Appendix

A.1: Mean Temperature and Total Precipitation

Dutchess County, New York

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Mean Temperature (Degrees Fahrenheit):[1]													
Glenham	26.2	28.1	37.6	49.6	60.2	69.3	74.1	72.4	65.0	53.7	42.9	30.9	50.8
Millbrook	23.2	25.5	34.5	46.5	56.8	65.2	69.7	68.2	60.9	50.7	39.9	27.9	47.4
Poughkeepsie	26.2	28.7	37.4	50.5	60.6	69.8	74.7	72.5	65.3	54.8	43.4	30.7	51.2
Poughkeepsie FAA AP	24.4	26.8	36.2	48.0	58.3	67.5	72.4	70.6	62.7	51.5	40.9	29.3	49.1
Total Precipitation (Inches):[1]													
Glenham	3.24	2.87	3.58	3.70	3.49	3.77	3.84	4.12	3.93	3.40	3.69	3.78	43.41
Millbrook	2.79	2.40	3.23	3.50	3.38	3.69	3.65	3.95	3.71	3.36	3.43	3.51	40.60
Poughkeepsie	2.55	2.65	2.94	3.59	3.00	2.95	3.31	3.81	3.46	3.00	3.47	3.29	38.02
Poughkeepsie FAA AP	2.75	2.42	3.28	3.66	3.62	3.43	3.50	3.77	3.66	3.30	3.57	3.20	40.16
Millerton[2]	2.88	2.83	3.74	4.63	2.81	2.98	3.71	4.62	4.32	3.95	3.34	3.01	42.82

Source: U.S. Department of Commerce, NOAA

Notes:
1. Mean temperature and total precipitation for every station except Pougkeepsie are based on the period 1951-1980. Data for the Poughkeepsie station are from the 1951-1970 period. Millbrook figures are partially estimated.
2. Millerton Station equipped with recording rain gages only, 1951-1960, and figures are partially estimated.

A.2: Weather Station Locations

Dutchess County, New York

Station	Latitude	Longitude	Elevation Above sea level
Glenham	41° 31'	73° 56'	275
Millbrook	41° 51'	73° 37'	815
Millerton (2 stations)	41° 57'	73° 31'	690,720
Poughkeepsie	41° 41'	73° 56'	103
Poughkeepsie FAA AP	41° 38'	73° 53'	154

Notes: The U.S. Department of Commerce, Weather Bureau, maintains or has maintained meteorological stations at Glenham (near Beacon), Millbrook, Poughkeepsie, and the Dutchess County Airport (Poughkeepsie FAA AP). Millerton has had a station equipped with rain gages only. These stations are indexed above.

A.3: Growing Degree Days

Poughkeepsie, New York

	Climatological Week Number	40° Base Mean	40° Base S.D.*	50° Base Mean	50° Base S.D.*
Mar. 1-7	1	5	7	0	0
	2	7	10	1	2
	3	15	24	2	8
	4	31	29	6	11
	5	38	30	9	15
	6	47	27	10	13
	7	59	40	18	25
	8	89	42	34	30
	9	103	33	41	28
May 10-16	11	132	28	63	27
	12	153	29	83	28
	13	163	32	93	31
	14	186	29	116	29
	15	194	24	124	24
	16	206	31	136	31
	17	222	27	152	27
	18	233	23	163	23
	19	237	24	167	24
July 19-25	21	243	22	173	22
	22	249	18	179	18
	23	235	26	165	26
	24	233	24	163	24
	25	223	22	153	22
	26	209	29	139	29
	27	212	31	142	31
	28	191	30	121	30
	29	173	28	103	28
Sept. 27-Oct. 3	31	127	26	59	24
	32	123	31	57	28
	33	108	35	46	30
	34	91	33	32	23
	35	67	33	19	20
	36	59	33	16	17
	37	36	25	7	9
	38	36	31	7	11
	39	17	21	3	6
Dec. 6-12	41	7	11	0	1
	42	2	3	0	0
	43	4	9	0	2
	44	3	6	0	1
	45	4	9	1	2
	46	2	7	0	1
	47	1	3	0	0
	48	2	4	0	1
	49	1	2	0	0
	50	1	1	0	0
	51	3	6	0	1
Feb. 21-27	52	5	12	1	3

Source: Cornell University Agricultural Experiment Station.
*S.D.: is the range of deviation from mean.

A.4: Average Wind Speeds (Knots[1])

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Avgs.
N	5.9	6.1	6.7	7.1	5.1	5.7	4.2	4.7	6.1	5.0	4.7	7.0	5.8
NNE	7.6	6.3	7.8	8.1	6.8	5.9	5.6	5.5	6.1	7.3	6.9	7.3	6.9
NE	4.0	4.2	5.8	4.8	4.6	4.3	3.6	4.1	3.8	5.5	5.1	5.8	4.7
ENE	3.1	4.4	5.3	4.1	3.7	3.7	3.6	3.4	3.0	4.4	4.9	3.5	4.0
E	2.5	3.0	3.4	3.8	3.8	3.2	3.0	3.0	2.3	3.4	6.1	4.2	3.5
ESE	3.4	3.7	6.8	5.8	4.8	3.9	3.6	3.8	3.1	3.7	6.1	6.0	4.6
SE	3.7	3.5	6.9	5.1	4.8	3.9	4.4	3.6	4.0	3.9	4.3	3.8	4.4
SSE	6.0	6.1	7.9	7.8	6.0	5.9	5.2	5.6	6.2	5.7	6.3	6.6	6.3
S	4.5	6.1	6.9	7.0	6.3	6.6	5.2	5.3	6.2	5.1	6.0	5.4	5.9
SSW	6.3	6.9	7.2	8.1	7.0	7.3	6.6	6.5	6.3	6.9	8.3	7.3	7.1
SW	5.5	6.2	7.1	7.3	6.7	7.3	6.2	6.2	6.3	7.3	7.3	7.5	6.8
WSW	8.8	8.5	9.8	10.4	8.8	8.0	7.4	7.1	7.3	7.8	9.8	10.0	8.9
W	8.3	7.8	9.5	9.2	6.1	6.6	4.7	5.7	7.2	7.0	6.5	9.2	7.6
WNW	10.7	11.8	12.0	10.6	9.0	9.1	7.6	7.0	8.0	8.0	10.4	11.3	10.3
NW	6.2	8.1	9.7	8.8	6.9	6.8	5.9	3.8	7.1	5.3	6.1	7.2	7.1
NNW	7.4	10.4	9.4	9.2	8.6	7.1	6.7	5.4	6.0	8.2	8.1	7.1	8.0
AVG.	5.9	6.5	7.4	7.1	5.3	5.3	4.4	3.9	4.4	4.7	5.3	6.4	5.5

Source: U.S. Department of Commerce, NOAA. Based on 8 observations per day, 1950-1954, at Station #14757, Poughkeepsie, N.Y.

Note: 1. 1 knot = 1.15078 miles per hour.

A.5: Wind Direction Frequencies

Percent of Total Observations

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Avgs.
N	7.4	6.3	5.7	4.0	4.1	3.4	3.3	3.7	4.6	4.5	3.2	5.8	4.7
NNE	14.6	10.4	11.7	13.0	10.8	8.6	6.2	9.2	8.5	11.2	8.7	9.2	10.2
NE	1.8	2.9	2.6	4.0	3.9	2.6	1.8	2.6	2.5	3.4	2.7	2.7	2.8
ENE	2.4	3.0	3.6	2.3	3.6	3.2	2.9	3.3	2.3	2.4	2.4	1.6	2.8
E	2.4	2.4	1.5	1.5	2.8	1.3	1.7	1.7	1.7	2.2	2.4	1.1	1.9
ESE	3.4	2.9	4.2	4.9	6.9	5.2	4.6	4.5	4.8	5.3	4.5	3.1	4.5
SE	2.0	1.6	2.7	3.0	3.0	2.9	3.4	3.7	2.8	2.4	2.7	1.9	2.7
SSE	7.7	6.0	7.7	10.6	9.5	10.0	10.6	7.5	9.8	8.5	7.0	6.9	8.5
S	3.5	4.2	3.3	5.7	4.0	6.2	6.3	8.1	5.8	3.3	3.2	4.1	4.8
SSW	9.1	6.3	6.4	9.5	7.3	11.7	11.3	9.1	10.0	7.8	9.6	9.7	9.0
SW	4.6	5.3	4.2	5.0	3.6	5.4	5.9	4.1	4.3	4.7	5.3	8.5	5.1
WSW	7.4	7.1	6.3	8.6	5.6	5.4	6.9	4.0	4.8	6.0	7.9	12.1	6.9
W	3.1	3.8	3.6	2.1	1.9	1.4	1.7	1.6	2.3	1.5	3.3	3.2	2.5
WNW	6.5	11.1	11.5	5.4	4.0	5.4	4.1	2.6	3.1	3.4	3.5	6.2	5.6
NW	3.2	5.5	3.8	2.1	3.5	1.9	2.4	1.6	2.1	1.9	2.8	3.2	2.8
NNW	9.8	9.2	9.9	8.8	8.0	8.1	4.7	5.0	5.4	6.7	5.2	5.4	7.2
CALMS	11.0	12.1	11.3	9.6	17.7	17.1	22.0	27.5	25.2	24.8	25.6	15.5	18.3

Source: U.S. Department of Commerce, NOAA. Based on 8 observations per day, 1950-1954, at Station #14757, Poughkeepsie, N.Y.

A.6: Annual Precipitation 1931 - 1980

Poughkeepsie, New York

Inches

1931	39.9	48	39.9	1965	27.7
32	45.9	49	33.9	66	31.0
33	43.9	1950	35.7	67	43.0
34	47.1	51	42.4	68	36.7
1935	32.0	52	46.0	69	41.5
36	45.1	53	45.3	1970	34.4
37	44.1	54	38.3	71	46.1
38	47.9	1955	44.7	72	54.8
39	30.5	56	36.3	73	44.4
1940	39.7	57	28.7	74	44.0
41	27.2	58	42.1	1975	55.2
42	40.7	59	39.9	76	42.3
43	40.1	1960	37.9	77	49.4
44	35.0	61	36.7	78	35.4
1945	60.3	62	31.6	79	45.4
46	31.3	63	31.2	1980	31.8
47	42.6	64	24.5		

Source: U.S. Department of Commerce, NOAA.
1931 to 1959 Data collected in Poughkeepsie.
1960 to 1980 Data collected at Dutchess County Airport.
1977 and 1978 Data collected in Millbrook.

A.7: Climatological Summary

Means and Extremes for Period 1951 - 1970

Poughkeepsie, New York

LATITUDE N41 41

LONGITUDE W73 56

ELEVATION 103

MONTH	TEMPERATURE (°F)													PRECIPITATION TOTALS (INCHES)													
	MEANS			EXTREMES						MEAN NUMBER OF DAYS										SNOW, SLEET						MEAN NUMBER OF DAYS		
										MAX.		MIN.																
	DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	RECORD HIGHEST	YEAR	DAY	RECORD LOWEST	YEAR	DAY	90° AND ABOVE	32° AND BELOW	32° AND BELOW	0° AND BELOW	MEAN	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR	DAY	MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DEPTH	YEAR	DAY	.10 or MORE	.50 or MORE	1.00 or MORE
JAN	35.5	16.8	26.2	66	67	24	-15+	61	22	0	11	29	2	2.55	5.25	53	1.83	62	6	10.0	39.8	61	36.0	61	22	6	2	0
FEB	38.6	18.7	28.7	70	53	22	-15+	61	2	0	7	26	2	2.65	4.66	62	1.93	51	1	11.2	29.0	62	16.0	61	4	6	2	1
MAR	47.6	27.2	37.4	80	62	30	-3	67	19	0	1	24	0	2.94	7.11	53	1.53	51	31	8.5	31.5	67	18.0	63	1	7	2	1
APR	62.2	38.8	50.5	94	69	28	17	65	1	0	0	7	0	3.59	7.57	52	2.49	52	5	.8	6.0	57	4.0	56	9	7	3	1
MAY	73.1	48.0	60.6	102	62	19	25	70	7	1	0	0	0	3.00	6.64	68	2.70	68	29	.0						7	2	0
JUN	82.2	57.4	69.8	102+	64	30	40	64	3	7	0	0	0	2.95	6.72	68	2.12	53	27	.0						6	2	1
JULY	86.8	62.6	74.7	107	66	3	42	63	9	12	0	0	0	3.31	8.68	69	2.75	69	27	.0						6	2	1
AUG	84.6	60.4	72.5	101	54	1	44+	65	31	8	0	0	0	3.81	11.50	55	5.50	55	19	.0						6	3	1
SEPT	77.0	53.5	65.3	103	53	3	29+	63	24	3	0	0	0	3.46	6.85	60	3.51	66	21	.0						5	2	1
OCT	66.4	43.2	54.8	91	59	5	24+	66	31	0	0	3	0	3.00	9.99	55	4.74	55	16	.1	2.0	58				5	2	1
NOV	53.0	33.7	43.4	75+	64	13	14+	58	30	0	0	15	0	3.47	6.22	54	2.17	54	3	1.4	7.0	68	6.0	68	12	7	3	0
DEC	39.3	22.1	30.7	70	70	2	-10+	69	25	0	7	27	1	3.29	5.68	69	2.04	52	12	10.4	31.0	69	26.0	69	27	6	2	1
YEAR	62.2	40.2	51.2	107	JUL 66	3	-15+	FEB 61	2	31	26	131	5	38.02	11.50	AUG 55	5.50	AUG 55	19	42.4	39.8	JAN 61	36.0	JAN 61	22	74	27	9

+ ALSO ON EARLIER DATES

Source: U. S. Department of Commerce, NOAA

A.8: Major Conventional Air Pollutants

Pollutant	*Sources*	*Health Effects*	*Other Effects*
OZONE and other photochemical oxidants	Secondary reaction products originating largely from motor vehicle use, the chemical industry, fossil fuel combustion by-products.	Irritates eyes, lungs, nose and throat: causes difficulty breathing.	Toxic to plants, primarily affects leaves. Can weaken materials such as rubber and fabrics.
TOTAL SUSPENDED PARTICULATES	Industrial processes, incinerators fossil fuel burning plants, especially coal burners: automobile exhaust road and building construction.	Disrupts the lungs normal cleansing mechanism. Additionally the particles can contain or carry materials that exhibit direct toxic effects on living organisms.	Causes haze which reduces visibility and the amount of solar energy reaching the earth. Particles also cause scaling of materials, are corrosive, and can damage buildings.
CARBON MONOXIDE	Internal combustion engines, fossil fuel combustion, and cigarette smoking.	Combines with hemoglobin to reduce the oxygen carrying capacity of the blood which may cause heart and brain damage. At low levels, carbon monoxide causes dizziness, fatigue, headaches and slowed physical reactions.	
SULFUR DIOXIDE	Installations burning fossil fuel such as electric power plants, home heating, industrial processes.	Impairment of breathing and irritation of eyes, throat and lungs.	Corrosion and deterioration of iron, steel, copper, nickel, aluminum and building materials, brittleness in paper, loss of strength of leather, deterioration of natural and synthetic fibers; corrosion of limestone and concrete structures
NITROGEN DIOXIDE	Emitted in approximately equal quantities from motor vehicles and from fossil fuel burning operations, most notably power plants, also from chemical plants and refineries.	Increased respiratory infections in children (particularly bronchitis); inhibition of cilia action and damage to the lung tissue.	Corrosion of metal surfaces, deterioration of rubber, fabrics and dyes; serious injury to vegetation including bleaching and death of plant tissue, loss of leaves and reduced growth; highly toxic to animals; instrumental in smog formation.
LEAD	Gasoline (leaded) vehicles emissions, fuel oil combustion. Manufacturing of batteries, paint, insecticides, etc.	Neurological impairment, brain damage, loss of appetite, loss of alimentory and other systemic functions	

Source: NYS Department of Environmental Conservation. 1981 A Challenge for the 80s. p. 28.

A.9: Geological Activity and Formations

Dutchess County, New York

ERA Duration Outstanding Biological Events	COUNTY ACTIVITY	GEOLOGIC FORMATIONS
PRECAMBRIAN 600 or more million years ago Primitive life begins	In ancient Precambrian times, almost 1300 million years ago (mya), sediments were eroded from older rocks to the north in the Canadian Shield Area. These sediments were subsequently transported and deposited by an ancient drainage system. During the Grenville Orogeny (1100-980 mya), these sediments were subjected to great heat and pressure and underwent deformation, metamorphism, and recrystallization. This event was also accompanied by rock folding and the intrusion of extensive masses of granite. The sediments were metamorphosed to gneiss and the Hudson Highlands came into being. Following the granitic intrusion, a long period of erosion occurred which reduced the area to a low plain. The rifting of a single crystal or tectonic plate during the end of this era and the beginning of the next era brought about the opening of the Proto-Atlantic Ocean.	Isolated uprooted blocks of gneiss Hudson Highlands gneisses
PALEOZOIC 225-600 million years ago Age of invertebrate dominance, rise of fishes, land plants, land vertebrates, large non-flowering plants, reptiles. Appearance of Coniferous trees	The ocean advanced over the county once again during the first period of the era (Cambrian) resulting in sediment deposition on the eastern edge of a broad continental shelf. When the sea returned, the first deposits were usually lime muds which today exist as a thin bed called the Balmville limestone. Other initial deposits were clean quartz sand (Poughquag Quartzite) and younger carbonates (Wappinger Group). Equivalent deposits on the continental slope of the basin were the Germantown (Early Cambrian through Early Ordovician periods), and in the oceanic basin the upper Nassau (Cambrian) and Stuyvesant Falls (Early Ordovician). Fracturing by faults, uplift accompanied by some folding, and subaerial erosion represented the change from an expanding to a contracting ocean at the close of the Canadian Epoch.	Poughquag Quartzite Wappinger Group: Stissing Dolostone Pine Plains Dolostone Briarcliff Dolostone Halcyon Lake-Calc-Dolostone Rochdale Limestone Copake Limstone The formations listed below occurred at about the same time as the Poughquag Quartzite and Wappinger Group: Everett schist, quartzite (east of Beacon-Stissing Mt. fault) Elizaville argillite, quartzite west of Beacon-Stissing Mt. fault)

A.9 (cont'd)

ERA Duration Outstanding Biological Events	COUNTY ACTIVITY	GEOLOGIC FORMATIONS
PALEOZOIC (cont.)	These dramatic changes resulted in the widespread unconformity above rocks of the Canadian age, and was one of the most significant changes, faunally, sedimentologically, and structurally, on the face of the earth. Additional compressional stresses, which brought about the closure of the ocean, produced welts and troughs to the east. The resultant differences in relief caused a westward movement of previously-formed slope and basin rocks by underwater gravity sliding towards what is now the Hudson Valley. Part of the Snake Hill shales found today is a melange of blocks torn from the ripped-up sole rocks during one of those gravity slides. These processes were part of the mountain-making episode known as the Taconic Orogeny. Two principal gravity slides occurred in Dutchess: Livingston Slide (Austin Glen and Mount Merino Shade) and Van Buren Slide (Austin Glen, Mount Merino, Indian River, Stuyvesant Falls, Germantown, and Nassau formations). Intensified folding and thrust faulting took place with the emplacement of Gallatin (Elizaville argillite) and Clove (Everett Schist) thrust slices, with carbonate slivers along the thrust. Regional metamorphism and cleavage formation accompanied the faulting, and the Taconic Orogeny came to an end during the late Ordovician and early Silurian Periods. The area was subjected to another long period of erosion following the Taconic Orogeny. During the Devonian Period, stresses again set in and the rocks underwent tight folding, thrusting, high angle reverse faulting and metamorphism. The Acadian Orogeny ended at the beginning of the late Devonian time, and the merging of the tectonic plates and the closure of the Proto-Atlantic Ocean were finished. At the close of the Paleozoic Era, the rocks were again folded and raised in the course of the Appalachian Revolution. Consolidated rocks were displaced and fractured along joints and thrust faults due to a series of large-scale crustal movements. Faults are fairly abundant in the southern part of the county and, in many places, control the extent of bedrock formations.	Nassau shale, quartzite Germantown shale, limestone, conglomerate Stuyvesant Falls shale, quartzite, chert Mount Merino and Indian River shale and cherts (lies on top of Stuyvesant Falls) Austin Glen graywacke and shale Snake Hill shale with included areas of Poughkeepsie melange Snake Hill Shale and Walloomsac Slate (east of Stissing Mountain Fault)

A.9 (cont'd)

ERA Duration Outstanding Biological Events	COUNTY ACTIVITY	GEOLOGIC FORMATIONS
MESOZOIC 70-225 million years ago First dinosaurs and primitive mammals, birds, flowering plants, deciduous trees and grasses. Extinction of dinosaurs and climax of reptiles on land, air, and sea	Erosion of mountains to lowlands. About 200 million years ago, the major opening of the Atlantic Ocean began.	
CENOZOIC Last 70 million years First placental mammals, apes, primitive horses and other ungulates, abundance of flowering plants, grains, grasses, and cereals, advent of human beings	The land was re-elevated and eroded again. During Pleistocene times, at the end of the Era, continental glaciers repeatedly advanced across the county in a southerly direction with localized, topographically-induced variations to the southwest and southeast. The highest peaks of the Taconic and Hudson Highlands were probably covered with ice. The glaciers laid down unconsolidated deposits consisting chiefly of clay materials and boulders (glacial till). After the melting and withdrawal of the ice, gravel, sand and silt were deposited in the stream valleys. These latter deposits sometimes blocked preglacial channels, causing the formation of lakes and wetlands in which silt, clay, peat, and other fine-grained materials were laid down. Relieved of its heavy ice burden, the land was partially reelevated an average of 2-1/4 feet per mile northward. Subsequently, rejuvenated streams became the erosion agents of glacial debris and exposed bedrock. Some deposition is presently occurring in lakes and swamps and on floodplains of larger watercourses. Lake deposition is more or less continuous while swamp and floodplain deposition primarily takes place during flood periods. This ongoing process of erosion and sediment deposition largely involves thin layers of clay, silt, sand, and gravel.	Deposits of unconsolidated material: boulders, gravels, sands, silts, and clays

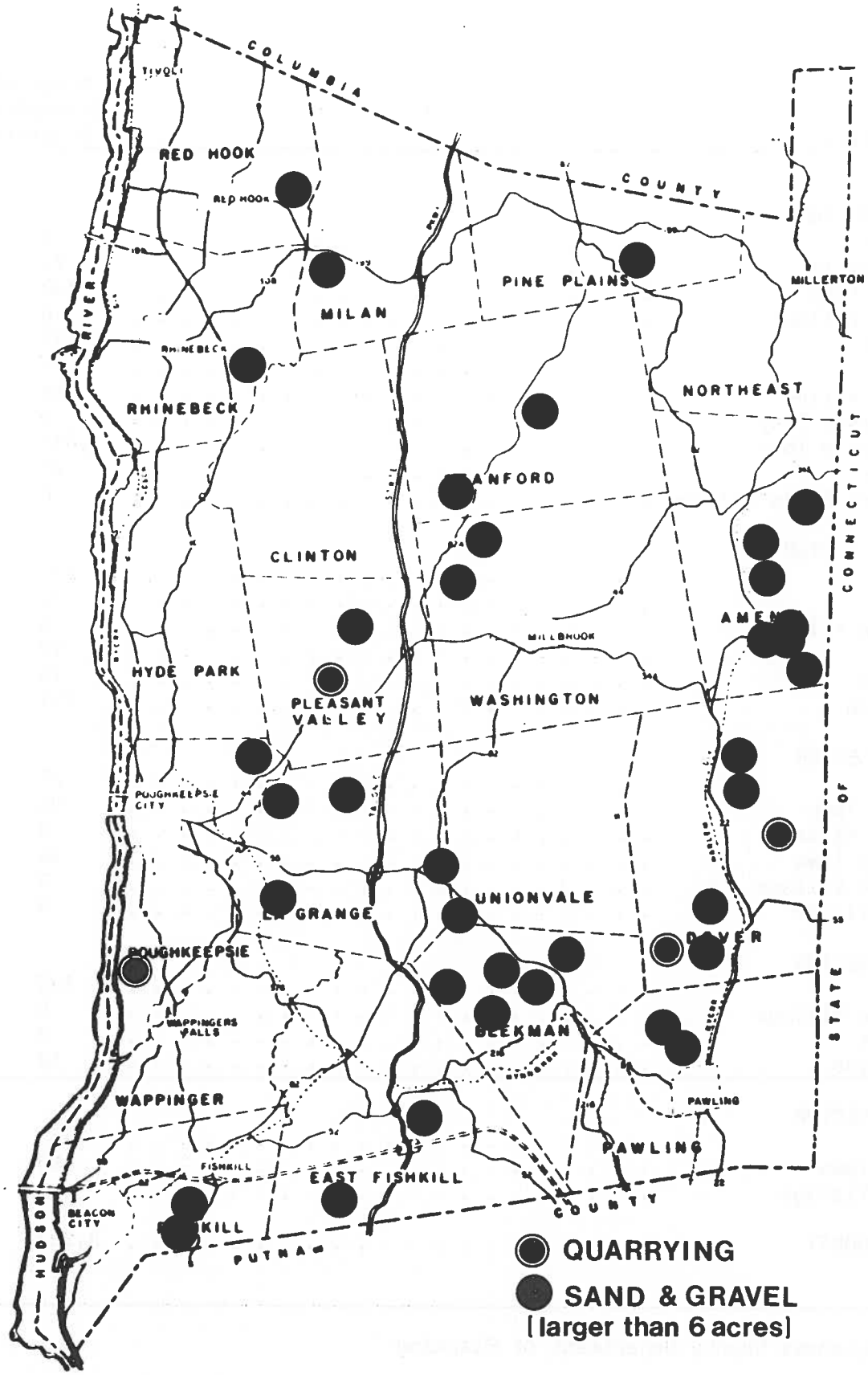
Sources: Simmons et.al. Groundwater Resources of Dutchess County, New York.
Johnsen, J.H.. ed. 1976. Field Guide Book: NYS Geological Association, 48th Annual Meeting.
Rutstein, M.S. 1977. The Lithologies and Geologic Evolution of the Mid-Hudson Valley.

A.10: Mined Lands in Dutchess County, 1976

Sector Municipality	Acres of Extractive Industry
SOUTHWEST SECTOR	
Beacon City	0
East Fishkill	73
Fishkill Town	140
Fishkill Village	0
Hyde Park	13
LaGrange	54
Pleasant Valley	28
Poughkeepsie City	0
Poughkeepsie Town	1,013
Wappinger	22
Wappingers Falls Village	0
MID-COUNTY SECTOR	
Beekman	250
Clinton	33
Millbrook Village	0
Stanford	77
Unionvale	15
Washington	151
NORTHWEST SECTOR	
Milan	27
Red Hook Town	96
Red Hook Village	0
Rhinebeck Town	46
Rhinebeck Village	0
Tivoli Village	0
NORTHEAST SECTOR	
Amenia	195
Millerton Village	0
Northeast	0
Pine Plains	12
SOUTHEAST SECTOR	
Dover	353
Pawling Town	85
Pawling Village	0
DUTCHESS COUNTY	2,983

Source: Dutchess County Department of Planning

A.11: Soil Mining and Quarrying 1982



Source: Dutchess County Department of Planning

A.12: Named Streams in Dutchess County

Stream name	Drainage Basin	Location of mouth	
		Tributary to	County
Amenia Brook a/	Tenmile River	Wassaic Creek	Dutchess
Bard Rock Creek	Hudson River	Hudson River	do.
Bean River	do.	Shekomeko Creek	do.
Beaver Brook	Tenmile River	Mill River	do.
Black Pond Brook	Croton River	West Branch Croton	Putnam
Bog Hollow Brook	Housatonic River	b/	--
Brady Brook	Croton River	East Branch Croton River	Dutchess
Burton Brook	Tenmile River	Swamp River	do.
Butts Hollow Brook	do.	Tenmile River	do.
Casper Creek	Hudson River	Hudson River	do.
Clove Brook	Fishkill Creek	Fishkill Creek	do.
Clove Creek	do.	do.	do.
Cold Spring Creek	Wappinger Creek	Wappinger Creek	do.
Cold Spring Creek Tributary c/	do.	Cold Spring Creek	do.
Coopertown Brook	Tenmile River	Mill River	do.
Crum Elbow Creek	Husdon River	Hudson River	do.
Deuel Hollow Brook	Tenmile River	Tenmile River	do.
Doctors Brook	do.	Mill River	do.
Drake Brook c/	Wappinger Creek	Wappinger Creek	do.
Drake Brook Tributary c/	do.	Drake Brook	do.
Dry Brook	Fishkill Creek	Fishkill Creek	do.
East Branch Croton River	Croton River	Croton River	Westchester
East Branch Wappinger Creek	Wappinger Creek	Wappinger Creek	Dutchess
Fall Kill	Hudson River	Roelifff Jansen Kill	do.
do.	do.	Hudson River	do.
Fallsburg Creek	do.	do.	do.
Fishkill Creek	do.	do.	do.
Flat Rock Brook	Fishkill Creek	Frog Hollow Brook	do.
Frog Hollow Brook	do.	Fishkill Creek	do.
Gardner Hollow Brook	do.	Whaley Lake Stream	do.
Gordons Brook	Hudson River	Hudson River	do.
Great Spring Creek	Wappinger Creek	Wappinger Creek	do.
Green Mountain Lake Outlet c/	Tenmile River	Swamp River	do.
Ham Brook	Hudson River	Roelifff Jansen Kill	Columbia
Hiller Brook	Tenmile River	Swamp River	Dutchess
Horse Pond Brook	Croton River	West Branch Croton River	Putnam
Hudson River	Hudson River	Atlantic Ocean	
Hunns Lake Creek	Wappinger Creek	Wappinger Creek	Dutchess

A.12 (cont'd)

Stream name	Drainage Basin	Location of mouth	
		Tributary to	County
IBM Stream c/	Fishkill Creek	Fishkill Creek	do.
Indian Kill	Hudson River	Hudson River	do.
Indian Lake Creek	Tenmile River	Webatuck Creek	do.
Jackson Creek	Fishkill Creek	Sprout Creek	do.
Kelsey Brook	Tenmile River	Webatuck Creek	do.
Kidney Creek d/	Hudson River	Hudson River	do.
Landsman Kill	do.	do.	do.
Lakes Kill	do.	Saw Kill	do.
Leetown Brook	Croton River	West Branch Croton River	Putnam
Little Wappinger Creek	Wappinger Creek	Wappinger Creek	Dutchess
Maritje Kill	Hudson River	Hudson River	do.
Middle Branch Croton River	Croton River	West Branch Croton River	Putnam
Mill Brook	Tenmile River	Webatuck Creek	do.
do.	Wappinger Creek	East Branch Wappinger Creek	do.
Mill Brook School Creek c/	Tenmile River	Wassaic Creek	do.
Mill River	do.	Swamp River	do.
Mountain Brook	Wappinger Creek	Cold Spring Creek	do.
Mudder Kill	Hudson River	Hudson River	do.
North Staatsburg Creek	do.	do.	Dutchess
Noster Kill	do.	Bashbish Brook	Columbia
Punch Brook	Hudson River	Roelifff Jansen Kill	Columbia
Quaker Brook	do.	Haviland Hollow Brook	Putnam
Rhinebeck Kill	do.	Landsman Kill	Dutchess
Roelifff Jansen Kill	do.	Hudson River	Columbia
Saw Kill	do.	do.	Dutchess
Sawmill Brook	Tenmile River	Webatuck Creek	do.
do.	Housatonic River	Candlewood Lake	b/
Seeley Creek	Fishkill Creek	Clove Brook	Dutchess
Shaw Brook	Wappinger Creek	Mill Brook	do.
Shekomeko Creek	Hudson River	Roelifff Jansen Kill	Columbia
Shenandoah Brook c/	Fishkill Creek	Fishkill Creek	Dutchess
Sprout Creek	do.	do.	do.
Squirrel Hollow Brook	Hudson River	Gordons Brook	do.
Stone Church Brook	Tenmile River	Wells Brook	do.
Stony Brook	do.	Mill River	do.
Stony Creek	Hudson River	Hudson River	do.

A.12 (cont'd)

Stream name	Drainage Basin	Location of mouth	
		Tributary to	County
Stump Pond Stream	Croton River	Middle Branch Croton River	Putnam
Swamp River	Tenmile River	Tenmile River	Dutchess
Sweezy Creek	Fishkill Creek	Fishkill Creek	do.
Tenmile River	Housatonic River	Housatonic River	b/
Thayer Brook	do.	do.	b/
Wades Brook	Hudson River	Hudson River	Dutchess
Wappinger Creek	do.	do.	do.
Wassaic Creek	Tenmile River	Tenmile River	do.
Webatuck Creek	do.	do.	do.
Weir Brook c/	do.	Swamp River	do.
Wells Brook	do.	Tenmile River	do.
Whaley Lake Stream	Fishkill Creek	Fishkill Creek	do.
Whaley Lake Stream Tributary c/	do.	Whaley Lake Stream	do.
Whortlekill Creek	do.	Fishkill Creek	do.
Wiccopee Creek	do.	do.	do.
Willow Brook	do.	Sprout Creek	do.
do.	Wappinger Creek	Wappinger Creek	do.

Source: Ayer and Pauszek. 1968. Streams in Dutchess County, New York. p. 100

Notes: a/ From N.Y.S. Department of Health Report (Housatonic River).
b/ In Conn.
c/ Local name.
d/ From N.Y.S. Department of Health Report No. 8.
do: Same as above (ditto)

A:13: Water Pollutant Sources and Effects

WATER POLLUTANTS	SOURCES	EFFECTS ON WATERS	PREVENTION & ABATEMENT
SOLIDS			
Particulate	Municipal wastewater and effluents from certain industries such as pulp and paper, food and tannery.	Degrades aesthetic appearance—utilizes oxygen resources; interferes with bottom life; prevents adequate disinfection and allows disease-causing organisms to live longer in natural waters.	Primary wastewater treatment; advance wastewater treatment by chemical coagulation and settling; filtration; industrial process modifications.
	Silt in runoff from construction sites and agricultural land.	May cover and destroy valuable fish and wildlife habitat; makes assimilation of oxygen-demanding wastes more difficult; adds to water treatment costs; degrades aesthetic appearance.	Land use control; improved soil conservation practices.
Dissolved	Municipal and industrial wastewater, particularly the mining and chemical industry, road salting.	Interferes with agricultural and industrial water use; increases hardness of water used for domestic purposes; excessive dissolved salts can also cause a laxative action when present in potable water; adds taste to water.	Process changes and in-plant controls in industry; advance wastewater treatment processes, such as reverse osmosis and ion exchange; controlled and effective use of road salting chemicals, or use of substitutes such as sand.
ORGANIC MATERIAL			
Biodegradable	Municipal wastewater and the wastewater from many industries such as milk, food, pulp and paper. Runoff from areas with high concentration of animals such as zoos, feedlots or barnyards.	Utilizes the oxygen resources of a stream & thus interferes with normal biological life; can cause taste, odors and colors.	Secondary wastewater treatment; in-plant industrial controls; containment, control and treatment of animal land runoff.
Non-biodegradable	" " " " " " " " " " " "	Can cause taste, odors and color in water; fish-tainting; foam; can become biodegradable.	Control use of non-biodegradable products; advance waste treatment process such as ozone or activated carbon absorption.
INFECTIOUS AGENTS			
Bacteria & Viruses	Domestic wastewater; waste from hospitals, research laboratories and some industries such as milk processing and meat packing.	Presents a health hazard to direct and indirect reuse and to water contact recreation.	Secondary wastewater treatment, plus disinfection.
NUTRIENTS			
such as Nitrogen & Phosphorus	Municipal wastewater; some industrial wastewater; runoff from agricultural and urban land.	Fertilizes the water and thereby stimulates the excessive growth of weeds and algae causing cultural eutrophication.	Advance waste treatment; land use controls; soil conservation practices; control use of products containing phosphorus and nitrogen.
TOXIC AGENTS			
Metals, acids & alkalides	Industrial wastewater.	Harms surface water ecology; interferes with downstream water reuse; potential health hazard; corrodes piers, boats.	Industrial process changes and controls; industrial waste treatment.
Pesticides & Other exotic organics	Agriculture, forestry, residential and commercial pest control, certain organic chemical industries.	Harms surface water ecology; interferes with downstream reuse; represents potential health hazard.	Controlled agricultural, forestry, residential and commercial pesticide use; prohibition of manufacture of certain particularly harmful organic chemical; industrial, wastewater treatment.
Radioactive waste	Nuclear power plants, radioactive material, reprocessing, industry, medical and laboratory radioactivity material uses.	Potential health hazard; potentially harmful to aquatic life.	Nuclear power plant and industrial process changes and wastewater treatment.
HEAT	Electric generating plants, steel mills, certain industries, large air conditioning systems.	Interferes with normal surface water life by favoring species tolerant to high temperatures; reduces the oxygen saturation concentration of water and increases rate of biological activity thus affecting weed and algae growth.	Reuse of waste heat; cooling towers; cooling ponds; more efficient electrical generation systems; reduce demand for power.
TASTE, ODOR & COLOR	Industrial wastewater.	Interfere with downstream recreation and reuse.	Industrial process changes and wastewater treatment.
Oil	Oil spills during transport or storage, railroad and truck yards, some industry, bilge water and ballast water from boats, urban runoff, waste oil from automobiles.	Aesthetic damage; taints fish; kills or injures fish and wildlife; interferes with recreational use.	Design and construction of failsafe oil transportation and storage facilities; containment and treatment of bilge and ballast water and runoff from areas with high potential for oil pollution; development of a market for waste oils reuse.

Source: NYS Department of Environmental Conservation. 1973. Environmental Plan For New York State: Preliminary Edition. p. 43

A:14: Some Large and Significant Wetlands of Dutchess County

D.E.C. Code	Common Name	Town(s)	Drainage Basin	Size	D.E.C. Class*	Comments
AM-1		Amenia, North East	Wassaic Creek	230	II	
AM-25	Swift Pond	Amenia	Webatuck Creek	101	II	EMC Significant Area
AM-26	Bog Hollow	Amenia	Tenmile River	124	II	N.Y. Significant Habitat
RC-39	Mud Pond	Clinton	Little Wappinger	113	I	EMC Significant Area
RC-44	Zipfelberg Bog	Clinton	Crum Elbow	20	II	EMC Significant Area
RC-52	Long Pond	Clinton	Little Wappinger	87	II	EMC Significant Area
DP-17	Tamarack Swamp	Dover	Tenmile River	36	III	EMC Significant Area
DP-22	Great Swamp	Dover, Pawling	Swamp River	2000 +	II	Largest D.C. Wetland, EMC Significant Area
HJ-42		E. Fishkill	Fishkill Creek	420	II	
HJ-49, HJ-50		E. Fishkill	Fishkill Creek	410	II	
HJ-54	Townsend Swamp	E. Fishkill	Fishkill Creek	85	I	N.Y. Significant Habitat
WF-13, WF-17, WF-18	Stoney Kill Environ. Center	Wappingers, Fishkill	Wappinger Creek, Hudson River	38 11,19	III III III	EMC Significant Area
	Roosevelt Cove	Hyde Park	Hudson River	25		EMC Significant Area
PV-30	James Baird State Park	LaGrange	Sprout Creek	31	I	
RC-32	Silver Lake	Milan	Little Wappinger	38	II	EMC Significant Area
CP-1, CP-2, CP-3	Panhandle Wetlands	North East	Webatuck Creek	650	III II III	EMC Significant Area
MT-17		North East	Webatuck Creek	13	I	
MT-22	Downy Swamp	North East	Webatuck Creek	160	I	EMC Significant Area
MT-23		North East	Webatuck Creek	42	I	
PP-8, PP-5 PP-34	Thompson Pond Wetlands	Pine Plains, Stanford	Wappinger Creek	1000 +	I, II, II	EMC Significant Area
PV-2		Pleasant Valley, Poughkeepsie	Wappinger Creek	240	II	
SG-3	Tivoli North Bay	Red Hook	Hudson River	400	I	EMC Significant Area
	Tivoli South Bay	Red Hook	Hudson River	300		EMC Significant Area
KE-4	Synder Swamp	Rhinebeck	Mudder Kill	110	II	EMC Significant Area
KE-5	Erncliff Forest Wetland	Rhinebeck	Hudson River	15	II	EMC Significant Area
	Vandenburgh Cove	Rhinebeck	Hudson River	125		EMC Significant Area
	Suckly Cove	Rhinebeck	Hudson River	30		EMC Significant Area
	Astor Cove	Rhinebeck	Hudson River	25		EMC Significant Area
AM-31		Stanford, Washington	Wassaic Creek	8	I	
MB-18	Bontecou Lake	Stanford, Washington	Wappinger Creek	320	II	EMC Significant Area
VB-17		Union Vale	Fishkill Creek	26	I	
VB-26		Union Vale	Fishkill Creek	240	II	
WF-11	Green Fly Swamp	Wappinger, Fishkill	Fishkill Creek, Wappinger Creek	180	II	EMC Significant Area
MB-37	Cary Arboretum Wetlands	Washington	Wappinger Creek	37	III	EMC Significant Area

*D.E.C. Tentative classification under the Freshwater Wetlands Act.

Source: Dutchess County Environmental Management Council. 1984. Freshwater Wetlands of Dutchess County: Part 1. p. 37

A:15: Erosion Rates for Dutchess County Watersheds, By Land Use Type

(Tons/Acre/Yr)

	Croton River	Crum Elbow Creek	Fishkill Creek	Hunns Lake	Jansen Kill	Tenmile River	Wappinger Creek	Upper Housatonic River
Construction Sites	9.50	14.40	19.00	--	234.00	0.47	3.80	--
Cropland without Conservation	22.42	12.77	12.63	11.58	17.36	11.69	7.39	--
Orchards, Vineyards & Brush Fruits	1.13	2.05	0.64	--	7.12	0.33	2.23	--
Urban Land	1.05	0.79	0.13	0.31	0.85	1.10	0.73	1.15
Cropland with Conservation	0.33	0.74	0.93	0.74	0.91	0.48	0.89	0.24
Pasture	2.29	0.63	0.97	1.00	0.69	0.82	0.76	0.92
Woodland	0.55	0.42	0.78	0.29	0.46	0.37	0.43	0.33
Streambanks (tons/bank-mile/yr.)	0.93	16.95	7.80	--	113.38	10.60	4.50	--
Roadbanks (tons/bank-mile/yr.)	1.14	16.16	38.39	--	5.76	21.70	15.50	60.00

Source: USDA Soil Conservation Service, Dutchess County Office. Data extracted from USDA Soil Conservation Service, Erosion and Sediment Inventory, New York, 1974.

A:16: Selected List of Plants in Dutchess County

Alders	Alnus rugosa, A. serrulata
Apple	Pyrus malus
Arrowwood	Viburnum dentatum
Arrowwood, downy	V. rafinesquianum
Arum, arrow	Peltandra virginica
Ash, black	Fraxinus nigra
Ash, red	F. pennsylvanica
Ash, white	F. americana
Aspen, quaking	Populus tremuloides
Aspens	Populus spp.
Asters	Aster spp.
Azalea, swamp	Rhododendron viscosum
Barberry, Japanese	Berberis thunbergii
Beech	Fagus grandifolia
Birch, black	Betula lenta
Birch, gray	B. populifolia
Birch, paper	B. papyrifera
Birch, yellow	B. lutea
Bittersweet	Celastrus scandens
Blackberry	Rubus allegheniensis
Bladdernut	Staphylea trifolia
Bladderworts	Utricularia spp.
Blueberry, high	Vaccinium corymbosum or near
Blueberry, low	V. vacillans, possibly V. angustifolium
Bluestem, little	Andropogon scoparius
Brambles	Rubus spp.
Buckthorn	Rhamnus cathartica
Bulrush, river	Scirpus fluviatilis
Bulrushes	Scirpus spp.
Bush-honeysuckle	Diervilla lonicera
Buttonbush	Cephalanthus occidentale
Cattail, narrowleaf	Typha angustifolia
Cattails	Typha spp.
Charophytes	Chara, Nitella
Cherry, black	Prunus serotina
Chestnut, American	Castanea dentata
Chokeberry	Aronia spp.
Chokecherry	Prunus pensylvanica
Corn, field	Zea mays
Cottonwood	Populus deltoides
Cranberry, small	Vaccinium oxycoccos
Creeper, Virginia	Parthenocissus quinquefolia
Cutgrass, rice	Leersia oryzoides
Day-lily	Hemerocallis fulva
Dewberry	Rubus flagellaris
Dogwood, flowering	Cornus florida
Dogwood, gray	C. racemosa
Dogwood, silky	C. amomum
Dogwood, red osier	C. stolonifera
Elm, American	Ulmus americana
False-indigo	Amorpha fruticosa
Fern, cinnamon	Osmunda cinnamonea
Goldenclub	Orontium aquaticum
Goldenrods	Solidago spp.
Grape	Vitis spp.
Grass, orchard	Dactylis glomerata
Grass, reed canary	Phalaris arundinacea
Grass, sweet vernal	Anthoxanthum odoratum
Grasses	Gramineae spp.
Hemlock	Tsuga canadensis
Hickory, pignut	Carya glabra
Hickory, shagbark	C. ovata
Hickories	Carya spp.
Honeysuckle, Bell's	Lonicera x bella (hybrid swarm of L. morrowi & L. tatarica)
Honeysuckle, Japanese	L. japonica
Hornbeam, American	Carpinus caroliniana
Hornbeam, hop	Ostrya virginiana
Huckleberry	Gaylussacia baccata
Juniper, common	Juniperus communis
Larch, European	Larix decidua
Leatherleaf	Chamaedaphne calyculata
Locust, black	Robinia pseudoacacia
Loosestrife, purple	Lythrum salicaria
Maple, red	Acer rubrum
Maple, silver	A. saccharinum
Maple, striped	A. pensylvanicum
Maple, sugar	A. saccharum
Mountain-laurel	Kalmia latifolia
Naiads	Najas spp.
Nannyberry	Viburnum lentago
Oak, black	Quercus velutina
Oak, chestnut	Q. prinus
Oak, red	Q. borealis
Oak, scrub	Q. ilicifolia
Oak, swamp white	Q. bicolor
Oak, white	Q. alba
Oaks	Quercus spp.
Periwinkle	Vinca minor
Pickerelweed	Pontederia cordata
Pine, red	Pinus resinosa
Pine, pitch	P. rigida
Pine, scotch	P. sylvestris
Pine, white	P. strobus
Plant, pitcher	Sarracenia purpurea
Poison-ivy	Rhus radicans
Pondweeds	Potamogeton spp.
Prickly-ash, American	Zanthoxylum americanum
Ragweed	Ambrosia artemisiifolia
Red-cedar	Juniperus virginiana
Reed, giant	Phragmites communis
Rose, multiflora	Rosa multiflora
Rush, soft	Juncus effusus
Rushes	Juncus spp.
Sassafras	Sassafras albidum
Sedge, tussock	Carex stricta
Sedges	Carex spp.
Shadbush	Amelanchier arborea
Skunk-cabbage	Symplocarpus foetidus
Smartweed, dotted	Polygonum punctatum
Spatterdock	Nuphar advena
Spicebush	Lindera benzoin
Sundew, roundleaf	Drosera rotundifolia
Sumac, poison	Rhus vernix
Sumac, smooth	R. glabra
Sumac, staghorn	R. typhina
Sweetfern	Myrica asplenifolia
Sycamore	Platanus occidentalis
Tamarack	Larix laricina
Timothy	Phleum pratense
Tree-of-heaven	Ailanthus altissima
Tuliptree	Liriodendron tulipifera
Viburnum, mapleleaf	Virburnum acerifolium
Water-chestnut	Trapa natans
Water-lily, white	Nymphaea odorata
Water-lily, yellow	Nuphar variegatum
Watermilfoil, European	Myriophyllum spicatum
Waterweed	Anacharis canadensis
Wild-celery	Vallisneria americana
Wild-rice	Zizania aquatica
Willows	Salix spp.
Witch-hazel	Hamamelis virginiana
Yew, Canada	Taxus canadensis

Note: Scientific names follow Gleason & Cronquist's Manual of Vascular Plants of Northeastern United States and Adjacent Canada (1963).