

MASTER PLAN

LONG POND PRESERVE

The Nature Conservancy
Lower Hudson Chapter

Town of Waccabuc
Township of Lewishoro
Westchester County
New York State 10597

Latitude: $41^{\circ} 18'$
Longitude: $73^{\circ} 36'$

Plan prepared by: Carol Gracie
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Preserve Chairman: Timothy M. Smith
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APPROVED

12/16/81

Ronald Kellan

LONG POND PRESERVE

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Reprint from Lower Hudson Chapter Guidebook

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LONG POND PRESERVE

SUMMARY DESCRIPTION

Long Pond Preserve consists of two separate parcels surrounding the western end of Lake Waccabuc. The larger part was formerly cleared for pastureland and has mostly reverted to forest, with the exception of about 14 acres at the extreme western end of the lake which is maintained as a meadow by annual mowing. This allows a splendid view of the lake and prevents the elimination of vast numbers of species which would perish if succession were permitted to proceed. The field is a botanist's delight and a source of aesthetic pleasure to all who view its continually changing colors as different species reach their peak of bloom and dominate the landscape. A small area north of the field was the site of a nursery in the 1930's and retains an assortment of mixed conifers. The southern shore of the lake is primarily second growth hardwoods, with an area of hemlocks.

The smaller portion of the preserve is the more spectacular. Castle Rock rises 60 feet (18 m) almost perpendicular to the lake at the base of Waccabuc Mountain and affords a fine view of the lake and surrounding area. Mountain laurel and chestnut oak are among the species to be found growing at the top of the rock.

Although both parcels are on the lake, there is no connecting trail. The property between the two parcels is privately owned.

The entire preserve is an excellent habitat for deer and nearly all birds, land and water animals indigenous to northern Westchester.

Lake Waccabuc is the site of a unique water quality improvement program. Increasing population created a sharp rise in phosphate levels in the lake and rapid development of algae, the resulting oxygen loss being harmful to fish and other water creatures. In 1973, the Union Carbide Corporation installed two hypolimnion aerators on the lake bottom together with a shore pumping facility. Air is pumped continuously through the turbines to restore the oxygen balance to the deeper levels of the lake. This, along with cooperative efforts by local residents to curb the amount of pollutants reaching the lake, has resulted in a dramatic improvement in water quality.

The Waccabuc area was settled in the late 1600's when the lake was known as Long Pond. Farming was the principal occupation. After 1900 a number of summer homes were built on or near the lake. Records show the existence of a large

inn located on the western shore near the present pump house. The property remained in control of a local family foundation until 1969 when the foundation and a group of local residents gave the land to the Conservancy.

Long Pond Preserve is open throughout the year to those wishing to observe and/or photograph nature, and for educational and research purposes. Many scientific and educational organizations are conducting limnology studies to determine the effect of the aeration on fish and plant life. Permission must be obtained from the Chapter office before scientific studies can be undertaken.

LONG POND PRESERVE

WACCABUC, WESTCHESTER COUNTY, NY

39 ACRES

The preserve: Long Pond Preserve protects shore frontage on Lake Waccabuc, called Long Pond by the Indians in colonial times. A 70-year old mixed-hardwood forest, with groves of hemlock, slopes down to swamp around the edge of the lake. Several brooks cross the property and a 7-acre open meadow which is selectively cut each year affords a spacious view of the discreetly developed lake. Castle Rock, a separate 1.6 acre area, can be seen from the meadow. Topped by tall hemlocks, the 80-foot high rock drops sharply into the lake.

Flora and fauna: The third-growth forest includes oak, maple, ash, yellow birch, beech, yellow poplar, dogwood and blueberry as well as some groves of hemlock and spruce. A red maple swamp predominates on the west side of the lake and along the edge of the eastern section. The meadow includes weeping willow, pussy willow, grasses, viburnum, other common wild flower and herbaceous plants. Deer, raccoon and Canada goose have been observed.

History: The Mead family owned the property from 1650 until 1970 when the Studdwell Foundation (a Mead family corporation) and a group of families gave the land to The Nature Conservancy. Remnants of an ice-house and ice-cutting operation can still be seen.

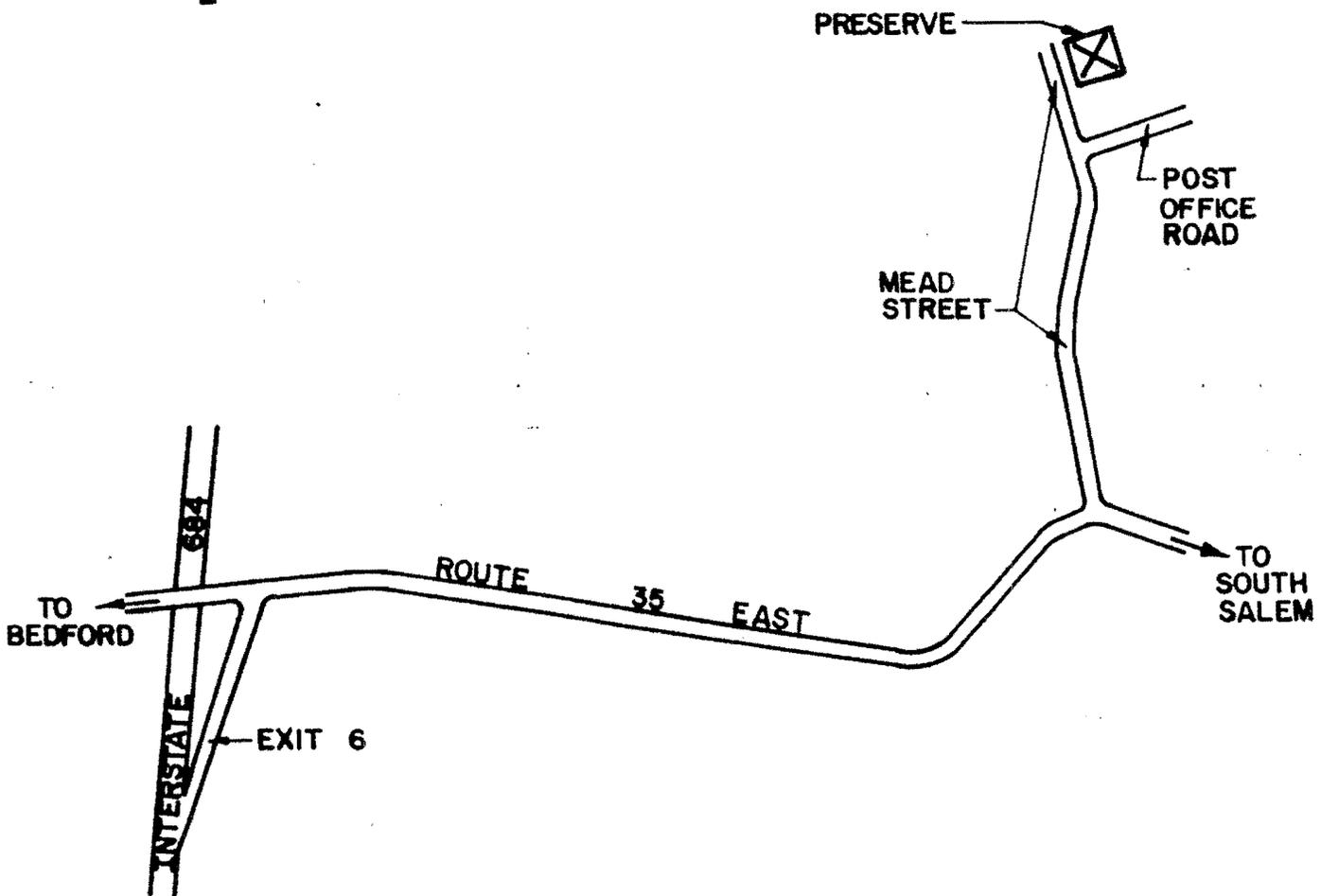
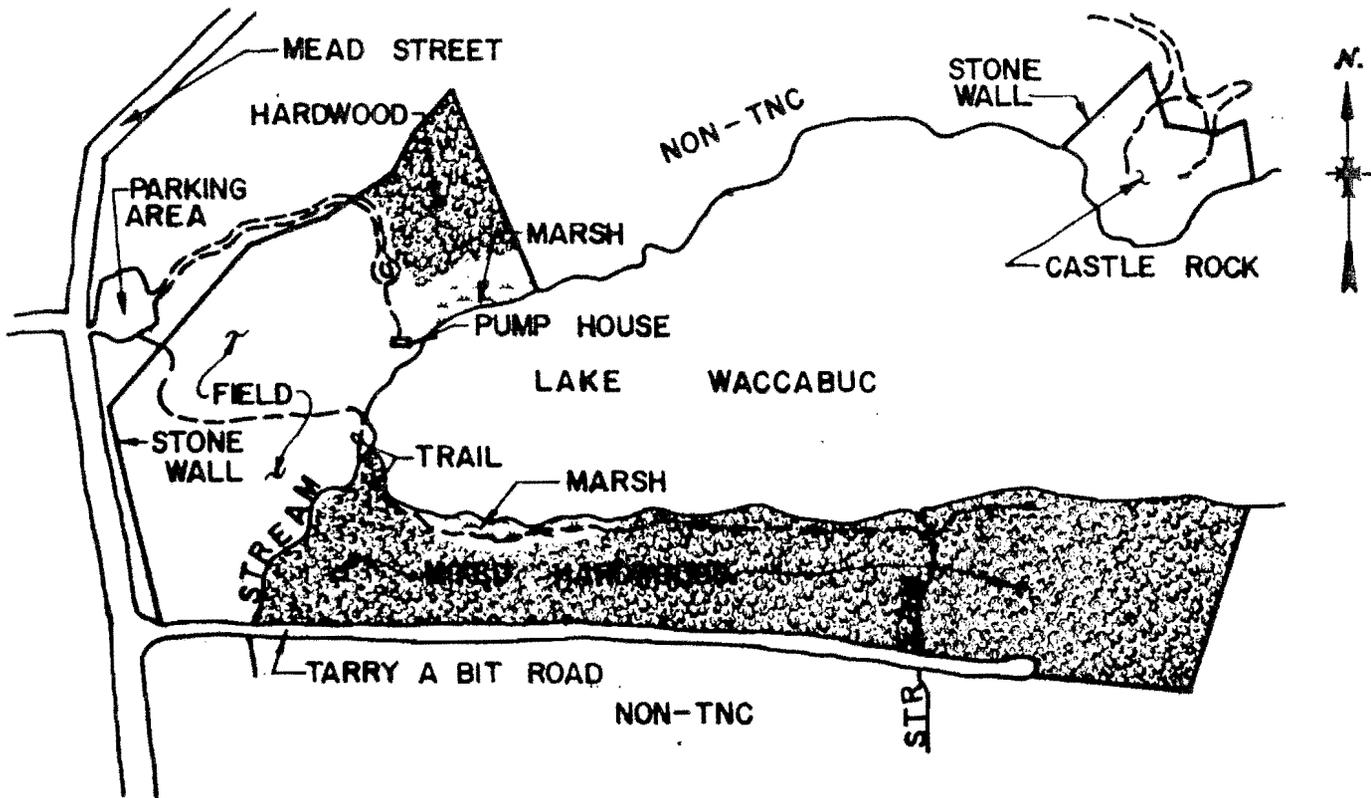
Preserve use: The preserve is open by permission from the preserve manager only for hiking, research and education. Maintained but unmarked trails circle the edge of the lake and cut through the meadow. Castle Rock is reached by following a dirt road and then a short, unmarked trail. Boundaries are posted.

Directions: From I-684, exit at Katonah, take Rt. 35 east 5.6 miles, turn left at Mead Street. Go 1.3 miles, just past Post Office Road and park on side of road by the meadow. To reach Castle Rock walk about 3/4 mile up Mead Street and take a right at first dirt road with broken stone posts. Walk about 1/2 mile to Castle Rock.

Preserve manager:

Timothy Smith
Box 151
Waccabuc, NY 10597

Telephone number (914) 763-5792



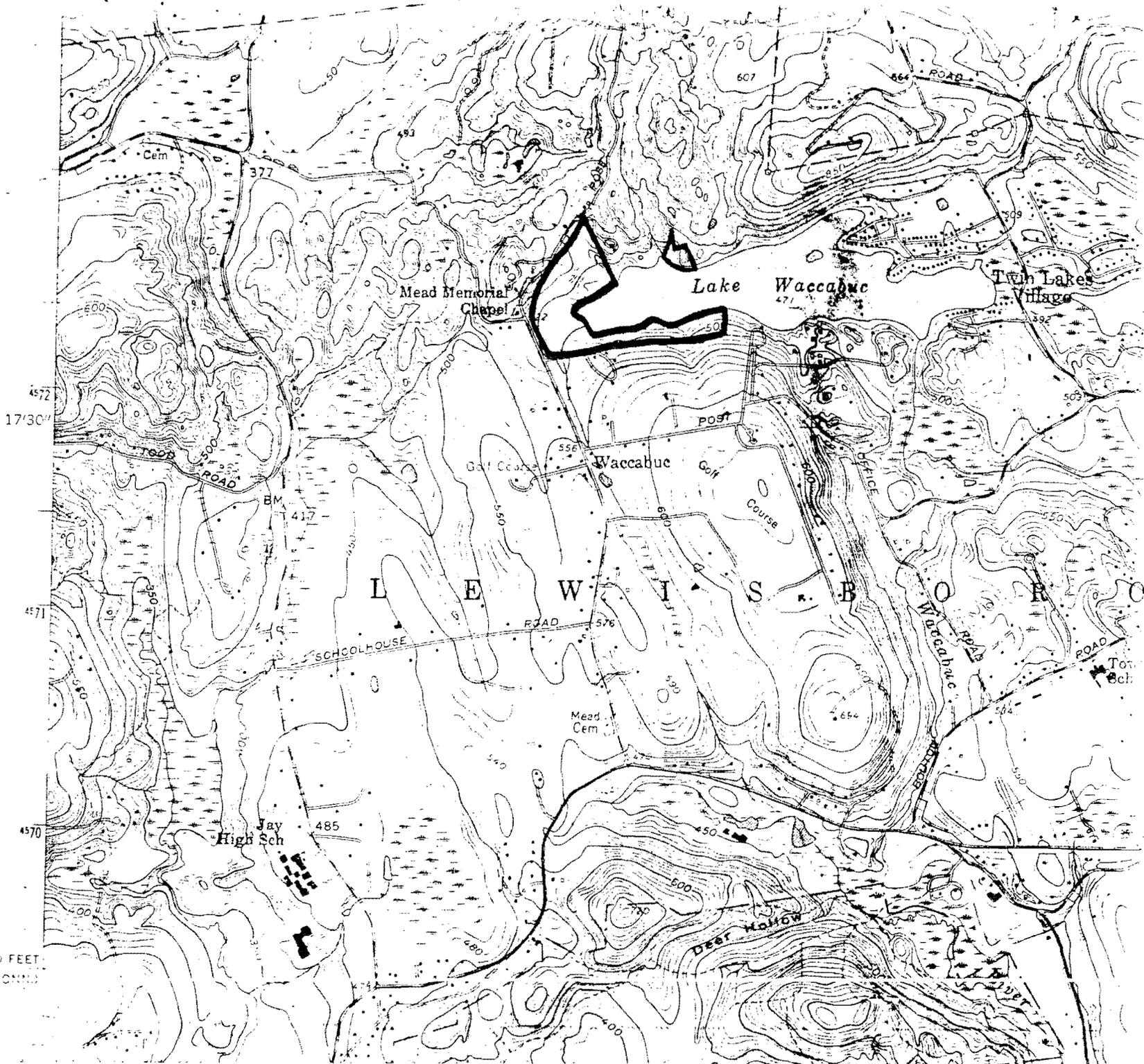
LONG POND PRESERVE

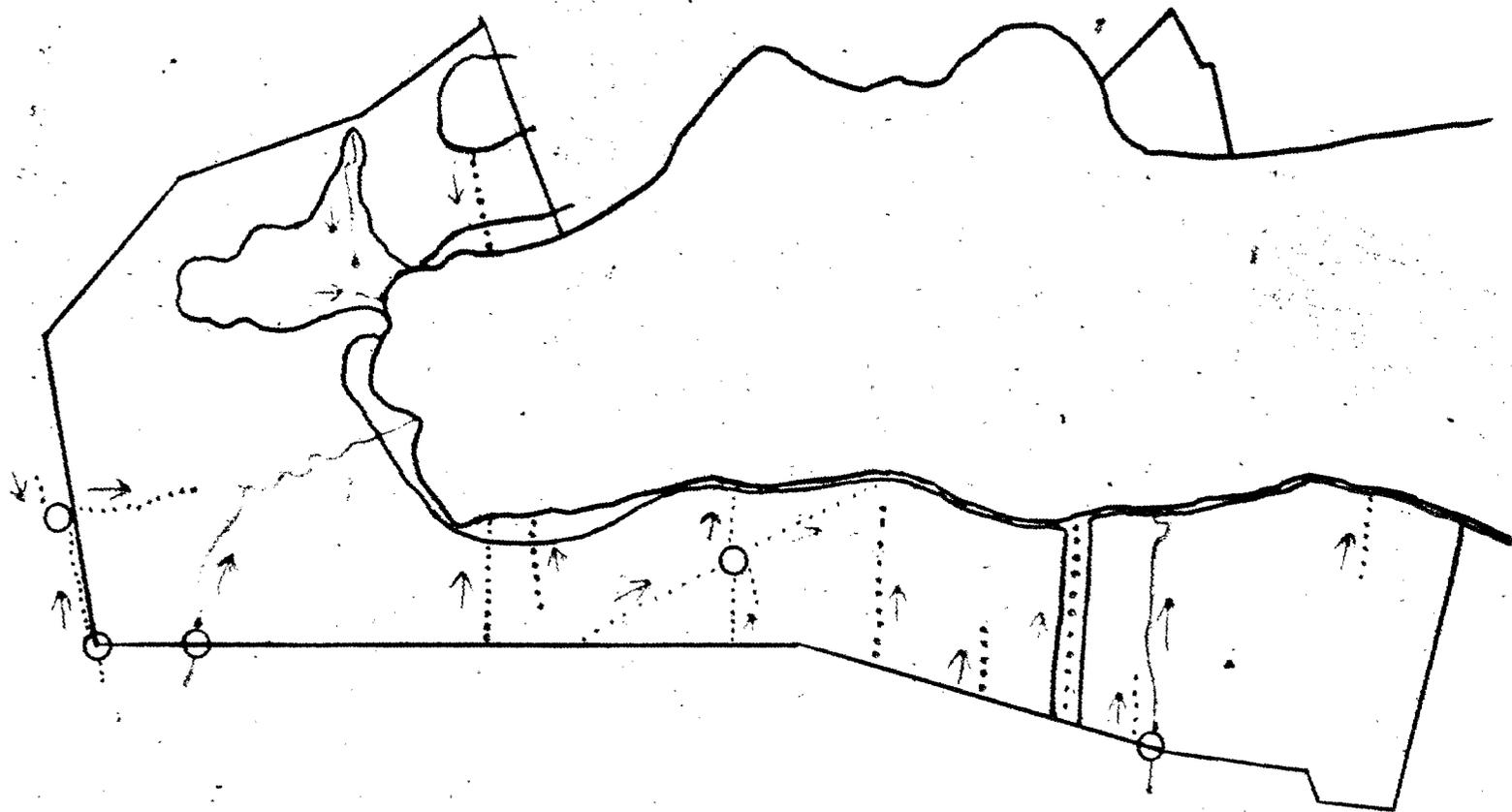
ing Pond .. reserve

Peach Lake Quadrangle
7.5 Minute Series

Latitude
41° 18'
Longitude
73° 36'

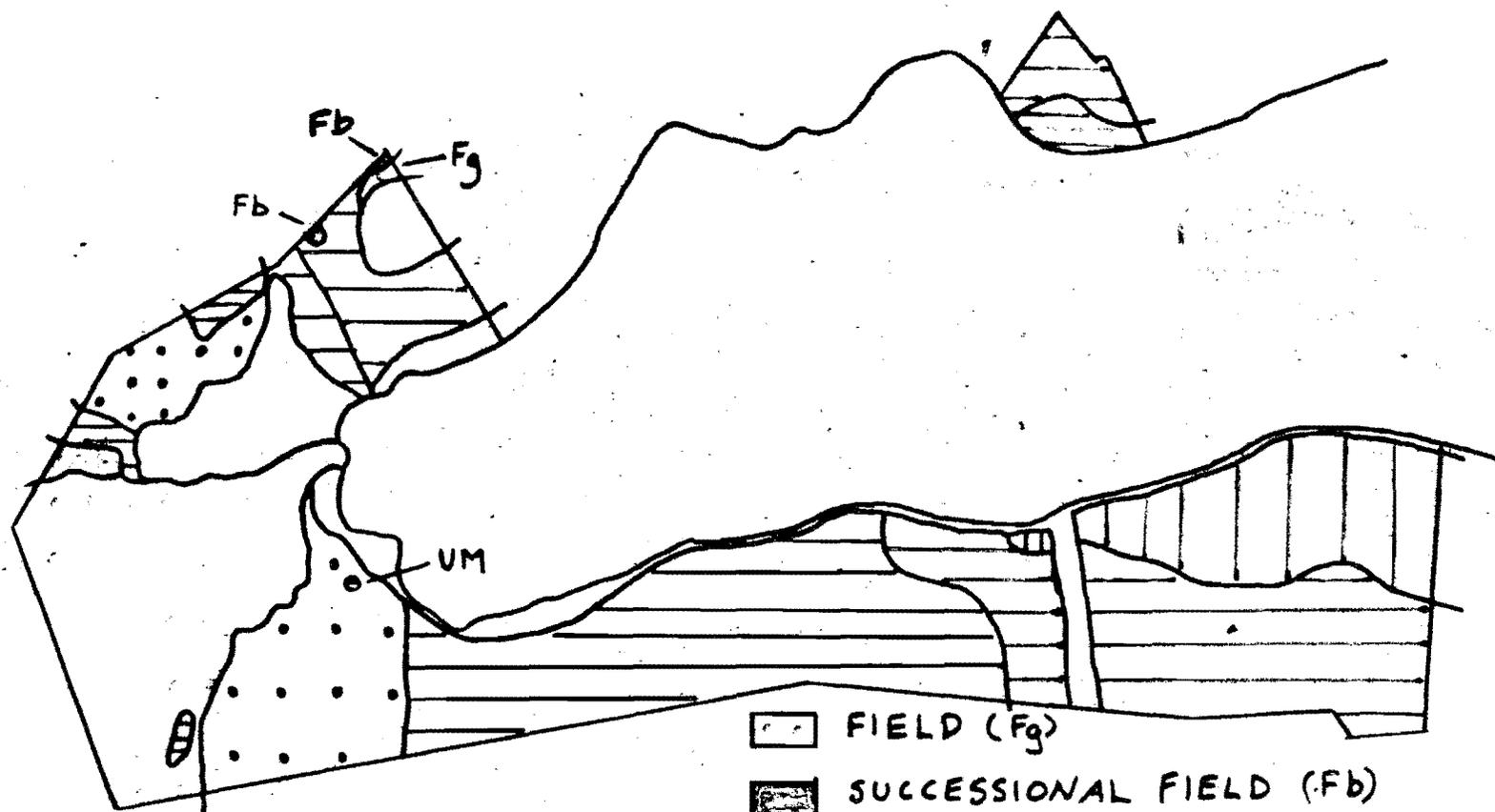
160 000 FEET
(CONT'D)





HYDROLOGY

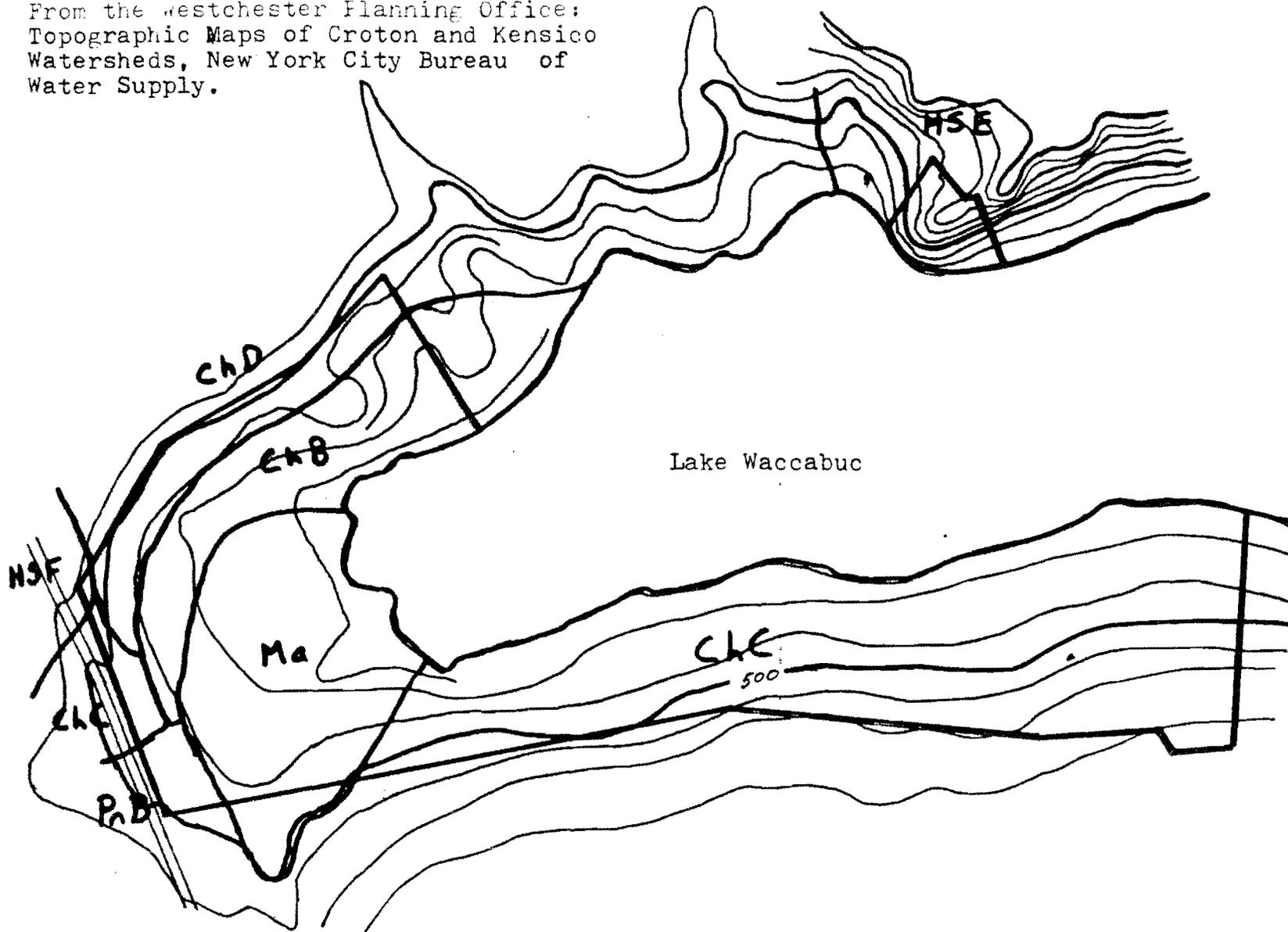
-  CULVERT
-  WETLAND
-  STREAM
-  SEASONAL STREAM



VEGETATION
HABITATS

-  FIELD (Fg)
-  SUCCESSIONAL FIELD (Fb)
-  WETLAND SWAMP
-  RED MAPLE STAND
-  LOWLAND MIXED DECIDUOUS
-  UPLAND MIXED DECIDUOUS (UM)
-  HEMLOCK - MIXED DECIDUOUS
-  CHESTNUT OAK DOMINANT
-  CONIFER PLANTATION

From the Westchester Planning Office:
Topographic Maps of Croton and Kensico
Watersheds, New York City Bureau of
Water Supply.



SOILS



SOIL BOUNDARY

CHC

UNIT DESIGNATION

N



1" = 4800"

Contour Interval 10'

With 5' Supplemental Contours

Vegetation Habitats

P. Turco

The vegetation habitats of the Preserve can roughly be classified into nine groups:

- Field or Meadow
- Successional Field
- Wetland Swamp
- Red Maple Stand
- Lowland Mixed Deciduous
- Upland Mixed Deciduous
- Hemlock-Mixed Deciduous
- Chestnut Oak Dominant
- Conifer Plantation

These groups were identified by visual survey. Statistical study would be needed to determine true dominance, age, and successional trends for the stands.

There usually is no abrupt change from one habitat type to another. Instead a transition zone or ecotone exists where component parts of each habitat intermingle. The exceptions, to some extent, are the fields and conifer plantations.

The following accounts refer to the vegetation habitat overlay. More detailed descriptions and locations can be found in the field maps in the appendices.

Field

The Preserve's largest field occurs in a flat to gently sloping wet area which, if it were not maintained, would probably succeed to red maple swamp and lowland deciduous stands dominated by red maple. There is a high incidence of 'poorly drained soil' type herbaceous plants, for instance: joe-pye weed, boneset, jewelweed, and ironweed.

The field is fairly homogeneous. There is very little woody growth throughout. Towards the northern portion is an area where short grasses and goldenrods occur in a mosaic

pattern. There is an intermittent stream fed by two road ditches that allows cattail, skunk cabbage, and sedges to grow among the other field species. Generally, however, species are uniformly distributed throughout the meadow.

At the northwesternmost corner of the Preserve (excluding Castle Rock) is a bit of field which continues onto private property. This area was probably cut or burned deciduous forest. Stumps can be found among the scrubby growth of grasses, mullein, jewelweed, smartweed, and grape vines. Sugar maple seedlings are present, indicating a possible succession to upland mixed deciduous forest.

Successional Field

This category includes three very small areas in the northern part of the Sanctuary (excluding Castle Rock.) They are open areas succeeding from field to brushland or can simply be called 'overgrown'.

Underneath the ash trees in the northern part of the large field is an area thickly overgrown by blackberry and vines. Near the dirt road's northern entrance to the pumphouse is an open area of tree stumps overgrown with jewelweed, grape vine, and smartweed. Under and around the hickory tree in the Preserve's northwestern corner is a dense stand of young sumac. These areas will eventually be colonized by adjacent mature trees and succeed to forest similar to abutting stands.

Wetland Swamp

This divides into two subcategories: red maple swamp and shoreline.

Red Maple Stand

This group occurs distinctly and abruptly between the field and an older red maple dominant lowland mixed deciduous stand to the southeast. The area is densely populated with small-trunked red maples. There is very little undergrowth. This stand was field approximately twenty years ago. Once maintenance was terminated, the meadow succeeded to red maple stand and will probably climax to a lowland mixed deciduous stand similar to the one it abuts. This is a good indication of what would happen to the remaining field were it no longer maintained. Areas in the existing field that are more poorly drained would tend to succeed towards red maple swamp.

Lowland Mixed Deciduous

This is a catch all category for mixed deciduous stands that contain a high degree of or are dominated by red maple and spicebush. In some places the red maples are quite large (diameters approximately two to three feet.) Thick poison ivy vines grow on these trees (five to six inches in diameter.) Associate trees which occur most often are ash and tulip. Ash occurs nearly all the time while tulip appears only in certain areas. Typically, spicebush forms a scanty shrub layer and there is little ground growth. Herbaceous cover sometimes becomes denser and swamp-like as the slope approaches the lake (skunk cabbage, jewelweed, cinnamon fern, and mosses.)

Red maple is generally stable and self-reproducing in lowland moist soils, so one would expect these stands to remain

Red Maple Swamp: There are three swamps in the Preserve. The first and best developed abuts the field on its northern boundary. Red maple is dominant, with a somewhat dense shrub layer occurring in places. Otherwise the wetland is generally open. There is a scanty ground herbaceous layer. The wetland is fed by surrounding slopes and a spring which issues from under a rock. A small brook travels into the swamp and dissipates, then reforms close to the lake into which it empties.

Another red maple dominant 'wetland' occurs at the northeasternmost corner of Long Pond Preserve (excluding Castle Rock.) Some shrub growth occurs, but again there are sparse shrub and ground layers. This wetland drains into an intermittent stream which empties into Lake Waccabuc.

The third 'wetland' is better described as a swampy strip along a seepage area. The only wetland vegetation present is skunk cabbage, spicebush, and cinnamon fern. Otherwise the vegetation type is upland mixed deciduous and hemlock-mixed deciduous.

Shoreline: Along nearly the entire Preserve's shoreline is a strip of forest distinct from surrounding vegetation. At Castle Rock this is either not present or minimally represented. Red maple usually dominates. There may be a thick shrub growth of pepperbush, spicebush, speckled alder, and dogwoods. Wetland species such as jewelweed, skunk cabbage, tussock sedge, cinnamon and sensitive fern, and mosses can be found, along with species such as royal fern, buttonbush, and arrow arum. In places this strip is very narrow, in others thicker (corresponding to low topographic areas.)

Most of the primary tree species are shade tolerant. Black birch, black cherry, and locust are shade intolerant, and so would disappear over time. Sugar maple and beech might be expected to dominate a slope community with white and black oak, tulip, ash, and hickory as secondary species. At present, the existence of a sugar maple understory in places suggests future sugar maple dominance at those sites.

Hemlock-Mixed Deciduous

This habitat occurs in the southeasternmost portion of the Preserve. Hemlock begins to appear near the 'strip wetland' and steadily becomes more dominant as one travels east off the Preserve. Mixed in with the hemlocks are ash, beech, sugar maple, chestnut oak, and spicebush. There is an extremely scanty ground herbaceous layer.

Hemlock is a climax species, usually occupying cool, moist ravines and slopes. It should remain dominant in this area. Intermixing with a few deciduous trees is commonplace.

Chestnut Oak Dominant

This flora group occupies the xeric bedrock areas of Castle Rock, where the soil is shallow and water availability is low. On Castle Rock itself are pockets of soil where stunted chestnut oak, upland blueberry, and mountain laurel predominate. Red maple, speckled alder, poison ivy, and grasses are also present. Much of the vegetation has been vandalized or trampled to grass, dirt, or rock. Lichens cover most bedrock surfaces. Just north of Castle Rock is an area where bedrock is at or just below the surface and there is a more continuous

somewhat the same as they mature. However, there is very little seedling growth. Ash seedlings were present in one area, and would perpetuate ash as a secondary species.

Upland Mixed Deciduous

This is another catch all term and pertains to mixed deciduous woods containing species that prefer dryer soils and/or when there is an absence of red maple. Primary species include sugar maple, black oak, and beech, with tulip, ash, white oak, and black birch as associates. Occasional species include locust, black cherry, and shagbark hickory. The stand in the northeasternmost section of the Preserve (excluding Castle Rock) also contains some young chestnut. The shrub layer often consists of sugar maple seedlings. Maple-leaf viburnum occurs at times and spicebush is present quite often. The herbaceous ground layer is generally sparse and includes Christmas, New York and other ferns, tree seedlings, and poison ivy.

Of interest is a small pocket of upland vegetation where the stream which borders the field empties into the lake. Here, surrounded by red maple lowland stand and wet meadow, are a few large black oak, sapling beech, and a ground cover of upland ferns and upland-type wood asters. Also present are red maple and spicebush.

It is difficult to forecast the successional trend of this habitat type. It will remain an upland mixed deciduous stand, but which tree species becomes dominant over time will be determined by soil, climate, water availability, and other factors.

soil cover. Here are larger and more numerous chestnut oak, red maple, black birch, black oak, blueberry, and mountain laurel.

Chestnut oak is a common dominant and climax species of Westchester's rocky hilltops. The vandalized areas, though slow in the recovery, will probably resucceed to a chestnut oak dominant stand.

Conifer Plantation

The plantations exist where there once was a nursery. Many of the conifers are hemlock. Others include white pine, various spruces (many dead), and Scotch pine. Red pine also occurred but was killed by the red pine scale which infested Westchester several years ago. There are some hardwoods mixed in with the conifers.

White pine, Scotch pine, and the spruces are not shade tolerant. As they die they will be replaced by hardwoods and succeed to either upland or lowland mixed deciduous forest. The hemlocks, if the site fulfills their growth requirements, may remain and become climax.

VEGETATION - GENERAL

Long Pond Preserve comprises four different ecological habitats; a large rock outcrop, forest, field, and marsh in addition to the lake itself. Each area contains its own distinct biotic community.

The rock outcropping, known as Castle Rock, drops steeply into Lake Waccabuc. There is little soil on the rock itself, and those species that manage to obtain a foothold are stunted as a result. The dominant tree is chestnut oak followed closely by red maple, a tree found in two extremely diverse habitats, low wet areas and high rocky areas. Black oak and black birch may also be found in fair numbers. Dominant shrubs include Mt. laurel and lowbush blueberry in great numbers accompanied by maple-leaved viburnum, shadebush and witch hazel. Poison ivy flourishes both on the rock and in the surrounding area. The rock is covered with lichens of various types including rock tripe.

The forest surrounding the rock contains a variety of mixed hardwoods. Beeches and maples vie for dominance with oaks and hickories. Several large red oaks grow in the rocky areas along the trail. Others include sycamore, elm, and tupelo, all typical of wet places, and a fair number of chestnut sprouts, some of good size. The understory consists of spicebush, staghorn sumac, sassafras, and flowering dogwood. Many of the dogwoods are in poor condition, weakened by a combination of disease and severe winters over the past few years. Blackberry and wild grape may be found along the trail where they receive adequate sunlight. The herbaceous plants

VEGETATION - GENERAL (con't.)

found on the forest floor include whorled loosestrife, white avens, jewelweed, yellow wood sorrel and hog peanut.

The forest down along the lake contains many of the same trees. Missing are the chestnut oaks and chestnut saplings which prefer high ridges. In addition to the forementioned species, there are sugar maples, American hornbeams, and white ash. Several large hop hornbeams may be seen along the trail which follows the south side of the lake. The presence of many American beech trees as well as some large yellow birch and stands of eastern hemlock is indicative of a more mature forest. A black ash is found close to the lake in its typical wet environment. There is also a stand of even-aged red maples of perhaps 15-20 years of age at the southwest corner of the lake; evidence that this area was probably still cleared until quite recently. Additional species of shrubs complete the understory such as sweet pepperbush and swamp azalea which thrive along the wet lake front. Spring wildflowers including wood anemone, trout lily, and purple trillium bloom on the forest floor before the canopy leafs out.

The field is a botanist's delight. Aside from providing an aesthetically rewarding scene as its flower-filled acres slope down to the lake, it contains an immense variety of plants. The field is maintained by mowing annually after most species have finished blooming in October. Large clumps of ferns, bracken, cinnamon, interrupted, and royal, reach heights of four to five feet. There are areas of blackberries, water hemlock, ragged robin, common milkweed, and Indian hemp interspersed with Canada lilies, two-flowered cynthia, culver's root and stargrass. An area of common cattail rises above its neighbors in one section of the field.

VEGETATION - GENERAL (con't.)

The borders of the field support a variety of shrubs, among them nannyberry, spicebush, elderberry, and multiflora rose. Large sugar maples line the boundary along Mead Street along with a red ash. A large horse chestnut is located near the small parking area at the head of the field. Only a small amount of purple loosestrife has infiltrated the wet field. Long Pond might serve as a good area in which to monitor how quickly this rapidly-spreading alien species displaces other wetland species.

In the marshy area on the north side of the lake may be found several varieties of ferns, sedge, Joe-Pye weed, New York ironweed, and along the lake front itself, smooth alder and red osier dogwood.

Various water plants including yellow pond lily and coontail may be found in the shallow portions of Lake Waccabuc.

SPECIES LIST - PLANTS

ACERACEAE - MAPLE FAMILY

Acer rubrum Red Maple
A. saccharum Sugar Maple

ALISMATICEAE - ARROWHEAD FAMILY

Sagittaria latifolia Broad-leaved Arrowhead

AMARYLLIDACEAE - AMARYLLIS FAMILY

Hypoxis hirsuta Stargrass

ANACARDIACEAE - CASHEW FAMILY

Rhus radicans Poison Ivy
R. hirta Staghorn Sumac

APOCYNACEAE - DOGBANE FAMILY

Apocynum androsaemifolia Spreading Dogbane
A. cannabinum Indian Hemp
Vinca minor Periwinkle

ARACEAE - ARUM FAMILY

Symplocarpus foetidus Skunk Cabbage
Arisaema atrorubens Jack-in-the-Pulpit

ARALIACEAE - GINSENG FAMILY

Aralia nudicaulis Wild Sarsaparilla
Panax trifolius Dwarf Ginseng

ASCLEPIADAEAE - MILKWEED FAMILY

Asclepias syriaca Common Milkweed
A. incarnata Swamp Milkweed

BALSAMINACEAE - TOUCH-ME-NOT FAMILY

Impatiens capensis Jewelweed

BETULACEAE - BIRCH FAMILY

Betula lenta Black Birch
B. populifolia Gray Birch
B. lutea Yellow Birch
Carpinus caroliniana American Hornbeam
Ostrya virginiana Hop Hornbeam

SPECIES LIST - PLANTS (con't.)

BERIBERIDACEAE - BARBERRY FAMILY

Berberis thunbergii Japanese Barberry

BIGNONIACEAE - UNICORN PLANT FAMILY

Catalpa catalpa Catalpa

CAMPANULACEAE - BLUEBELL FAMILY

Lobelia spicata Pale-spike Lobelia
Specularia perfoliata Venus Looking-glass

CAPRIFOLIACEAE - HONEYSUCKLE FAMILY

Sambucus canadensis Common Elder
Viburnum acerifolium Maple-leaved Viburnum
V. dentatum Arrowwood
V. lentago Nannyberry

CARYOPHYLLACEAE - PINK FAMILY

Cerastium vulgatum Mouse-ear Chickweed
Stellaria media Common Chickweed
S. graminea Lesser Stitchwort
Lychnis flos-cuculi Ragged Robin
Dianthus armeria Deptford Pink

CELASTRACEAE - STAFF TREE FAMILY

Celastrus orbiculatus Asiatic Bittersweet
Euonymus alatus Winged Euonymus

CERATOPHYLLACEAE - HORNWORT FAMILY

Ceratophyllum demorsum Hornwort (Coontail)

CLETHRACEAE - WHITE ALDER FAMILY

Clethra anifolia Sweet Pepperbush

COMPOSITAE - COMPOSITE FAMILY

Achillia millefolium Yarrow
Taraxacum officinale Dandelion
Antennaria neglecta Field Pussytoes
Krigia biflora Two-flowered Cynthia
Rudbeckia hirta Black-eyed Susan

SPECIES LIST - PLANTS (con't.)

<u>Tragopogon pratensis</u>	Yellow Goat's Beard	V J
<u>Erigeron pulchellus</u>	Robin Plantain	P M
<u>Hieracium pratensis</u>	King Devil	
<u>H. autantiacum</u>	Orange Hawkweed	
<u>H. paniculatum</u>	Panicled Hawkweed	A J
<u>Ambrosia artemisiifolia</u>	Common Ragweed	
<u>Chrysanthemum leucanthemum</u>	Ox-eye Daisy	
<u>Lactuca canadensis</u>	Wild Lettuce	
<u>Prenanthes altissima</u>	Tall White Lettuce	A J
<u>Eupatorium perfoliatum</u>	Boneset	
<u>Prenanthes alba</u>	White Lettuce	A J
<u>Eupatorium maculatum</u>	Spotted Joe-Pye Weed	A J
<u>Eupatorium purpureum</u>	New York Ironweed	
<u>Solidago odora</u>	Sweet Goldenrod	
<u>S. ulmifolia</u>	Elm-leaved Goldenrod	V J
<u>S. juncea</u>	Early Goldenrod	J
<u>S. rugosa</u>	Rough-stemmed Goldenrod	V J
<u>S. gigantea</u>	Late Goldenrod	
<u>S. graminifolia</u>	Lance-leaved Goldenrod	
<u>Helianthus giganteus</u>	Tall Sunflower	V J
<u>H. decapetalus</u>	Thin-leaved Sunflower	V J
<u>Aster umbellatus</u>	Flat-topped Aster	W J
<u>A. vimineus</u>	Small White Aster	W J
<u>A. divaricatus</u>	White Wood Aster	W J

CONVOLVULACEAE - MORNING GLORY FAMILY

<u>Ipomoea pandurata</u>	Wild Potato Vine	J
<u>Cuscuta gronovii</u>	Dodder	J

CORNACEAE - DOGWOOD FAMILY

<u>Cornus stolonifera</u>	Red Osier Dogwood
* <u>C. florida</u>	Flowering Dogwood
<u>Nyssa sylvatica</u>	Tupelo

CRASSULAGEAE - ORPINE FAMILY

<u>Sedum telephium</u>	Live-forever
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CRUCIFERAE - MUSTARD FAMILY

<u>Alliaria officinale</u>	Garlic Mustard	V J
<u>Capsella pennsylvanica</u>	Pennsylvania Bittercress	V J
<u>Dentaria diphylla</u>	Toothwort	V J
<u>Barbarea vulgaris</u>	Winter Cress	V J
<u>Lepidium virginicum</u>	Poor Man's Pepper	V J

SPECIES LIST - PLANTS (con't.)

CYPERACEAE - SEDGE FAMILY

<u>Cyperus strigosus</u>	<u>galingale</u>	Sedge
<u>Carex vulpinoidea</u>		Fox Sedge
<u>C. crinita</u>		Long-haired Sedge
<u>C. conjuncta</u>		Sedge
<u>C. scoparia</u>		Sedge
<u>C. rosea</u>		Sedge
<u>C. latiflora</u> ,	variety <u>blanda</u>	Sedge
<u>C. gracillime</u>		Graceful Sedge

ERICACEAE - HEATH FAMILY

* <u>Kalmia latifolia</u>	Mountain Laurel
<u>Vaccinium vacillans</u>	Lowbush Blueberry
<u>V. corymbosum</u>	Highbush Blueberry
<u>Rhododendron viscosum</u>	Swamp Honeysuckle

EQUISETACEAE - HORSETAIL FAMILY

<u>Equisetum arvense</u>	Field Horsetail
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FAGACEAE - BEECH FAMILY

<u>Fagus grandifolia</u>	American Beech
<u>Quercus alba</u>	White Oak
<u>Q. rubra</u>	Red Oak
<u>Q. velutina</u>	Black Oak
<u>Q. prinus</u>	Chestnut Oak
<u>Castanea dentata</u>	American Chestnut

GERANIACEAE - GERANIUM FAMILY

<u>Geranium maculatum</u>	Wild Geranium
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GRAMINEAE - GRASS FAMILY

<u>Phragmites phragmites</u>	Common Reed Grass
<u>Andropogon scoparius</u>	Little Blue Stem
<u>A. spp.</u>	Grass
<u>Agrostis alba</u>	Red Top Grass
<u>Arrhenatherium elatius</u>	Tall Oat Grass
<u>Bromus inermis</u>	Hungarian Brome
<u>Calamagrostis canadensis</u>	Grass
<u>Dactylis glomerata</u>	Orchard Grass
<u>Elymus canadensis</u>	Canadian Wild Rye
<u>Phleum pratense</u>	Deer Tongue Grass
<u>Poa pratensis</u>	Kentucky Blue Grass
<u>Sorghastrum nutans</u>	Indian (Nut) Grass

GROSSULARIACEAE - GOOSEBERRY FAMILY

<u>Ribes vulgare</u>	Red Garden Currant
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SPECIES LIST - PLANTS (con't.)

GUTTIFERAE - ST. JOHNSWORT FAMILY

Hypericum punctatum : Spotted St. Johnswort

Y J

HAMAMELIDACEAE - WITCH HAZEL FAMILY

Hamamelis virginiana Witch Hazel

HIPPOCASTANACEAE - BUCKEYE FAMILY

Aesculus hippocastanum Horse Chestnut

ILICACEAE - HOLLY FAMILY

Ilex verticillata Black Alder

IRIDACEAE - IRIS FAMILY

Iris versicolor Larger Blue Flag

M

JUGLANDACEAE - WALNUT FAMILY

Myrica carolinensis Bayberry
Carya ovata Shagbark Hickory
C. glabra Pignut Hickory

JUNCACEAE - RUSH FAMILY

Scripus atrovivens Rush
Juncus effusus Common Rush, Bog Rush
J. canadensis Rush

LABIATAE - MINT FAMILY

Prunella vulgaris Heal-all
Leonurus cardiaca Motherwort
Pycnanthemum tenuifolium Narrow-leaved Mountain Mint
Satureja vulgaris Basil
Mentha arvensis Wild Mint

LAURACEAE - LAUREL FAMILY

Sassafras sassafras Sassafras Tree
Lindera benzoin Spice Bush

LEGUMINOSAE - PEA FAMILY

Amphicarpa bracteata Hog Peanut
Robinia pseudacacia Black Locust

SPECIES LIST - PLANTS (con't.)

Trifolium procumbens
T. hybridum
T. pratense
Apios americana

Smaller Hop Clover
Alsike Clover
Red Clover
Groundnut

LILIACEAE - LILY FAMILY

Maianthemum canadense
Polyganatum biflorum
Smilax herbacea
S. rotundifolia
Erythronium americanum
Allium virala
Trillium erectum
Ornithogalum umbrellatum
Smilacena racemosa
Uvularia sessifolia
Veratrum viride
Hemerocallis fulva
Lilium canadense

Wild Lily-of-the Valley
Solomon's Seal
Carrion Flower
Greenbriar
Trout Lily
Field Garlic
Purple Trillium
Star of Bethlehem
False Solomon's Seal
Sessile Bellwort
False Hellebore
Day-lily
Canada Lily

LYTHRACEAE - LOOSESTRIFE FAMILY

Lythrum salicaria

Purple Loosestrife

MAGNOLIACEAE - MAGNOLIA FAMILY

Liriodendron tulipifera

Tulip Tree

MALACEAE - APPLE FAMILY

Amelanchier canadensis

Shadbush

NYMPHAEACEAE - WATER LILY FAMILY

Nymphaea advena

Yellow Pond Lily

OLEACEAE - OLIVE FAMILY

Fraxinus americana
F. pennsylvanica
F. nigra

White Ash
Red Ash
Black Ash

ONAGRACEAE - EVENING PRIMROSE FAMILY

Circaea quadrisulcata

Enchanter's Nightshade

ORABONCHACEAE - BROOM RAPE FAMILY

Epifagus virginiana

Beech Drops

OSMUNDACEAE - FLOWERING FERN FAMILY

Osmunda cinnamomea

Cinnamon Fern

SPECIES LIST - PLANTS (con't.)

O. claytonia Interrupted Fern
O. regalis Royal Fern

OXALIDACEAE - WOOD SORREL FAMILY

Oxalis europaea Yellow Wood Sorrel

PHYTOLACCACEAE - PCKEWEED FAMILY

Phytolacca americana Pokeweed

PINACEAE - PINE FAMILY

Pinus strobus White Pine
Picea glauca White Spruce
Picea rubens Red Spruce
Tsuga canadensis Eastern Hemlock
Juniperus virginiana Red Cedar

PLANTAGINACEAE - PLANTAIN FAMILY

Plantago major Common Plantain

PLANTANCEAE - PLANE TREE FAMILY

Platanus occidentalis Sycamore

POLYGONACEAE - BUCKWHEAT FAMILY

Polygonum persicaria Lady's Thumb
P. sagittatum Arrow-leaved Tearthumb
Rumex obtusifolius Broad Dock
R. crispus Curled Dock

POLYPODEACEAE - TRUE FERN FAMILY

Thelypteris palustris Marsh Fern
Onoclea sensibilis Sensitive Fern
Polystichum acrostichoides Christmas Fern
Dryopteris noveboracensis New York Fern
Pteridium agutenium Bracken Fern
Athyrium Filix-foemina Lady Fern
Adiantum pedatum Maidenhair Fern

PRIMULACEAE - PRIMROSE FAMILY

Lysimachis quadrifolia Whorled Loosestrife
L. nummularia Moneywort
L. terrestris Yellow Loosestrife
L. ciliata Fringed Loosestrife
Trientalis boreglis Starflower

SPECIES LIST - PLANTS (con't.)

PYROLACEAE - WINTERGREEN FAMILY

Montrspa uniflora Indian Pipe
Pyrola elliptica Shinleaf

RANUNCULACEAE - CROWFOOT FAMILY

Ranunculus abortivus Kidney-leaved Buttercup
R. bulbosus Bulbous Buttercup
R. acris Common Buttercup
Cimicifuga racemosa Black Cohosh
Actaea alba White Baneberry
Clematis virginiana Virgin's Bower
Anemone quinquefolia Wood Anemone
Thalictrum polygamum Tall Meadow Rue

ROSACEAE - ROSE FAMILY

Agrimonia gryposepala Agrimony
Fragaria virginiana Common Strawberry
Potentilla simplex Common Cinquefoil
Prunus serotina Black Cherry
Rubus canadensis Blackberry
R. allegheniensis Highbush Blackberry
R. occidentalis Black Raspberry
R. flagellaris Common Dewberry
Rosa multiflora Multiflora Rose
R. carolina Pasture Rose
R. palustris Swamp Rose
Spiraea latifolia Meadowsweet
Aronia spp. Chokeberry
Geum canadensis White Avens
Padus nana Choke Cherry

RUBIACEAE - MADDER FAMILY

Mitchella repans Partridge Berry
Galium aparine Cleavers
G. asprellum Rough Bedstraw
G. verum Yellow Bedstraw

SALICAEAE - WILLOW FAMILY

Salix nigra Black Willow
Populus grandidentata Big-toothed Aspen

SAXIFRAGACEAE - SAXIFRAGE FAMILY

Saxifrage pennsylvanica Swamp Saxifrage

SCROPHULARIACEAE - SNAPDRAGON FAMILY

Veronicastrum virginicum Culver's Root
Penstemon digitalis Foxglove Beardtongue

SPECIES LIST - PLANTS (con't.)

P. hirsutus Hairy Beardtongue
Minulus ringens Square-stemmed Monkey-flower

STAPHYLEACEAE - BLADDERNUT FAMILY

Staphylea trifolia Bladdernut

TYPHACEAE - CATTAIL FAMILY

Typha latifolia Broad-leaved Cattail

ULMACEAE - ELM FAMILY

Ulmus americana American Elm

UMBRELLIFERAE - PARSLEY FAMILY

Osmorhiza claytonia Sweet Cicely
Cicuta maculata Water Hemlock
Zizia aptera Golden Alexanders
Daucus carota Queen Anne's Lace

URTICACEAE - NETTLE FAMILY

Pilea pumila Clearweed

VERBENACEAE - VERVAIN FAMILY

Verbena hastata Blue Vervain
V. urticifolia White Vervain

VIOLACEAE - VIOLET FAMILY

Viola cucullata Marsh Blue Violet
V. pubescens Downy Yellow Violet
V. conspersa Dog Violet

VITACEAE - GRAPE FAMILY

Vitus labrusca Northern Fox Grape

Protected Native Plants

Effective September 1, 1974, no one may knowingly pick, pluck, sever, remove or carry away, without the consent of the owner thereof, any protected plant. Violations of the law are punishable by fines of up to \$25 each (Environmental Conservation Law § 9-1503). The following are native plants which shall be protected pursuant to the above law and state regulation (NYCRR § 193.3). Such list shall apply statewide.

COMMON NAME*	SCIENTIFIC NAME	COMMON NAME*	SCIENTIFIC NAME
Green-dragon (Dragonroot)	<i>Arisaema dracontium</i>	American Ben-balm; Oswego Tea (Indian-heads; Scarlet Bee-balm)	<i>Monarda didyma</i>
Butterfly-wreid (Chigger-flower; Orange Milkweed; Pleuris-root)	<i>Asclepias tuberosa</i>	Bayberry (Candleberry)	<i>Myrica pensilvanica</i>
Bluebell-of-Scotland (Harebell)	<i>Campanula rotundifolia</i>	Lotus (Lotus Lily; Nelumbo; Pond-nuts; Water Chinquapin; Wonkapin; Yellow Lotus)	<i>Nelumbo lutea</i>
American Bittersweet (Waxwork)	<i>Celastrus scandens</i>	Prickly Pear (Wild Cactus; Indian Fig)	<i>Opuntia humifusa</i> (<i>O. compressa</i> , p.p.)
Pipsissewa (Prince's-pine; Wax-flower) Spotted Evergreen (Spotted Wintergreen)	<i>Chimaphila spp.</i>	All Native Orchids, including: Alder's-mouth (Malaxis); Arethusa (Dragon's-mouth; Swamp-pink); Bug-candle (Scent-bottle); Calopogon (Grass-pink; Swamp-pink); Calypso (Fairy-slipper); Coral-root; Cypripedium (Lady's-slipper; Moccasin-flower; nerve root); Goxlyera (Lattice-leaf; Rattlesnake plantain); Kittle-pink; Ladies'-tresses (Pearl-twist; Screw-auger); Orange-plume; Orchis; Pogonia (Beard-flower; Snake-mouth); Putty-root (Adam-and-Eve); Soldier's-plume; Three-birds; Twayblade; Whipperwill-shoe	<i>Orchidaceae</i>
Flowering Dogwood	<i>Cornus florida</i>	Golden-club	<i>Orontium aquaticum</i>
Sunkew (Daisy-dew; Dewthroat)	<i>Drosera spp.</i>	Ginseng (Sang)	<i>Hanax quinquefolius</i>
Trailing Arbutus (Ground Laurel; Mayflower)	<i>Epigaea repens</i>	Wild Crabapple	<i>Pyrus coronaria</i>
Burning-bush (Wahoo) Strawberry-bush (Bursting-heart)	<i>Euonymus spp. (Native)</i>	Azalea; Great Laurel (White Laurel); Honeysuckle; Pinxter (Election-pink; Pinxter-bloom); Rhododendron (Rosebay); Rhodora	<i>Rhododendron spp. (Native)</i>
All ferns, including: Adler's-tongue, Arolla, Buckhorn, Cliff Brake, Curly-grass, Fiddleheads, Hart's-tongue, Maidenhair, Moonwort, Polypody, Rock Brake, Salvinia, Spleenwort, Walking-leaf, Wall-rue, Water-spangle, Woodsia But excluding Bracken (<i>Pteridium aquilinum</i>); Hay-scented Fern (<i>Dennstaedtia punctilobula</i>); Sensitive Fern (<i>Onoclea sensibilis</i>), which are not protected.	<i>Filices (Filicinae; Ophioglossales and Filicales) (Native)</i>	Bitterbloom (Marsh-pink; Rose-pink; Sabatia; Sea-pink)	<i>Sabatia spp.</i>
Ague-weed, Blue-bottles, Gentian (Gall-of-the-earth)	<i>Gentiana spp.</i>	Bloodroot (Puccoon-root; Red Puccoon)	<i>Sanguinaria</i>
Golden Seal (Orange-root; Yellow Puccoon)	<i>Hydrastis canadensis</i>	Pitcher-plant (Huntsman's-cup; Sidesaddle-flower)	<i>Sarracenia purpurea</i>
Holly (Hulver); Inkberry (Bitter Galberry); Winterberry (Black Alder)	<i>Ilex spp. (Native)</i>	Wild Pink	<i>Silene caroliniana</i>
Laurel, Spoonwood (Calico-bush) Wicky (Landkill)	<i>Kalmia spp.</i>	Bethroot (Birthroot; Squawroot; Stinking Benjamin; Wake-robin); Toadshade, Trillium	<i>Trillium spp.</i>
Lily, Turk's-cap	<i>Lilium spp. (Native)</i>	Globe-flower (Trollius)	<i>Trollius laxus</i>
Cardinal-flower (Red Lobelia)	<i>Lobelia cardinalis</i>	Bud's-foot Violet	<i>Viola pedata</i>
All Clubmosses, including: Bear's-bed (Christmas-green, Running Evergreen; (Trailing Evergreen; Ground Pine); Bunch Evergreen; Festoon Pine (Coral Evergreen; Buckhorn; Staghorn Evergreen; Wolf's-claws); Ground Cedar (Creeping Jenny); Ground Fir; Heath Cypress	<i>Lycopodium spp.</i>		
Bluebell (Roanoke-bells; Tree Lungwort; Virginia Bluebell; Virginia Lungwort; Virginia Cowslip)	<i>Mertensia virginica</i>		

*NOTE: In this list above, common names are not included if they repeat the generic common name with a modifier (e.g., "Trillium" is understood to include "Painted Trillium," "White Trillium", "Nodding Trillium" and all others.) Names appearing within parentheses are less familiar synonyms for the principal common names of each species listed.

Fauna

Peggy Turco

Long Pond Preserve, although relatively small, contains a high diversity of moist habitats. Generally, a moist habitat will attract a higher diversity of animal species than a dryer one. The poorly drained field abuts the swamp, red maple stand, stream, and lake. Throughout the woods are small mesic upland stands, lowland stands, streams, coniferous stands, and wet areas. Not only is there a relatively high diversity of habitats within only 39 acres, but the habitat types are well intermixed. This allows for a high degree of transition areas or ecotones and edges, which are highly suited for wildlife utilization. For example, traveling north and east of the large field is a swamp, conifers, upland stand, lowland stand, upland stand, swamp, and field in the northeasternmost corner. The southern part of the Sanctuary contains a stream, red maple stand, lowland stand, upland stand, wetland strip, upland stand, stream, and hemlock-mixed deciduous stand. Throughout, the habitats are never far from the lake. Many adjacent private properties also contain nice mosaics of field and treed areas. These factors combined should allow for a high species diversity of animals.

Castle Rock by itself does not offer a necessarily good food supply or attractive cover for larger mammals, though they probably occur within the forest type that Castle Rock is a part of. Smaller mammals, reptiles, amphibians, and birds are probably present. There would be higher concentrations of individuals directly along the lake shore and north of the bedrock area in the upland deciduous stand, rather than on the rock itself. Castle Rock receives a lot of attention and abuse from human

visitors. This may be adversely affecting the occurrence of faunal species in that area.

The species lists exhibit mammal, reptile, and amphibian species that would be expected to inhabit the Preserve. Most are typical for Westchester's swamps, moist woods, and meadows. Some animals might be restricted to the lake shore (ie. muskrat, bullfrog, green frog, painted turtle, spotted turtle, etc.) The table is divided into three categories: sighted, probable (species commonly found in similar habitats), and possible (species with a high probability of occurring in such habitats.)

Fauna Species List: Amphibians

Probable

Spotted Salamander	<u>Ambystoma maculatum</u>
Red-backed Salamander	<u>Plethodon c. cinereus</u>
Bullfrog	<u>Rana catesbeiana</u>
Green Frog	<u>Rana clamitans</u>
Wood Frog	<u>Rana sylvatica</u>
Northern Leopard Frog	<u>Rana p. pipiens</u>
American Toad	<u>Bufo americanus</u>
Fowler's Toad	<u>Bufo woodhousei fowleri</u>
Northern Spring Peeper	<u>Hyla c. crucifer</u>

Possible

Northern Dusky Salamander	<u>Desmognathus f. fuscus</u>
Northern Two-Lined Salamander	<u>Eurycea b. bislineata</u>
Pickerel Frog	<u>Rana palustris</u>

Reptiles

Probable

Wood Turtle	<u>Clemmys insculpta</u>
Eastern Box Turtle	<u>Terrapene c. carolina</u>
Northern Water Snake	<u>Natrix s. sipedon</u>
Eastern Garter Snake	<u>Thamnophis s. sirtalis</u>
Northern Ringneck Snake	<u>Diadophis punctatus edwardsi</u>

Possible

Eastern Hognose Snake	<u>Heterodon platyrhinos</u>
Northern Black Racer	<u>Coluber c. constrictor</u>
Black Rat Snake	<u>Elaphe o. obsoleta</u>
Northern Copperhead	<u>Agkistrodon contortrix mokasen</u>

Fauna Species List: Mammals

Sighted

Raccoon	<u>Procyon lotor</u>
Eastern Gray Squirrel	<u>Sciurus carolinensis</u>
Eastern Chipmunk	<u>Tamias striatus</u>
Eastern Cottontail	<u>Sylvilagus floridanus</u>
Whitetail Deer	<u>Odocoileus virginianus</u>

Probable

Opossum	<u>Didelphis marsupialis</u>
Masked Shrew	<u>Sorex cinereus</u>
Least Shrew	<u>Cryptotis parva</u>
Shorttail Shrew	<u>Blarina brevicauda</u>
Starnose Mole	<u>Condylura cristata</u>
Eastern Mole	<u>Scalopus aquaticus</u>
Little Brown Myotis	<u>Myotis lucifugus</u>
Eastern Pipistrel	<u>Pipistrellus subflavus</u>
Shorttail Weasel	<u>Mustela erminea</u>
Longtail Weasel	<u>Mustela frenata</u>
Mink	<u>Mustela vison</u>
Striped Skunk	<u>Mephitis mephitis</u>
White-footed Mouse	<u>Peromyscus leucopus</u>
Southern Bog Lemming	<u>Synaptomys cooperi</u>
Meadow Vole	<u>Microtus pennsylvanicus</u>
Muskrat	<u>Ondatra zibethica</u>
Meadow Jumping Mouse	<u>Zapus hudsonius</u>
Woodland Jumping Mouse	<u>Napaeozapus insignis</u>

Possible

Longtail Shrew	<u>Sorex dispar</u>
Keen Myotis	<u>Myotis keeni</u>
Small-footed Myotis	<u>Myotis subulatus</u>
Silver-haired Bat	<u>Lasiorycteris noctivagans</u>
Red Bat	<u>Lasiurus borealis</u>
Big Brown Bat	<u>Eptesicus fuscus</u>
Hoary Bat	<u>Lasiurus cinereus</u>
River Otter	<u>Lutra canadensis</u>
Red Fox	<u>Vulpes fulva</u>
Woodchuck	<u>Marmota monax</u>
Red Squirrel	<u>Tamiasciurus hudsonicus</u>
Southern Flying Squirrel	<u>Glaucomys volans</u>
Northern Flying Squirrel	<u>Glaucomys sabrinus</u>

Soils

Peggy Turco

The soils of Long Pond Preserve were weathered from glacial till and bedrock. Climate and biological activity acted slowly over time with the topography to form the present soil profile.

The following soils information was obtained from the Westchester County Soil and Water Conservation District Office in White Plains. The soil units are named for the dominant soils that occur within the delineated areas on the overlay. Some variation within designations could exist. Further soil characteristics for the Preserve are exhibited in the soils table.

Often, soil type will correspond with vegetation type, especially with wetlands. Massena roughly fell within a floodplain and Castle Rock's Hollis supported a typical cover of chestnut oak dominant. Generally however, most of the Sanctuary's soil types did not correspond well with florae type. This disjunction may be due to the fact that much of the vegetation is second and third (perhaps even fourth) growth not yet climaxed.

Charlton - ChB, ChC, ChD

This fine sandy loam was weathered from gravelly and stony glacial till deposits derived principally from granite, gneiss and schist. It is found on the top and upper slopes of most of the upland till plains in Westchester County. The series is deep, well-drained and medium textured and moderately-coarse textured.

In a given profile, the dark yellowish-brown sandy loam surface layer is about 7" thick. The upper part of the subsoil (5" thick) is a strong brown gravelly fine sandy loam. The lower subsoil (12" thick) is yellowish-brown gravelly fine sandy loam. The substratum is dark grayish-brown gravelly fine sandy loam.

The water table is many feet below the surface during the year but seasonally, in phases, may fluctuate to within a depth of three feet. Interestingly, there is a moderate ground water pollution hazard when the soil is used for the disposal of septic tank effluent. Permeability is moderate to moderately rapid. Available water capacity is moderate and natural fertility is medium. Unlimed reactions of both the surface and subsoil are strongly acid.

Charlton soils are found in the southern and western parts of the Preserve. The letters "B", "C", and "D" denote changes in slope.

Paxton - PnB

These are deep, well drained, moderately coarse-textured soils formed in low to medium lime glacial till. Paxton occurs only slightly within part of the Preserve's western boundary.

The surface layer (8" thick) is a dark brown friable fine sandy loam. The 9" thick upper subsoil is strong brown, gravelly fine sandy loam. The lower subsoil (6" thick) is brown fine sandy loam. Beneath this is a 7" layer of grayish-brown fine sandy loam, underlain by a very firm, dark grayish-brown gravelly fine sandy loam substratum.

The water table seasonally fluctuates to within 2 feet of the surface. Permeability is moderate above the fragipan and very slow within the fragipan. Available water capacity is moderate and natural fertility medium. Unlimed reaction of the surface and subsoil is medium acid to slightly acid.

Hollis-Rock Outcrop Association - HSE, HSF

The Hollis Association occurs at Castle Rock (HSE) and slightly within the northwestern corner of the Preserve (HSF), though it is questionable whether the latter actually extends onto Sanctuary land. Hollis soils typically occur on shallow to bedrock side slopes of the broader upland ridges and till plains of Westchester. The Association includes steep Hollis soils, bedrock outcroppings, and other soils that are deeper than Hollis soils and are found on the lower slopes. The series is shallow, somewhat excessively drained, and moderately coarse-textured. It was formed from gravelly and stony glacial till derived principally from granite, schist, and gneiss. Some areas of these soils have a complex pattern of deep to shallow soils that were individually too small to delineate on the Westchester County soils maps. This may be applicable to the Castle Rock parcel where bedrock outcrops juxtapose pockets of soil supporting upland forest.

Hollis soils consist of a 1" to 1½" layer of leaves and undecomposed or decomposed forest litter on the surface. The surface layer is 2" thick and very dark grayish brown fine sandy loam. The upper subsoil (5" thick) is strong brown, friable fine sandy loam. The entire profile is underlain by granite bedrock.

The Outcrop part of the Association is composed of granite bedrock usually exposed near the shoulders and upper backslopes of slopes.

Association permeability is moderate to moderately rapid. Available water capacity is very low in the Hollis soils. Natural fertility is medium. Unlimed reaction at the surface and in the subsoil is strongly acid.

Massena - Ma

These are deep, somewhat poorly drained medium-textured soils formed in medium to high lime glacial till. Massena roughly corresponds to the floodplain of the stream which flows along the large meadow.

Typically, the surface is very dark grayish-brown friable loam and about 10" thick. The subsoil totals about 23" in thickness. The upper subsoil is yellowish-brown, friable, mottled fine sandy loam. The lower subsoil is grayish-brown, friable, mottled fine sandy loam. The upper substratum (9" thick) is pale brown, friable, mottled fine sandy loam. The lower substratum is grayish brown, friable fine sandy loam.

During the wettest parts of the year the seasonal high water table is $\frac{1}{2}$ ' to $1\frac{1}{2}$ ' below the surface. During dry periods this drops to 3' to 4' below the surface. Permeability is moderate in the surface and moderately slow to slow in the subsoil and substratum. Available water capacity is moderate or high. Natural fertility is moderate. The unlimed reaction ranges from medium acid to neutral in the surface and subsoil. The substratum is neutral to mildly alkaline.

Soils Descriptions

P. Turco

UNIT	NAME	(%) SLOPE	PARENT MATERIALS	SURFACE ERODIBILITY*	RUNOFF POTENTIAL		DEPTH TO BEDROCK	DEPTH TO SEASONAL WATER TABLE
					WITH COVER	WITHOUT COVER**		
ChB	Charlton fine sandy loam	3-8	glacial till	low	low	very high	6'+	3'+
ChC	"	8-15	"	"	"	"	"	"
ChD	"	15-25	"	"	medium	"	"	"
PnB	Paxton fine sandy loam	3-8	glacial till	medium	medium	high	6'+	2'+
HSE	Hollis- Rock Outcrop	15-35						
	Hollis part:		glacial t.	medium	very high	v.h.	10-20"	6'+
	Rock O. part:		bedrock	medium	very high	v.h.	0-10"	6'+
HSF	Hollis- Rock Outcrop	35-60						
	Hollis part:		glacial t.	medium	very high	v.h.	10-20"	6'+
	Rock O. part:		bedrock	medium	very high	v.h.	0-10"	6'+
Ma	Massena loam	0-3	glacial till	medium	medium	very high	6'+	½-1½'

Abbreviations: O. - Outcrop
v.h. - very high

After Westchester County Soil Survey, Westchester County Soil and Water Conservation District, 1978.

*Surface erodibility takes into account all soil characteristics that could affect erodibility (ie. texture, consistency) except for slope. Soils with a low erodibility will erode on steeper slopes if left unprotected by vegetation.

**The runoff potential heading of "cover" denotes a well established growth of grasses. "Without cover" indicates removal of the grasses and the upper 6" to 8" of soil.

Hydrology

Peggy Turco

Long Pond Preserve throughout drains into Lake Waccabuc, either through perennial or intermittent streams, or from movement of ground water downhill by the force of gravity.

Lake Waccabuc drains into the Waccabuc River, which joins the Cross River on its way to Cross River Reservoir, which drains into the Croton River, enters the Hudson River, and flows to the Atlantic Ocean.

There are two well-defined permanent streams traversing the Preserve. The brook which passes along the southeastern edge of the large field ranges up to 3 feet in depth and 12 feet in width. The bottom is composed of sand and cobbles and the banks are undercut and eroded. At the mouth is a sandy 'delta' intruding into the lake. The stream at the Sanctuary's eastern end is similar. It, too, has undercut and eroded banks (in places) and a stone and sand bottom. It ranges in depth up to 4 feet and up to 20 feet in width. This stream traverses a better drained soil and a steeper slope than the 'field' stream.

There is another perennial stream that is considerably smaller and carries a lesser water volume than the two aforementioned brooks. In the northern portion of Long Pond is a small spot enclosed by stone walls. Inside is a large rock from which issues a brook which travels southward into the red maple swamp and dissipates. A stream bed reforms near the lake and flows into Lake Waccabuc (see Hydrology Overlay.) This stream has a sand, silt, and cobble bottom and reaches a maximum depth of 1 foot and a maximum 3 foot width.

Throughout the Preserve, particularly in the larger lowland mixed deciduous stand, are numerous intermittent streams. Dry during periods of drought or when rainfall is sparse, these exhibit leaf bottoms and can have eroded floors and sides. The only exceptions to this are the intermittent stream that flows through the field and the southeasternmost wetland area. Here the stream beds are less clearly defined. Often there is simply ground surface seepage. All the seasonal streams drain perpendicular to slope, towards the lake, except for one which cuts diagonally across the larger lowland mixed deciduous stand. This stream follows the uphill side of a trail. In a few instances intermittent streambeds dissipate before reaching the lake.

Geology

P. Turco

The geology of Westchester, or the Manhattan Prong, has been the subject of considerable debate since it was first studied in the 1800's. The region has been metamorphosed many times over, making it difficult to understand what took place. The following geology report reviews the literature concerning the Lake Waccabuc area and accompanies a mylar overlay. Castle Rock was field checked and is described at the end of the report.

Stephen M. Tomecek

REGIONAL SETTING -

The area described in this report lies in the Northeastern portion of Westchester County, New York in the Town of Lewisboro, and is located on the Peach Lake 7½ minute quadrangle of the U.S. Geological topographic map series. Three unique formations have been identified in this map area, and all are member units of the structural and petrologic province known as the Manhattan Prong. Generally speaking, this province is characterized by high-grade metamorphic rocks although some igneous intrusives are present to a lesser degree.

For the most part, the various rock types which comprise the Manhattan Prong are the controlling elements of the regional geomorphology. In the broadest sense, it may be stated that the major topographic highs are underlain with gneisses, the intermediate elevations with schist, and the valley areas with marble. Due to the intensive glaciation which this region has undergone, however, these relationships do not always hold true. Much of the topography has been greatly modified by glacial action whereby both scouring of the high elevations and deposition in the valleys have resulted in an overall reduction in relief.

BEDROCK GEOLOGY -

As previously noted, three distinct rock units have been recognized and mapped in this area. (fig. 1 after Prucha et al 1968) The oldest of these units, as determined by relative age dating techniques, is the Fordham Gneiss. Typically, the Fordham Gneiss is a coarsely banded hornblende-biotite-quartz-plagioclase gneiss with alternating light and dark layers generally not exceeding 2 feet in thickness. Prucha et al (1968) has described the Fordham Gneiss as including abundant intercalated layers of amphibolite, marble, calc-silicate rock, quartzite, granitic gneiss and pegmatite. Field checks have confirmed this description, especially with respect to the amphibolite and pegmatite layers. These appear quite frequently and their local thickness often exceed 10 feet.

In outcrop, the Fordham Gneiss typically appears quite massive weathering to dark gray to black on surfaces. Individual layers within the rock unit are fairly consistent along strike and are generally between 2 and 4 inches in thickness, rarely exceeding 2 feet. Variation in color between layers is the direct result of changes in constituent mineralogy, and these compositional layers can often be traced several tens of feet

along strike. Rock textures are typically homeoblastic (granoblastic) but can appear schistose where high concentrations of micaceous minerals occur. Within the Pegmatite veins, textures are extremely coarse-grained with most crystals (grains) exceeding 1 cm in diameter.

The next younger rock unit located in the map area is the Inwood Marble which is generally a grayish white medium to coarse grained rock ranging in composition from calcite to nearly pure dolomite. (Prucha et al, 1968) In addition to the expected calcic minerals, the Inwood marble also contains moderate amounts of calc-silicate minerals, particularly diopside, tremolite, and muscovite. Also present are locally abundant concentrations of quartz, microcline and pyrite which appears rusty brown on the weathered surfaces of the rock.

As previously noted, the Inwood Marble generally is found to be underlying the valley areas and consequently is often covered by a considerable amount of glacially derived sediment. Outcrops are not common and in this map area they may only be found as intercalated layers within the Fordham Gneiss or Manhattan Schist. Part of the problem in locating outcrops which are comprised solely of marble is the fact that the best exposure area lies directly under Lake Waccabuc. It should be noted that topography alone is not adequate reason for assuming the underlying bedrock is marble, but in general terms low lying elevations may be underlain by marble more often than any other rock type in this region.

The youngest of the three formations found in the map area is the Manhattan Schist. This unit, (which has been mapped as a gneiss by Prucha et al, 1968) is primarily a garnet bearing, quartz-plagioclase-biotite gneissic schist often including abundant quantities of both muscovite and sillimanite. This unit is quite foliated with gneissic banding frequently giving way to a well developed schistosity where micaceous minerals dominate the mineralogy.

In outcrop, layers of amphibolite, pegmatite and marble are often associated with the Manhattan formation, and intensive weathering along the foliation planes within the rock often gives the outcrop a slabby appearance. Outcrops of the Manhattan Formation are not common in the map area due to the abundance of glacially derived, surficial sediments.

STRATIGRAPHY, HISTORY AND AGE -

The exact age and stratigraphic relationships of those formations which comprise the Manhattan Prong has been a major point of conflict since

The rocks were first studied in the early nineteenth century. As already noted, the Fordham Gneiss is generally thought to be the oldest unit of the three described in this map area, however, it must be noted that actual tops and bottoms of the formations have not as yet been determined. The geographic distribution of the Fordham Gneiss is quite broad as it extends from New York City to an area near Danbury, Connecticut. Throughout this entire area, the Fordham consistently appears to occupy a stratigraphic position which is lower than the Inwood Marble and the Manhattan Formation. Most authors will agree that the Fordham is the basal unit of the New York City Group (Manhattan Prong) and it is generally thought to be Precambrian in age.

Because of the intensive metamorphism and the numerous deformations which the Fordham Gneiss has undergone, the original sedimentary environment of deposition for this unit can only be inferred. Scotford (1956) interpreted the Fordham to be of a metasedimentary origin based primarily on his work on the mineralogy and chemical composition of the formation. Although there may be more than one interpretation of this data, he concluded that the original sedimentary unit which predated the Gneiss was probably mostly a graywacke.

The next major point of disagreement concerning the stratigraphy of the New York City Group is the nature of the contact between the Fordham Gneiss and the Inwood Marble. Prucha et al (1968) in his mapping of the area recognized no major unconformities between any of the formations of the New York City Group, although he did not rule this possibility out. Hall (1966) on the other hand, in mapping these same formations near White Plains, New York has concluded that the contact between the Inwood and Fordham formations is clearly an angular unconformity. In field checking the area around Lake Waccabuc, the data would seem to support Prucha simply because no distinct contact between rock types has been recognized. If one examines several of the large cliff faces on the North side of the lake, however, the dramatic interlayering of the different rock types would suggest that the contact between the Fordham Gneiss and Inwood Marble is not only conformable but is gradational as well. Although the exact age of the Inwood marble has not been determined by isotopic dating techniques, it is generally thought of as being Cambro - Ordovician in age.

As with the other units in the New York City group, the Inwood Marble has experienced a great deal of deformation as a result of regional tectonics. Despite this problem, Prucha et al (1968) has determined that the Inwood is clearly of metasedimentary origin and they have inferred it to have been derived from a slightly siliceous limestone. This interpretation

would seem to be valid when one considers the relative abundance of calc-silicate minerals which are often found incorporated within the Inwood Marble per se.

The final rock unit which has been described in this map area is the Manhattan Formation, and unlike the questionable stratigraphic relationships between the other members of the New York City group, the contact between the Inwood Marble and the Manhattan Formation seems to be a point of general agreement. The Manhattan Formation is generally thought of as the youngest of the three members of the New York City group and in almost all cases it has been found to lie above the Inwood Marble in conformable contact. As with the other members of this group, the actual age of the Manhattan Formation cannot be obtained by isotopic dating techniques, therefore it shares an age of Cambro-Ordovician with the Inwood Marble.

As with the other units in the Manhattan Prong, the Manhattan Formation is thought to have a metasedimentary origin. Due to the strong foliation in the rock and the schistose nature of much of the unit, it has been concluded that the Manhattan Formation has been derived from a sedimentary sequence which was originally an alternating series of siltstone and shales.

STRUCTURE -

As previously noted, all of the rock units which belong to the Manhattan Prong have been deformed several times during their post depositional history. This action has resulted in a rather complex structure for the entire region. One factor which has made the task of decoding this structure somewhat easier, however, is the fact that all three formations have behaved structurally as a single rock unit. Because of the fact that most of the deformation has occurred after the initial deposition of all three units, the Fordham, Inwood, and Manhattan formations have all been folded and refolded simultaneously.

In general, the rock units which are present in the Waccabuc Lake area have been deformed in such a way as to make a large, cross-folded syncline which plunges to the northeast. Besides the folding, there are some small fault zones which come in close proximity to the map area. All of these faults are of minor significance, however, and little if any displacement can be recognized across them.

OUTCROP DISCRIPTION -

On the northwestern shore of Lake Waccabuc, there lies a massive cliff face which rises some 80 feet above the surface of the lake to an elevation of about 550 feet. This outcropping is of particular interest because it lies in close proximity to the presumed contact of the Fordham Gneiss and the Inwood Marble and additionally, it is near the nose of a major regional fold.

The dominant rock type found in the outcrop is Fordham Gneiss. Both the light gray quartz-plagioclase and the darker amphibolite units are present in distinct layers with average thickness ranging from 2 to 6 feet respectively. Intercalated with these two rock types are numerous veins of coarse grained pegmatite and quartz. As one descends down the cliff face, the amphibolite layers appear in greater thickness (up to 10 feet) and many of the thinner quartz-plagioclase layers have been cut by an even greater number of pegmatite veins. Finally, near the bottom of the outcrop layers of both calc-silicate rock and dolomitic marble are seen to be intercalated with the gneissic layers. This interlayering of rock types continues right into the lake, and consequently, no distinct contact between the Inwood Marble and the Fordham Gneiss has been recognized.

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- Scotford, David M., 1956, Metamorphism and Axial-plane Folding in the Poundridge Area, New York: Geol. Soc. Amer. Bull., v.67, pp. 1155 - 1198.

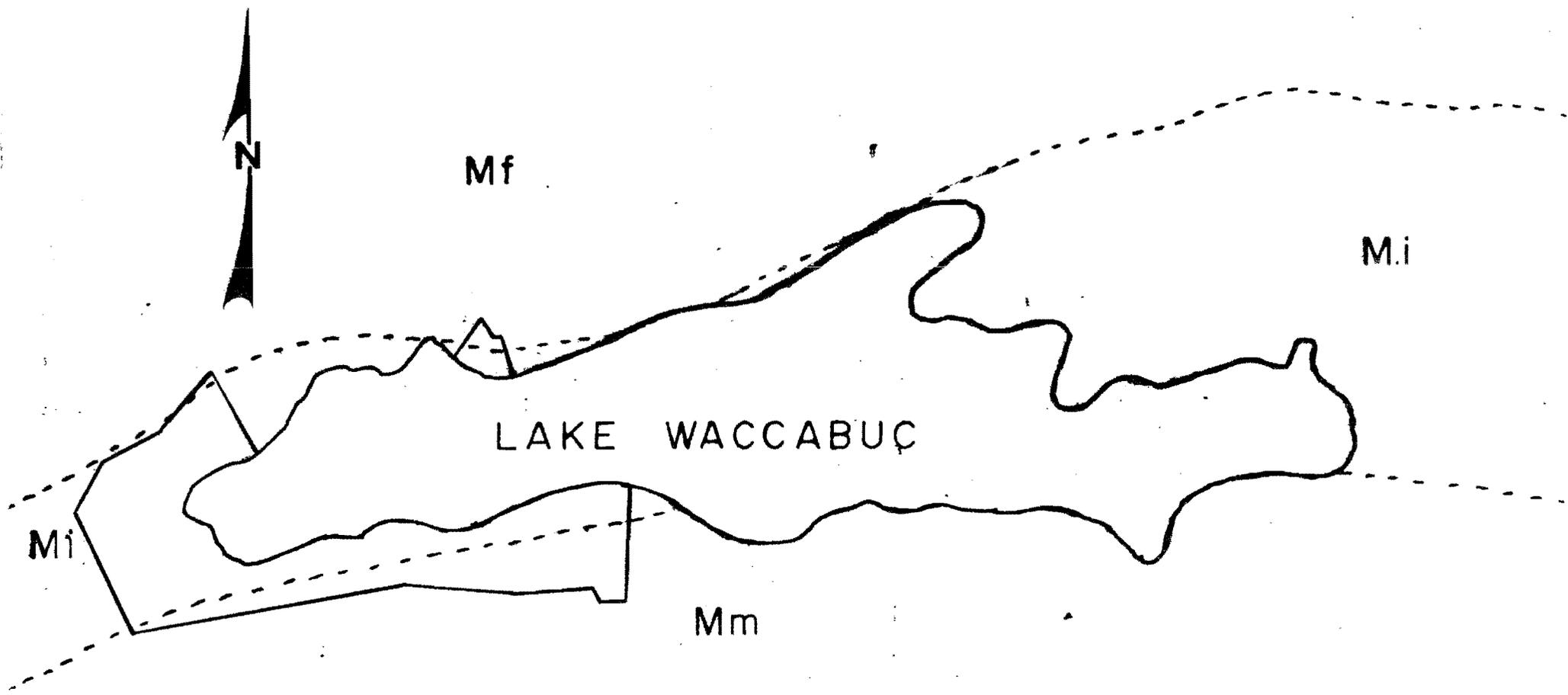


Fig. 1 BEDROCK GEOLOGY OF LAKE WACCABUC

SCALE 1=9600

Mf - FORDHAM
 Mi - INWOOD
 Mm - MANHATTAN

S. M. TOMECEK
 9/80

Climate

P. Turco

As part of the region, Long Pond has a humid-continental type climate predominately influenced by air flow and weather systems from the continental land mass to the west. The Atlantic Ocean moderates cold winter temperatures, lengthens the freeze-free season, and is largely responsible for the fairly uniform distribution of precipitation throughout the year. Man also exerts an influence over the climate. The heat dome affect increases with increasing human population density. This warms the climate and alters properties of the atmosphere. The affect in the region is greatest over New York City, but has intensified over Westchester as development has increased.

Lake Waccabuc itself probably has an influence on the climate of the Preserve. Water bodies usually moderate temperatures of the surrounding landscape, especially in late fall. There are generally lower snow depths within one-half mile of reservoirs and larger lakes in Westchester. Topography also has an influence on climate. Low lying areas receive less snow and more fog than higher elevations. In winter, cold denser air moves down into and chills valleys, leaving surrounding hilltops slightly warmer.

Generally, the ice-out date for northern Westchester ranges from March 1 to April 5. The last frost averages April 24 to May 6. Droughts can occur in spring and summer that cause vegetation damage. At Long Pond this would especially affect Castle Rock's chestnut oak stand where water is scarce at all

times of year.

Summer is the wettest season of the year (see precipitation table.) Relative humidity rarely falls below 50%. Normally the relative humidity ranges from 57% in the evening to 80% in the morning. This is due to the Atlantic Ocean's influence. The 'oppressive' heat of summer is more duly attributed to the high humidity complementing the high temperatures. Heat waves usually endure for two to three days. Of the thirty or so thunderstorms that take place each year, most occur in summer. High winds and lightning can cause tree damage, especially on ridgetops. The average length of the growing season is 155 to 175 days from May 1 to September 30, during which the temperature averages 65 degrees Fahrenheit and rainfall 21 inches. An occasional hurricane can graze Westchester, the main effects being high winds (which can cause forest damage), and very heavy rains.

In fall there is an increased likelihood of fog, most noticeable in lower areas near water bodies (such as the Preserve.) This is where the air's moisture content is greatest. During the year approximately 22 days are foggy. Out of this 7 to 11 days arise in autumn. The first frost averages October 7. October is the month of full autumn vegetation color. After the first frost can come Indian summer characterized by warm days with clear skies, calm air, a distant haze, and cool nights. "Indian summer" is caused by the persistence of a high pressure ridge centering over the West Virginia area.

By November the tree foliage is gone and with mid-fall

the weather systems are moving rapidly. By late November there have been snow flurries and a substantial reduction in solar radiation and daylight duration.

Throughout winter frigid cold waves originating in Hudson's Bay sweep the area. January is less stormy and sunnier than December. As previously mentioned, at night cold, denser air slides down slopes and cools lowland areas, leaving hilltops slightly warmer. The average lowest temperature of the winter is -10 degrees F. An extreme of -18 degrees F. can be expected every 10 years, and -23 degrees F. every 25 years. Despite these low extremes, Westchester winters are comparatively mild. As the driest season of the year, the three months of winter average 20% of the annual precipitation total. There can be heavy snowstorms, but blizzard type conditions are rare. More common is a freezing rain or glaze in the colder months. The average winter wind speed is eleven miles per hour, which drops to about five miles per hour for the rest of the year. The prevailing winter wind direction is from the northwest (Thaler, 1977.)

There are two tables further describing annual precipitation and temperature. Both means and extremes are exhibited. The data was collected at Bedford Hills and Carmel and collated by Jerome Thaler (1977.) Long Pond is roughly between the two weather stations and so would be expected to show similar characteristics. Nearer to Long Pond are three discontinued precipitation stations. The Cross River station averaged a yearly precipitation total of 43.24 inches from 1950 to 1975. Croton Falls, from 1907 to 1975 averaged 44.22 inches, and Titicus from 1903 to 1975 averaged 45.78 inches.

Climate Data*

P. Turco

PRECIPITATION

Inches	1941 - 1970				<u>SNOW</u> 1895 - 1977 (1896-1977 for C.)					
	Mean		Greatest Daily Inches		Mean		Maximum Monthly Inches		Greatest Daily Inches	
	B.H.	C.	B.H.	C.	B.H.	C.	B.H.	C.	B.H.	C.
Jan	2.81	2.84	2.60	2.57	8.6	9.6	28.0	35.0	16.0	17.0
Feb	2.83	2.83	3.98	3.37	10.2	13.0	29.0	47.0	22.0	20.0
Mar	3.62	3.57	2.80	3.44	6.3	9.1	26.0	32.0	15.0	13.0
Apr	3.70	3.63	4.43	2.82	1.1	1.7	20.0	15.0	12.0	14.0
May	3.80	4.11	2.87	5.57			Trace	1.0	Trace	1.0
June	3.33	3.42	3.50	4.30						
July	4.67	4.47	8.00	5.03						
Aug	4.39	4.18	4.00	6.00						
Sept	3.53	3.54	6.00	4.18						
Oct	3.49	3.40	4.79	6.77			Trace	4.0	Trace	4.0
Nov	4.19	4.29	3.35	3.07	1.5	1.8	11.0	18.0	11.0	8.0
Dec	4.02	3.94	3.22	3.05	7.1	9.4	25.0	30.0	20.0	25.0
Annual	44.38	44.22			34.8	44.6				

* From Thaler, 1977.

B.H. = Bedford Hills; latitude 41° 14' N, longitude 73° 43' W, elevation (ground) 425 ft.
 C. = Carmel; latitude 41° 25' N, longitude 73° 42' W, elevation (ground) 500 ft.

Climate Data*

P. Turco

TEMPERATURE

Degrees Fahrenheit	MEANS 1941 - 1970						EXTREMES 1895 - 1976 (1888-1977 for C.)			
	Daily Maximum		Daily Minimum		Monthly Mean		Record Daily Highest	Record Daily Lowest		
Month	B.H.	C.	B.H.	C.	B.H.	C.	B.H.	C.	B.H.	C.
Jan	36.2	35.0	20.0	14.6	28.1	24.8	72	68	-17	-24
Feb	38.6	32.6	21.4	19.5	30.0	26.1	74	73	-19	-24
Mar	47.9	45.9	28.5	24.1	38.2	35.2	91	85	-4	-14
Apr	61.4	59.7	38.6	34.9	50.0	47.3	96	93	13	11
May	72.5	70.0	47.8	44.1	60.1	57.1	100	97	24	24
June	81.4	79.0	57.1	53.1	69.3	66.1	100	99	38	33
July	85.6	83.8	62.2	58.3	73.9	71.4	104	103	42	41
Aug	83.1	82.1	60.2	56.7	71.7	69.4	104	102	37	35
Sept	76.1	75.3	53.3	50.0	64.7	62.7	103	103	28	28
Oct	65.9	65.5	43.5	40.1	54.7	52.8	97	90	16	16
Nov	52.4	51.9	34.6	31.3	43.5	41.6	83	81	4	5
Dec	38.8	38.1	23.4	19.3	31.2	28.7	66	68	-12	-19
Annual	61.6	59.9	40.9	37.2	51.3	48.6				

* From Thaler, 1977

B.H. = Bedford Hills: latitude 41° 14'N, longitude 73° 43'W, elevation (ground) 425 ft.
 C. = Carmel: latitude 41° 25'N, longitude 73° 42'W, elevation (ground) 500 ft.

LONG POND PRESERVE

OBJECTIVES FOR PRESERVATION

Although a small preserve, Long Pond offers an example of forest and meadow typical of this part of the country, but becoming increasingly rare in the rapidly developing County of Westchester. The scenic views along the shoreline, and particularly from Castle Rock, are protected, and the lake is protected from residential pollutants by the preservation of this land. Many birds and other wildlife indigenous to northern Westchester are provided refuge at Long Pond.

Objectives for preservation at Long Pond are:

- ...to serve as an undisturbed natural area within the rapidly developing Westchester County.
- ...to serve as an outdoor classroom for students at schools in the area.
- ...to provide an undisturbed place for scientific research.
- ...to provide a natural, unspoiled area where families may enjoy nature together in peace.
- ...to provide a quiet place where the individual may find solitude, self-knowledge, and a sense of nature's bounty.

LONG POND PRESERVE - OBJECTIVES FOR PRESERVATION

A. Protection

Our objective is to protect the diverse flora species of the meadowland and the lakeshore woodlands and wildlife.

B. Educational Use

Our objective is to promote scientific study of the flora, birds and animals of Long Pond Preserve, and encourage use of the area for nature walks.

C. Scientific Use

Continued study of inventory of plants to develop optimal management program. Continued cooperation with study of oxygen balance in Lake Waccabuc.

D. Passive recreational use.

We continue to encourage passive recreational use of the preserve.

E. Special management considerations

Our objective is to control misuse of Castle Rock and its attendant litter and damage to plant life.

PLANS FOR IMPLEMENTATION OF OBJECTIVES

A. Protection

The preserve is posted with identifying signs. Surveillance is accomplished by the committee members who live adjacent to the preserve. The police have been cooperative and helpful. Burns International has been hired to provide guards on summer weekends when Castle Rock attracts young people for swimming and picnicking.

There are no planned additions to the preserve.

Past problems with vehicles in the field have been stopped by large stones preventing access.

The community is appreciative of TNC's preservation and stewardship of the land. The Long Pond Committee proposes to expand its membership to involve more members of the community.

B. Educational use

Local schools have used the preserve for nature hikes. Maps and information on the preserve are available in the Lower Hudson Chapter Guidebook. A trail guide and brochure for Long Pond is in progress.

The preserve is open to the public from dawn to dusk.

John Jay High School uses the preserve for nature study. The Lewisboro Town Conservation Board is cooperative with the Preserve Committee.

Parking facilities are available at the Chapel parking lot, and provides room for 4 or 5 cars.

Two groups from SUNY (State University of New York) have conducted aquatic research projects. The Long Pond Committee proposes to increase local use by schools and community by increasing publicity.

Implementation of Objectives

C. Scientific use

No collecting is allowed without permission from the Lower Hudson Chapter office.

The Preserve Committee has cooperated with the Union Carbide Corporation in experiments to improve the water quality of Lake Waccabuc. Air is pumped by two hypolimnion aerators on the lake bottom and a shore pumping facility to restore the oxygen balance to the deeper levels of the lake. With the cooperation of local residents to curb pollutants, the experiment has resulted in a dramatic improvement in water quality. The program is continuing.

D. Passive recreational use

The preserve is open to the public for hiking, nature walks, photography, and other passive uses. A new trail was cleared from the parking lot to the old pump house. Existing trails were maintained. Several nature photographers have visited the preserve.

E. Special management considerations

The field is cut every Fall allowing a splendid view of the lake and preventing the elimination of many species which would perish if succession were permitted to proceed.

Castle Rock, an attractive nuisance, should be sold or transferred out. If held in private ownership, the trespass problem could be better controlled. The situation now is ambivalent, as TNC preserves are open to the public, but restricted to "appropriate" uses. The cost of hiring weekend guards during the summer is an expensive solution, and five days a week the area remains unpatrolled. There is the possibility of serious injury on Castle Rock. For these reasons, the Castle Rock portion of the preserve should be relinquished to private ownership.

Implementation of Objectives

The Nature Conservancy is being given title to a small building, formerly a water pump house, located on the preserve. The Committee plans to use this structure as an information center, with brochures and trail maps available for hikers.

F. Finance

1. Anticipated expenditures

a. Protection

Until the sale or transfer out of Castle Rock, the private patrol service will cost at least \$1050 per annum.

b. Education

The trail guide and brochure is estimated to cost about \$200.

c. Scientific

The Union Carbide study involves no expenses to TNC.

d. Passive recreational use

The cost of trail maintenance is estimated at about \$200 per annum.

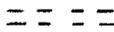
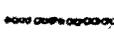
2. Anticipated income.

The Preserve committee has an account at the National Office. Their annual Spring fund raising appeal raises approximately \$1500 locally.

Field Maps

The following maps and notes are the result of a visual field survey conducted during early September 1980. Boundaries and locations have been approximated as closely as possible. To acquire the true dominance relationships and relative occurrences of vegetation would require data collection and statistical analyses. In the field notes vegetative species are listed in descending order of what appeared to be dominant species.

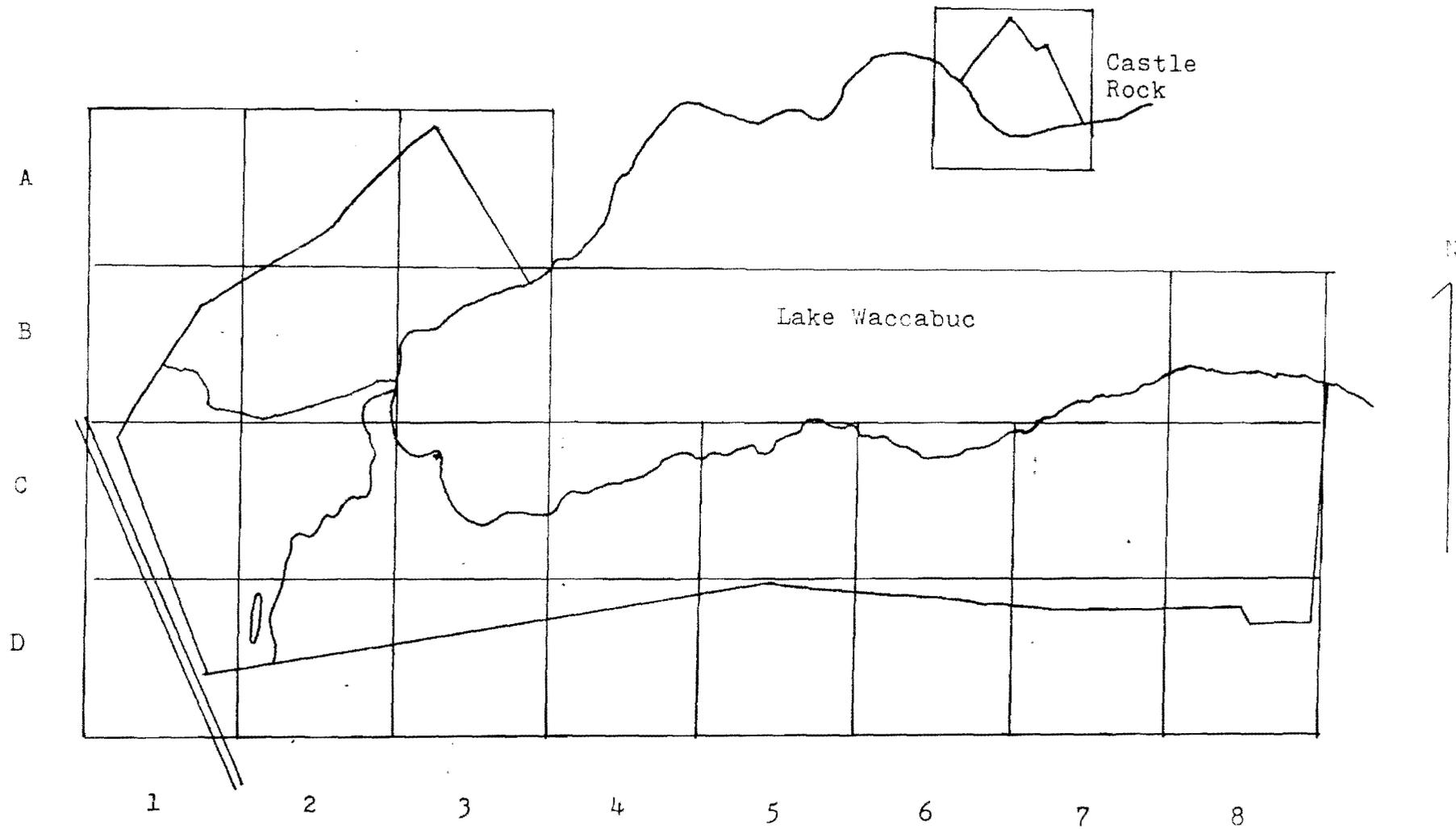
Key

Ff forest		tree line
Fb brush		road (in use)
Fg field		dirt road
Ws wetland		trail
RK bedrock outcrop		stream
		seasonal stream
		building
		powerline
		stone wall
		Preserve boundary
		culvert
		wetland border

Flora Species List for Field Maps

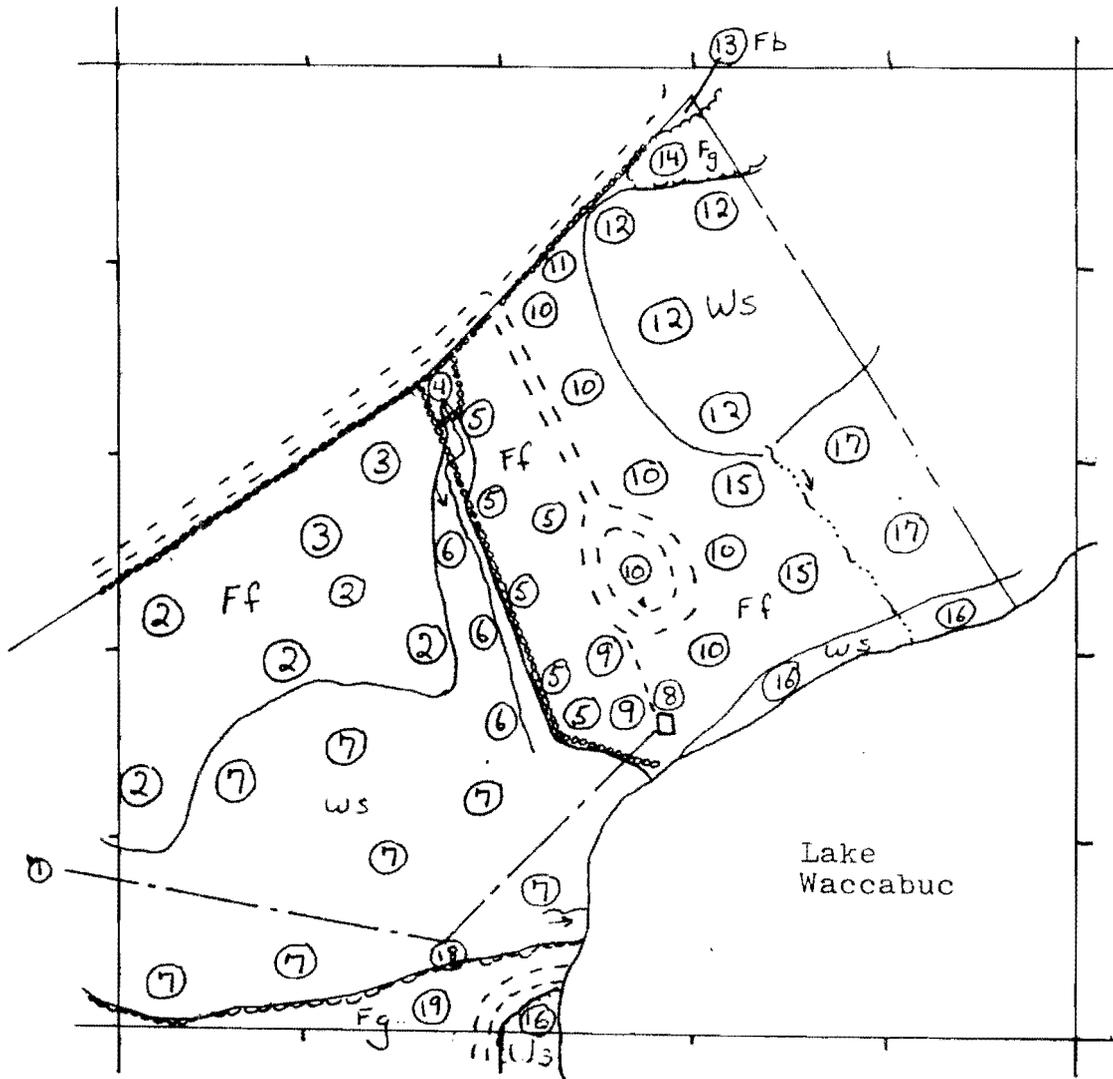
P. Turco

Alder, Speckled	<u>Alnus rugosa</u>
Ash	<u>Fraxinus americana</u>
Beech	<u>Fagus grandifolia</u>
Birch, Black	<u>Betula lenta</u>
, Grey	<u>Betula populifolia</u>
, Yellow	<u>Betula lutea</u>
Blackberry	<u>Rubus (probably R. occidentalis)</u>
Blueberry	<u>Vaccinium sp.</u>
Boneset	<u>Eupatorium perfoliatum</u>
Cattail	<u>Typha sp.</u>
Cherry, Black	<u>Prunus serotina</u>
Chestnut	<u>Castanea dentata</u>
Dogwoods	<u>Cornus sp.</u>
Dogwood, Flowering	<u>Cornus florida</u>
Elderberry	<u>Sambucus sp.</u>
Elm	<u>Ulmus americana</u>
Fern, Christmas	<u>Polystichum acrostichoides</u>
, Cinnamon	<u>Osmunda cinnamomea</u>
, New York	<u>Dryopteris noveboracensis</u>
, Royal	<u>Osmunda regalis</u>
, Sensitive	<u>Onoclea sensibilis</u>
Goldenrods	<u>Solidago sp.</u>
Grape	<u>Vitis sp. (probably V. labrusca)</u>
Hemlock	<u>Tsuga canadensis</u>
Hickory, Shagbark	<u>Carya ovata</u>
Ironweed	<u>Vernonia sp.</u>
Jewelweed	<u>Impatiens capensis</u>
Joe-Pye Weed	<u>Eupatorium maculatum</u>
Laurel, Mountain	<u>Kalmia latifolia</u>
Locust	<u>Robinia pseudoacacia</u>
Maple, Red	<u>Acer rubrum</u>
, Sugar	<u>Acer saccharum</u>
Milkweed, Common	<u>Asclepias syriaca</u>
, Swamp	<u>Asclepias incarnata</u>
Mullein	<u>Verbascum thapsus</u>
Oak, Black	<u>Quercus velutina</u>
, Chestnut	<u>Quercus prinus</u>
, White	<u>Quercus alba</u>
Pepperbush	<u>Clethra alnifolia</u>
Pine, Red	<u>Pinus resinosa</u>
, Scotch	<u>Pinus sylvestris</u>
, White	<u>Pinus strobus</u>
Poison Ivy	<u>Rhus (Toxicodendron) radicans</u>
Sedge, Tussock	<u>Carex stricta</u>
Skunk Cabbage	<u>Symplocarpus foetidus</u>
Smartweed	<u>Polygonum sagittatum</u>
Spicebush	<u>Lindera benzoin</u>
Spruces	<u>Picea sp.</u>
Spruce, Norway	<u>Picea abies</u>
Sumac	<u>Rhus (typhina or glabra)</u>
Tulip-Tree	<u>Liriodendron tulipifera</u>
Viburnum, Maple-Leafed	<u>Viburnum acerifolium</u>
Willow	<u>Salix sp.</u>



Quadrant Locations for Field Maps

1" = 400'

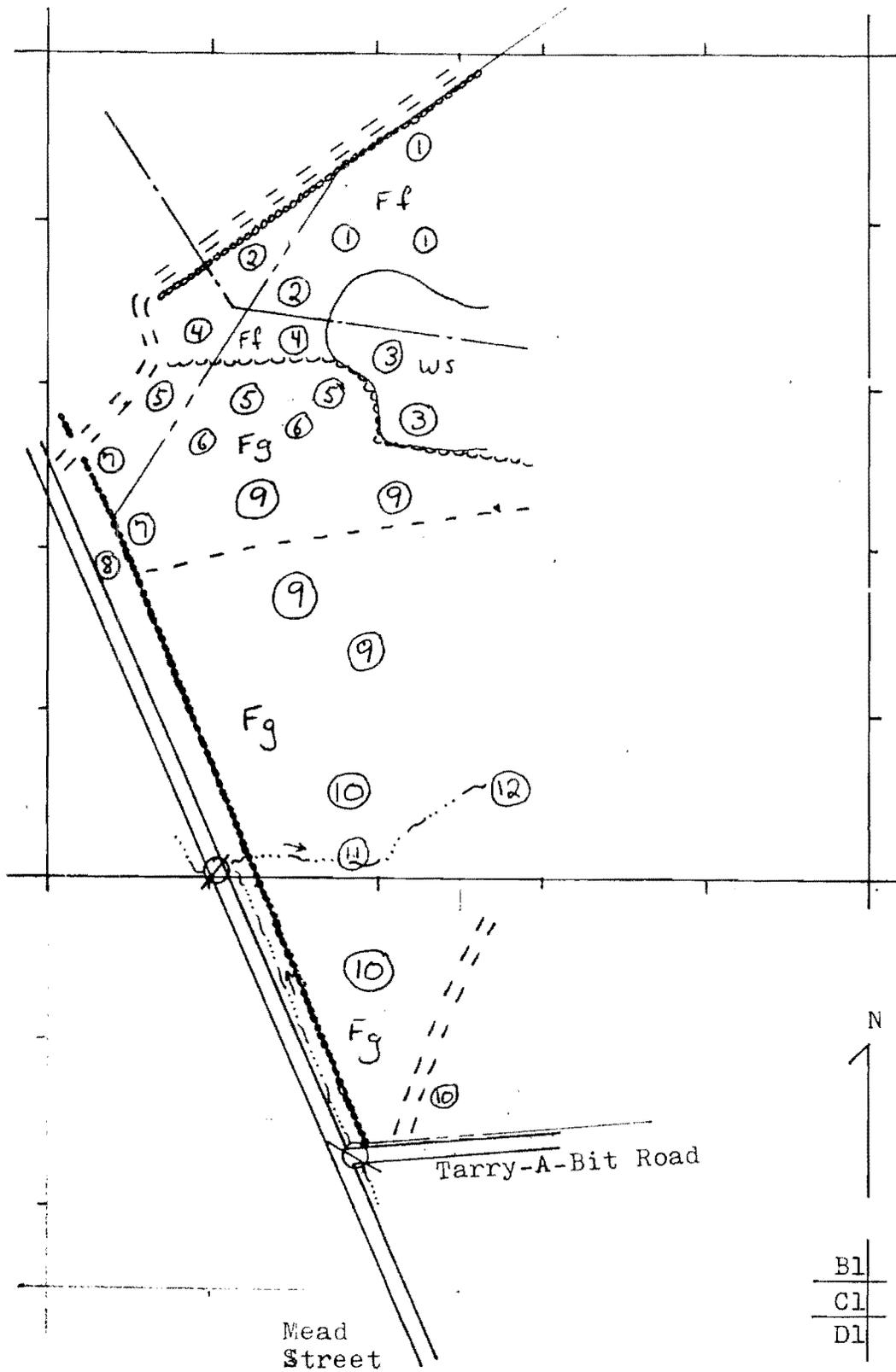


A2	A3
B2	B3

September 1980
P. Turco

1"=160'

1. Electric lines with poles.
2. Ff: hemlock, dead red pine, white pine, various spruces (many dead), Scotch pine, some hardwoods mixed in.
3. Ff: ash, locust, sugar maple, numerous grape vines.
4. Area enclosed by stone walls, in center of which is a large rock from which issues a small brook. Metal piping present, leads into swamp area.
Brook: sand, silt, and cobble bottom; depth 1 foot; maximum width 3 feet.
5. Ff: red maple, a few spicebush; ash seedlings, poison ivy, very little undergrowth.
6. Ws: red maple, ash, thick growth of dogwoods.
7. Ws: red maple, dogwoods, speckled alder, pepperbush, jewelweed, sensitive fern, skunk cabbage, smartweed, tussock sedge, mosses.
8. Working pumphouse.
9. Ff: same as (5) but with addition of tulip-tree.
10. Ff: sugar maple, red maple, ash, grape vines, dead gray birch in center of circle.
11. Fg: open area; jewelweed, grape vine, smartweed.
12. Ws: red maple, dogwoods, skunk cabbage, tussock sedge, mosses.
13. Fb: young sumac.
14. Fg: grasses, mullein, grape vine, sumac, jewelweed, smartweed, maple seedlings.
15. Ff: sugar maple, tulip, black cherry, ash, flowering dogwood, spicebush, poison ivy, little undergrowth.
16. Ws: shore vegetation: red maple, spicebush, ash, dogwoods, ferns, tussock sedge, skunk cabbage.
17. Ff: sugar maple, tulip, ash, shagbark hickory, a few young chestnut; maple-leaved viburnum, poison ivy on floor.
18. One Norway spruce.
19. Fg: goldenrods, joe-pye weed, iron weed, swamp milkweed, smartweed, jewelweed, grasses, common milkweed, ferns, boneset, vines, elderberry.



B1
CL
D1

September 1980
P. Turco

1" = 160'

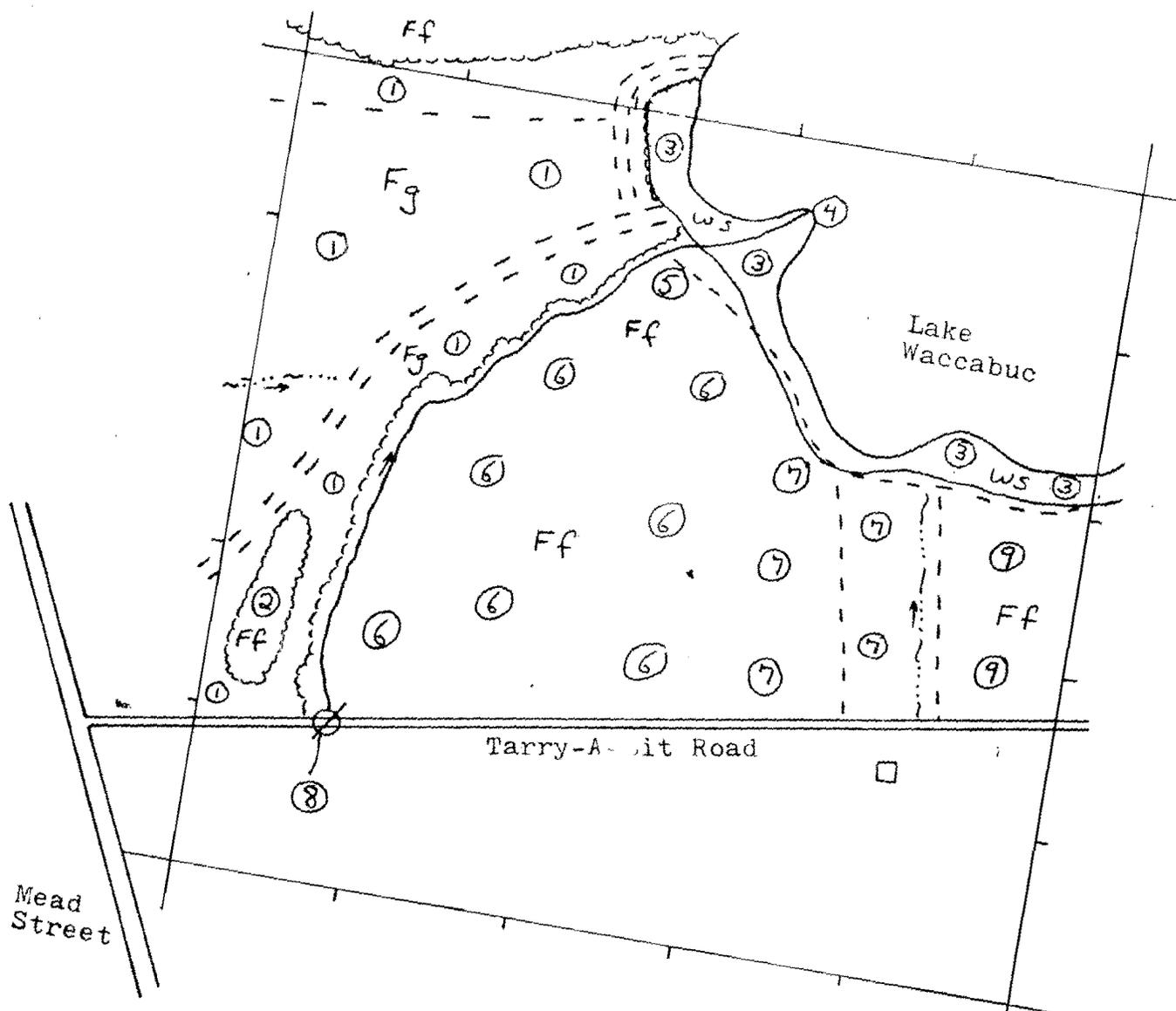
Field Notes

B1
C1
D1

September 1980

P. Turco

1. Ff: hemlock, dead red pine, white pine, various spruces (many dead), Scotch pine, some hardwoods mixed in.
2. Ff: mostly hemlock, some spruce and hardwoods.
3. Ws: red maple, pepperbush, speckled alder, dogwoods, jewelweed, sensitive fern, skunk cabbage, tussock sedge, mosses.
4. Ff: sugar maple, tulip, locust.
5. Fb: Fg overgrown with blackberry and vines.
6. Ash tree.
7. Fg/Fb: locust invading Fg, up to 7 feet high.
8. Sugar maples along length of wall.
9. Fg: grasses, goldenrods, ferns, vines. In places are short grasses and short goldenrods, otherwise Fg vegetation is tall and dense. Practically no woody growth throughout field.
10. Fg: goldenrods, joe-pye weed, ironweed, swamp milkweed, smartweed, jewelweed, grasses, common milkweed, ferns, cinnamon fern, boneset, vines, elderberry. (9) similar.
11. Cattails.
12. Fg/Ws: wet area caused by 'stream: along length of stream are: jewelweed, skunk cabbage, sedges, otherwise same as (9) and (10). Near culvert is a willow bush.



Mead Street

Tarry-Abit Road

Lake Waccabuc

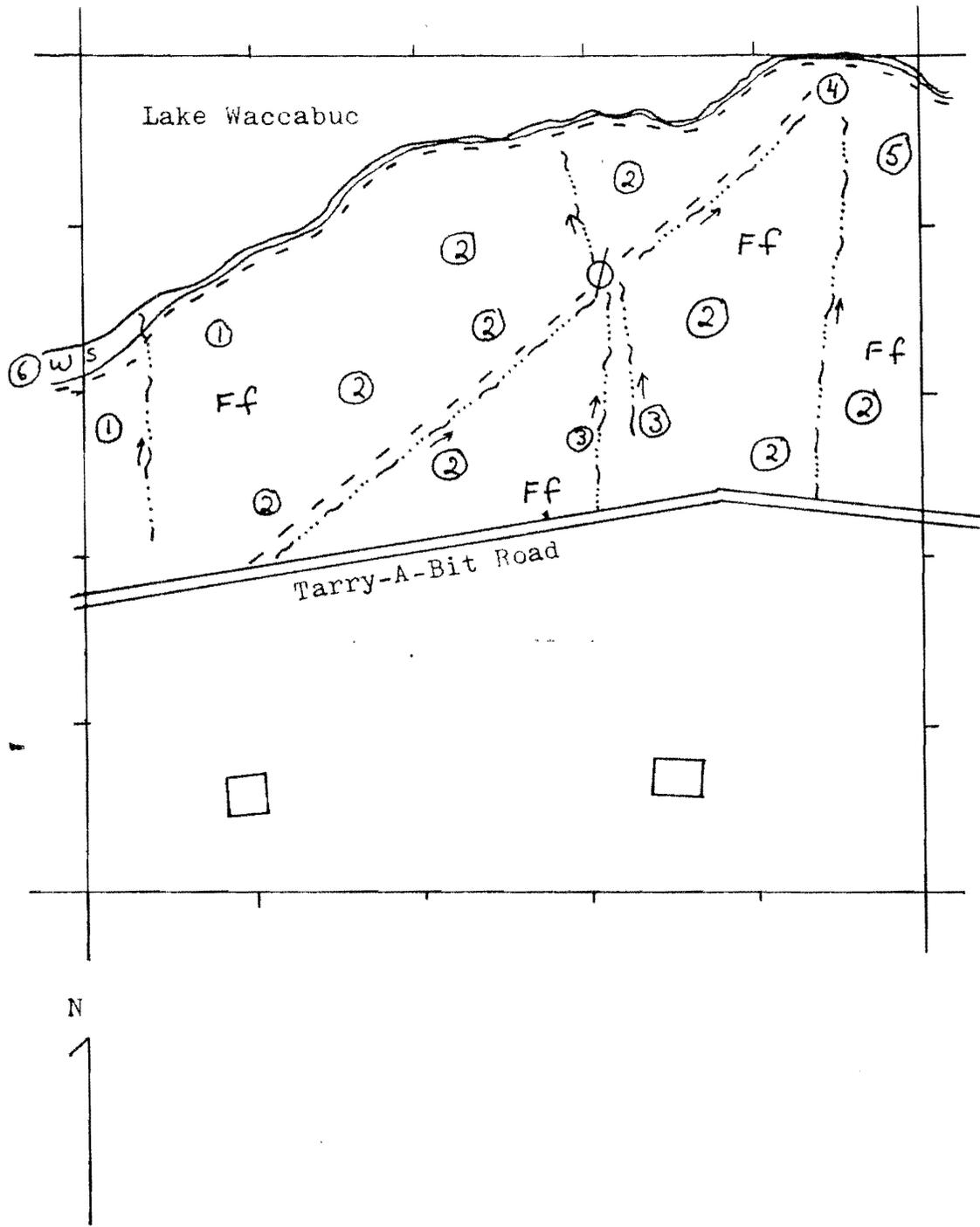
N

C2	C3
D2	D3

September 1980
P. Turco

1" = 160'

1. Fg: goldenrods, grasses, joe-pye weed, ironweed, swamp milkweed, smartweed, jewelweed, common milkweed, ferns, cinnamon fern, boneset, vines, elderberry.
2. Ff: clump of sugar maple and ash.
3. Ws: shore vegetation: red maple, pepperbush, buttonbush, royal fern, blueberry, spicebush, dogwoods.
4. Sand spit.
5. Ff: black oak, beech, red maple, spicebush, ferns.
6. Ff: dense young stand of red maple, little undergrowth.
7. Ff: large old red maple; ash, young hickory, a few small elm; as get closer to lake there is more undergrowth: jewelweed, spicebush, cinnamon fern, pepperbush.
8. Stream: cobble and sand bottom, banks undercut and eroded, up to 3 feet deep and 12 feet wide.
9. Ff: red maple, ash, spicebush, poison ivy on larger trees, little ground growth.

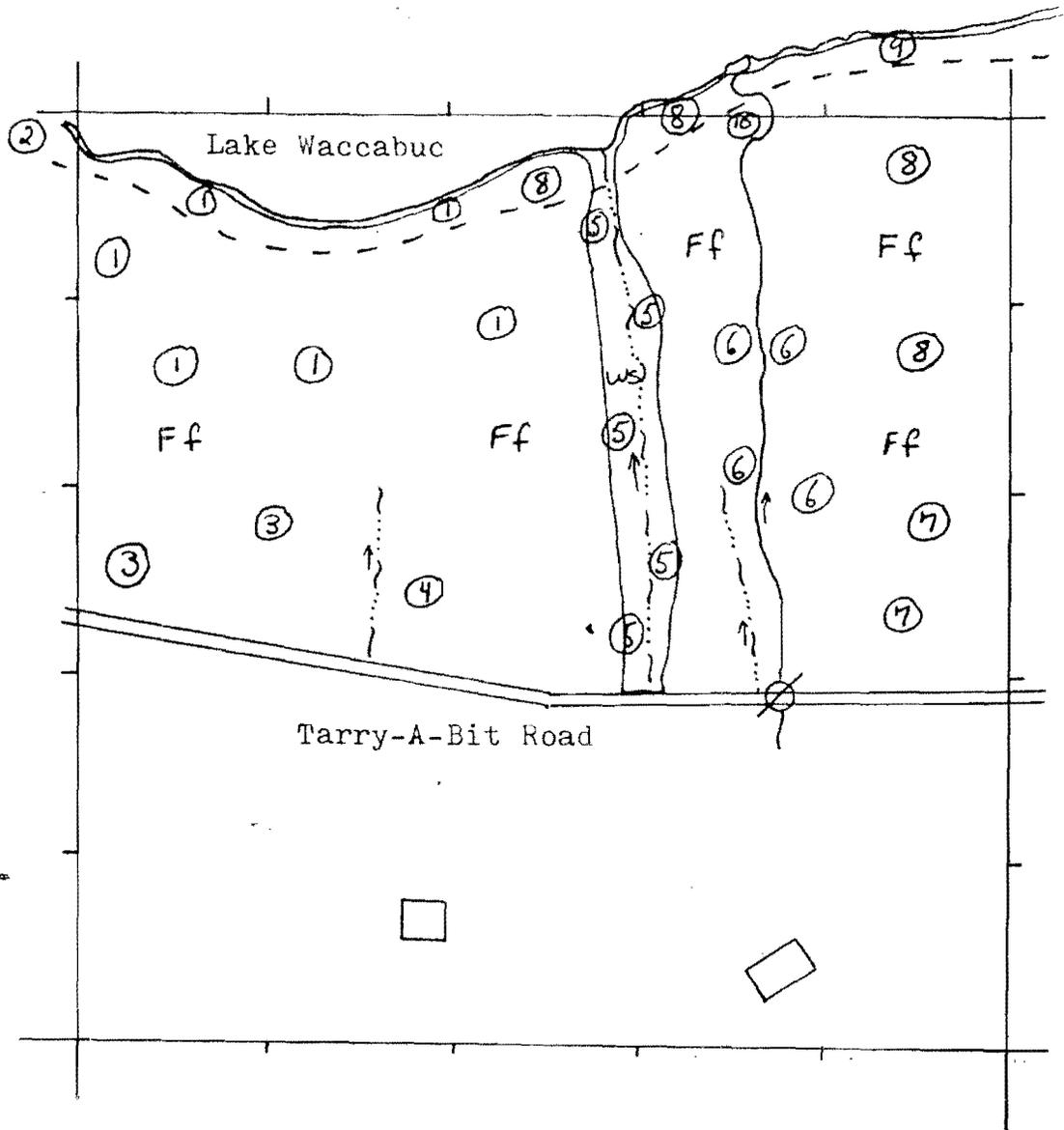


C4	C5
D4	D5

September 1980
P. Turco

1" = 160'

1. Ff: red maple, some ash; spicebush, poison ivy on larger trees, little ground growth, gets swampy as approach lake; in places; skunk cabbage, jewelweed.
2. Ff: same as (1) but with less red maple and addition of tulip-tree. Also no swampy areas.
3. Ff: same as (2) but with mosses, skunk cabbage, Christmas fern.
4. Site of ice house: stone and cement foundation, cog, wheel, chain, wooden beams.
5. Ff: beech, sugar maple, tulip-tree.
6. Ws: Along length of shore: red maple, pepperbush, speckled alder, dogwoods, tussock sedge, other shore vegetation.



N

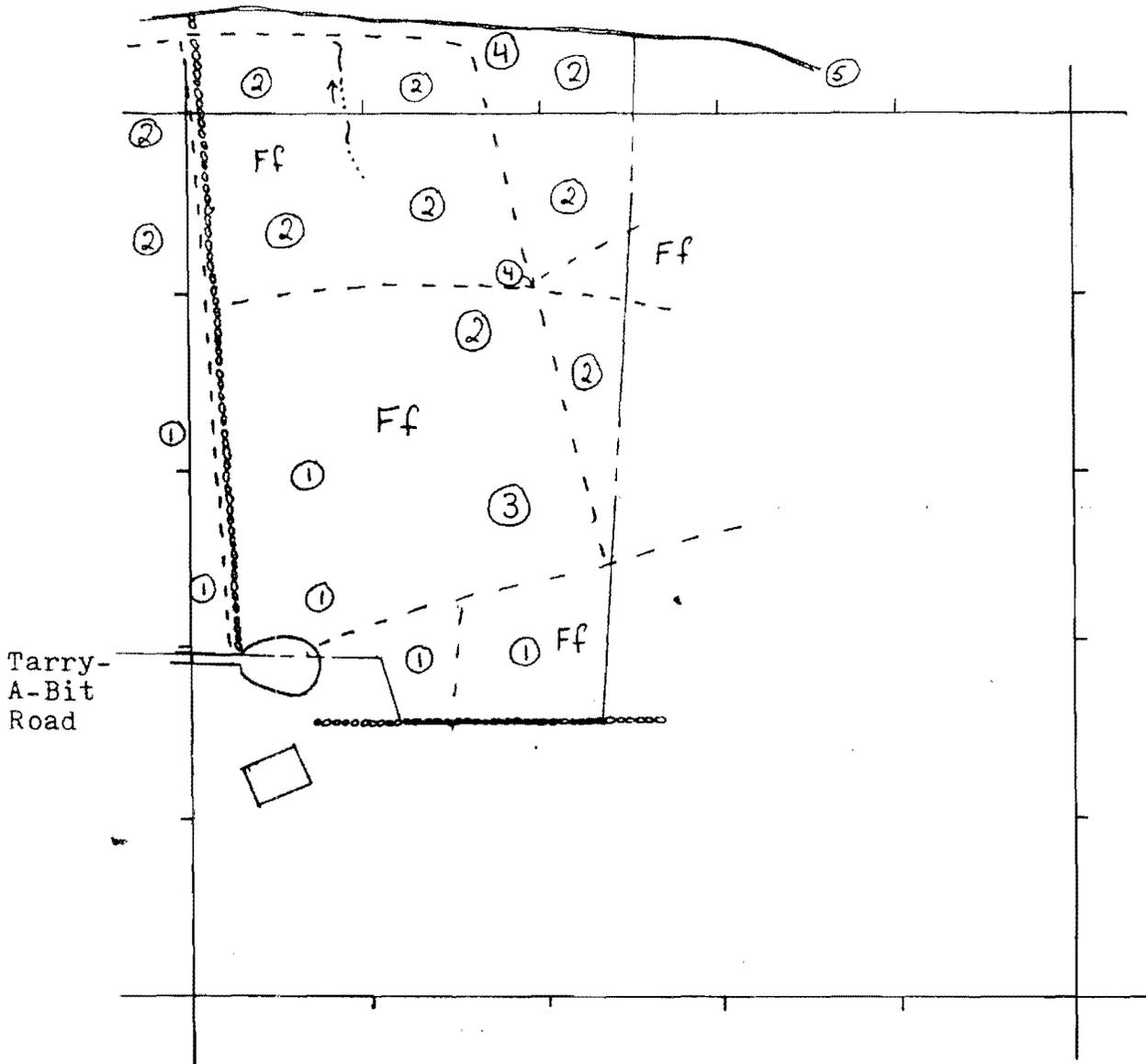


C6	C7
D6	D7

September 1980
P. Turco

1" = 160'

1. Ff: sugar maple, tulip, beech, white oak, a few spicebush.
2. Ws: along length of shore: red maple, pepperbush, speckled alder, jewelweed, other shore plants.
3. Ff: red maple, ash, tulip, spicebush, little ground growth.
4. Ff: black birch, white oak, sugar maple, sugar maple under growth.
5. Ws: swampy: skunk cabbage, spicebush, cinnamon fern.
6. Stream: banks undercut and eroded in places, stone and sand bottom, up to 4 feet deep and 20 feet wide.
Ff: beech, sugar maple, a few hemlock, maple-leafed viburnum.
7. Ff: sugar maple, tulip, ash, beech, white oak, sugar maple undergrowth, Christmas fern, spicebush.
8. Ff: hemlock, ash, beech, spicebush.
9. Ff: red maple, yellow birch, sugar maple, beech, maple-leafed viburnum, pepperbush.
10. Camp area.
Ff: same as (8) but with addition of chestnut oak.



Tarry-
A-Bit
Road

N

C8
D8

September 1980
P. Turco

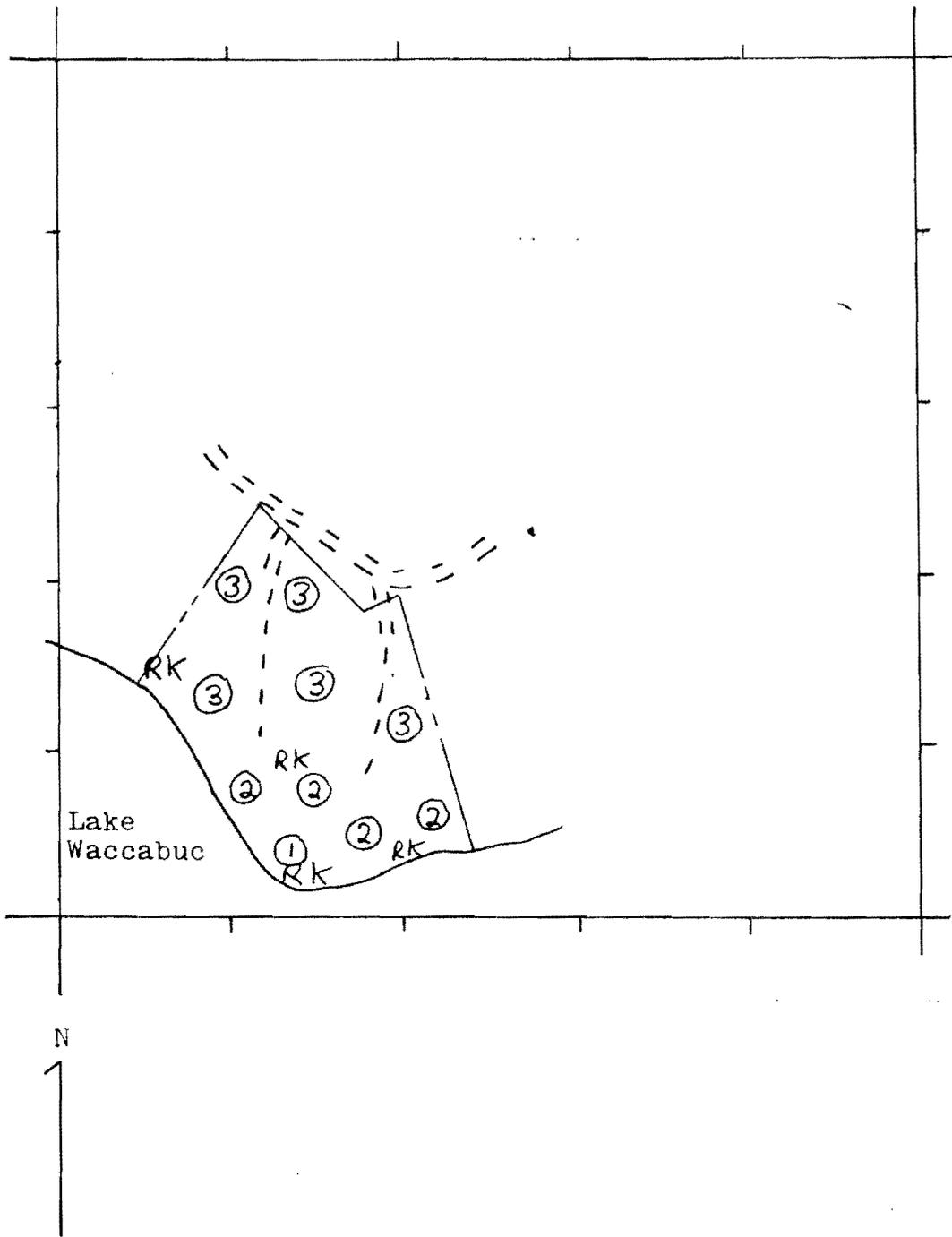
1" = 160'

Field Notes

C8
D8

September 1980 P. Turco

1. Ff: sugar maple, tulip, ash, beech, white oak, sugar maple undergrowth, Christmas fern, spicebush.
2. Ff: hemlock, ash, beech, spicebush.
3. Ff: same as (1) but with less sugar maple undergrowth and some adult red maple.
4. Camping area.
5. Ws: along length of shore in places: shore vegetation.



Castle Rock

September 1980

P. Turco

1" = 160'

1. Castle Rock: stunted chestnut oak, blueberry, speckled alder, red maple, mountain laurel, poison ivy, grasses, lichens. Area vegetation largely trampled to grass, dirt, or rock.
2. Bedrock at or near surface: chestnut oak, red maple, black birch, black oak, blueberry, mountain laurel.
3. Ff: a few large black oak, otherwise mostly black birch; some sapling beech; sugar maple seedlings, hickory seedlings, flowering dogwood, maple-leaved viburnum, Christmas fern, New York fern.

Literary Sources

P. Turco

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Acknowledgements

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Westchester County Planning Department
Natural Resources Division

Soils: Westchester County Soil and Water Conservation Office