Counties. The counties with the least agriculture were Rockland and Westchester Counties.

In 1994, per capita income ranged from a low of \$14,285 in Allegany County to a high of \$37,324 in Westchester County, New York. The affected counties were below the statewide per capita income of \$25,720, with the exception of Rockland County (\$28,201) and Westchester County (\$37,324).

In 1990, housing vacancy rates in the project area averaged 13 percent and ranged from a low of 3.8 percent (Rockland County) to a high of 41.2 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 housing units were in Westchester County (336,727 units), Orange County (110,814 units), Erie County, Pennsylvania (108,585 units), and Rockland County (88,254 units). The fewest housing units were in Tioga County (20,254 units) and Allegany County (21,951 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, Mount Vernon, and others (Westchester County).

TABLE 4.10-1

Selected Demographic Statistics

	New York	Chautauqua County	Cattaraugus County	Allegany County	Steuben County	Chemung County	Tioga County	Broome County
1990 land area (square miles)		1,062	1,309	1,030	1,393	408	519	707
1995 total population	18,136,081	140,800	85,680	51,282	99,201	93,282	52,520	201,533
Percent change (1980 to 1995)	3.3%	-4.2%	0.0%	-0.9%	0.0%	-4.5%	+ 5.4%	-5.7%
1995 persons per square mile	386	133	66	50	68	230	102	286
1995 civilian labor force	8,493,429	68,400	40,300	24,000	486,000	44,700	26,000	99,700
Percent unemployment rate	6.3%	5.4%	6.8%	7.0%	5.9%	4.5%	3.4%	3.8%
1994 per capita income	\$25,720	\$17,423	\$15,686	\$14,285	\$18,497	\$18,880	\$17,833	\$19,933
1993 total non-farm establishments		3,215	1,803	822	1,854	2,030	750	4,608
Percent retail trade		29.5%	32.2%	31.3%	32.9%	31.8%	30.3%	29.1%
Percent services		32.8%	29.8%	32.5%	35.0%	35.4%	33.3%	35.1%
1992 number of farms		1,679	941	682	1,254	285	507	517
Percent of total land		38%	24%	25%	41%	23%	35%	22%
1990 total housing units	7,226,891	62,682	36,839	21,951	43,019	37,290	20,254	87,969
Percent change (1980 to 1995)	+5.2%	+2.9%	+5.7%	+5.9%	+6.2%	+ 1.6%	+ 12.6%	+7.3%
Percent vacant	8.1%	14.3%	17.3%	22.5%	13.3%	5.4%	7.0%	7.0%
Percent mobile home/trailer	2.7%	7.3%	13.7%	16.0%	15.6%	5.8%	17.0%	5.7%
Percent owner-occupied	52.2%	68.6%	65.4%	73.1%	73.1%	68.3%	78.8%	65.4%

TABLE 4.10-1 (cont'd)

	Delaware County	Sullivan County	Orange County	Rockland County	Westchester County
1990 land area (square miles)	,446	970	816	174	433
1995 total population	47,287	70,346	324,422	278,136	893,412
Percent change (1980 to 1995)	+1.0%	+8.0%	+25.0%	+7.2%	+3.1%
1995 persons per square mile	33	73	399	1,604	37,324
1995 civilian labor force	21,000	32,700	153,700	142,000	446,200
Percent unemployment rate	4.9%	5.1%	4.0%	4.2%	3.7%
1994 per capita income	\$15,705	\$20,155	\$20,497	\$28,201	\$37,324
1993 total non-farm establishments	1,191	2,231	7,181	7,695	28,897
Percent retail trade	29.6%	28.1%	27.6%	21.8%	21.3%
Percent services	32.0%	35.6%	34.3%	39.6%	38.5%
1992 number of farms	716	306	641	27	97
Percent of total land	21%	9%	20%	1%	2%
1990 total housing units	27,361	41,814	110,814	88,264	336,727
Percent change (1980 to 1995)	+20.3%	-8.8%	+18.8%	+10.1%	+6.3%
Percent vacant	35.5%	41.2%	8.4%	3.8%	5.0%
Percent mobile home/trailer	16.7%	12.4%	3.7%	1.3%	0.1%
Percent owner-occupied	74.1%	68.7%	67.5%	63.7%	59.7%

SOURCE: U.S. Bureau of the Census: 1990 U.S. Census and County and City Data Book, 1994.
U.S. Bureau of the Census: 1994 County Business Patterns
U.S. Bureau of the Census: USA Counties 1996