

Environmental Regulatory Enhancement Master Plan

Eastern Pequot Tribal Nation

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EASTERN PEQUOT TRIBAL NATION

ENVIRONMENTAL REGULATORY ENHANCEMENT MASTER PLAN

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1.0 INTRODUCTION

The Eastern Pequot Tribal Nation has established a set of goals regarding economic independence and environmental preservation. One means of achieving these goals is through the use and protection of the Tribe's land resources and its components. At the present time, the Tribe's land resources consist of its approximate 227-acre reservation property.

To assist the Tribe in establishing a responsible, proactive Land Use/Environmental Management Plan, and related planning capabilities, this Environmental Assessment was conducted. The assessment describes and evaluates site characteristics, cultural and natural resources, access and utilities and related infrastructure. This work, guided by the Tribal Land Management Task Force and Staff, Tribal Council and Tribal Community, provides a basis to plan for and assess the capability of the site to sustain development as envisioned by the Tribe.

The Plan also provides two Land Use Options for consideration. These options illustrate two possible scenarios for use and preservation of the reservation site. While these options do not embrace all the possibilities, they do begin to provide a framework for what might be done if all the pieces fall into place.

The Plan has been prepared based on information available at the present time. As time goes on and conditions change, the Plan assumptions and recommendations may need to be updated and reconsidered. To this end, the Plan has been produced in a format that allows it to be revisited and updated as new situations warrant. The Plan can also serve as a valuable educational tool to Tribal members and other interested parties who desire to learn more about the reservation. Finally, the Plan is intended to provide the background necessary to enable the Eastern Pequot Tribal Nation to establish a planning/environmental management capability that is fully integrated into the Tribal decision making process.

2.0 EXECUTIVE SUMMARY

The Eastern Pequot Tribal Nation Reservation is located in a rural area of southeastern Connecticut that has recently undergone a number of changes. In spite of the changes occurring around the reservation, the site remains as a peaceful and tranquil place for

tribal members to live and visit. The site may also contain the potential means for the Tribe to realize its objectives for economic development and environmental protection. This environmental assessment is intended to provide a inventory of the site's significant natural and cultural resources and a guide as to how they may be utilized and otherwise protected.

Significant natural resources on site include geology and soils, vegetation, wildlife and landforms. The site is underlain by bedrock and a relatively thin layer of till type soils. The soils are limited in their potential by an abundance of rocks and boulders, steep slopes and shallow depth to bedrock. The dominant vegetation type is hardwood forest which covers over 85 percent of the site. While the cover is considered moderate, its value is low due to species types which are suitable for firewood use. Wetlands are found along the shores of Long Pond and Silex Mine Brook and in the narrow swales, benches and trenches along the site's hillslopes. The former provide value for the adjacent waterbodies while the latter are mostly associated with poorly drained soils types. The pond and brook are also considered valuable aquatic habitats. While an extensive inventory of Long Pond was beyond the scope of this effort, a variety of aquatic animals and vegetation are apparent.

The wildlife potential of the site is based on forest cover types. While a variety of habitats were noted, the values are considered lower due to a lack of habitat interspersion and diversity, particularly open habitat. A special effort was undertaken to document occupancy by the red-tailed hawk. Although a pair of such birds were discovered near the site, the site habitat is not particularly conducive to this bird and no nesting or roosting sites were identified. While both Long Pond and Silex Mine Brook provide important fisheries habitat, Silex Mine Brook does not exhibit high values due to upstream barriers and poor streambed conditions. On the other hand, Long Pond is stocked with fish and serves as a significant fishing and recreational resource. The Conn DEP Natural Diversity Data Base (NDDDB) was consulted for the existence of any rare or endangered species on or adjacent to the property. There are no known populations of federal or state endangered, threatened or special concern species at the site although there are three aquatic plants associated with Long Pond that are noted.

An interest was also expressed in the existence of **lady's slippers** at the site of which there are a number of varieties common to Connecticut, none were observed at the site. The pink variety particularly prefers woods of which the reservation has an abundance. It is quite likely that this variety is present but others are doubtful.

Cultural resource documentation included site walkovers, research and limited interviews with tribal members. These inspections yielded a number of rubble foundations, a network of stone walls, a modest dam and two potential rock shelter archeological sites. Also, three potential archeological sites were noted. This effort suggested that future investigations may be appropriate but care should be taken not to disturb these resources.

Water resources associated with the site include Long Pond, Silex Mine Brook and three intermittent stream channels. The most significant, Long Pond, provides water supply to nearby residences. While Silex Mine Brook provided historic drinking water supply, its volume and quality are suspect. The remaining streams serve to drain the site wetlands and ultimately discharge to Long Pond. Since till soils in bedrock typically have limited water yields, the chance for a sizeable source is somewhat doubtful.

The reservation property fronts on **two local roads**, Wintechog Hill Road to the north and Lantern Hill Road to the west. These roads connect to State maintained roads in the immediate area. Current site access, a gravel road, is adequate for existing usage but would need to be upgraded and relocated to accommodate more intensive use of the site. Connection to other modes of transportation (rail & air) are somewhat distant from the site but are available.

One of the most critical elements to evaluate in relationship to the potential development is the availability of **water and sewer services**. There are no such services available at or near the site. The only existing systems are some distance away. The site itself is not large enough to incorporate water supply and sewage disposal facilities. The Tribe would need to extend these utilities to the site either as part of a agreement with an existing utility provider or as their own utility.

As part of the planning process, the Land Management Task Force conducted a **Land Use Option Evaluation**. This effort focused on the characteristics of the site and their ability to accommodate various types of development and preservation. As a direct result of the

work, two Land Use Options were developed for the property. These options allocate land area for economic development, housing, services, tribal activities and natural and cultural resource protection. These options will serve to provide a basis for decisions related to use and protection of Tribal land and resources.

3.0 SITE INTRODUCTION

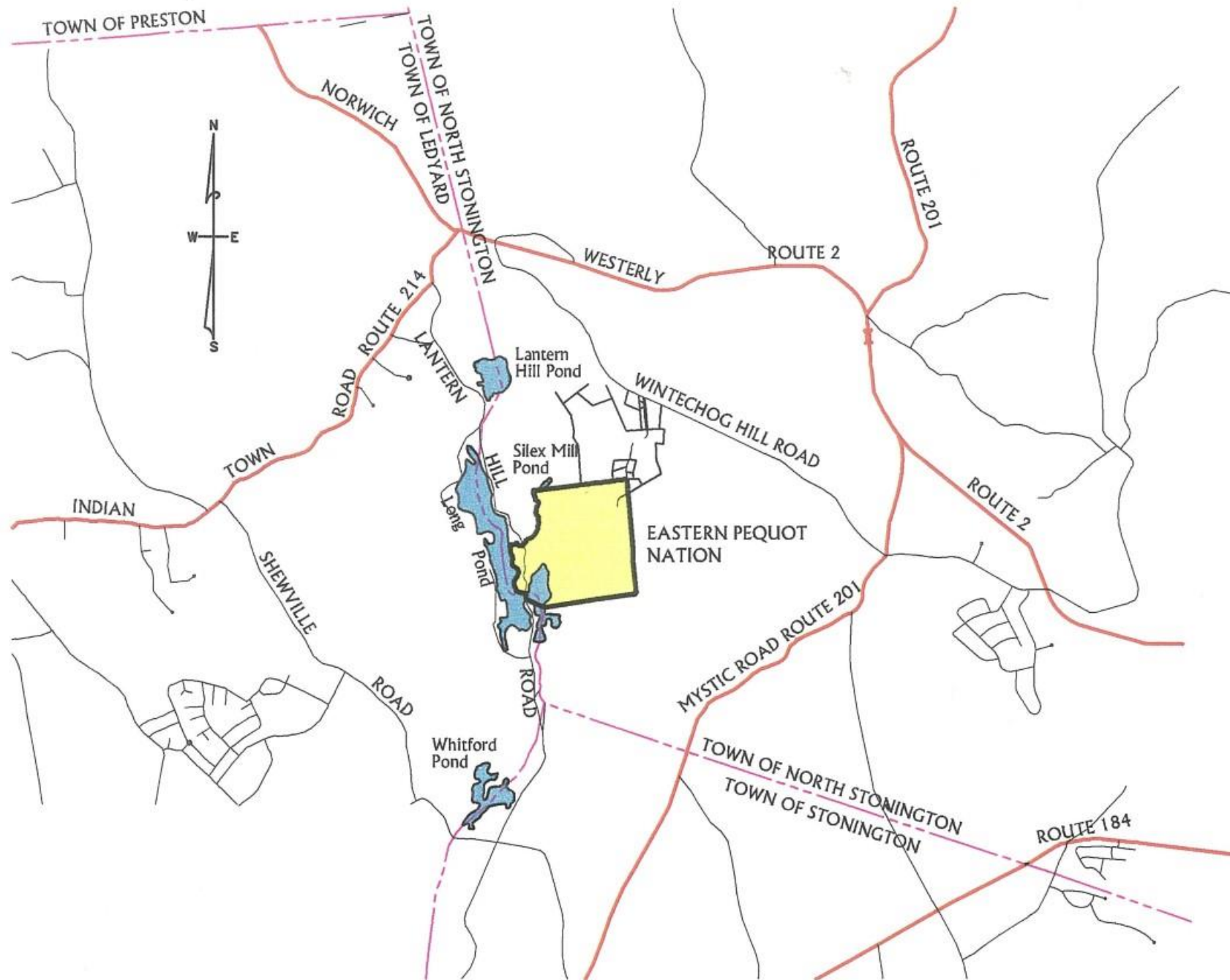
The Eastern Pequot Tribal Reservation is located south of Wintechog Hill Road and east of Long Pond and Lantern Hill Road in North Stonington and borders the Town of Ledyard in the vicinity of Long Point. (See Map 1). The site is approximately 227 acres in area and square in shape except for its western boundary, which follows Long Pond and its associated watercourses. The site area and configuration are depicted in Map 2.

At the present time, the site is occupied by the personal residences of tribal members at the northeast corner of the site and at the west edge of the site. The Tribal pow wow area, tribal cemetery, a number of historical structures and a variety of natural resources coexist on the site. With the exception of the areas noted above, the site is largely undeveloped.

4.0 NATURAL RESOURCES

GEOLOGY & SOILS

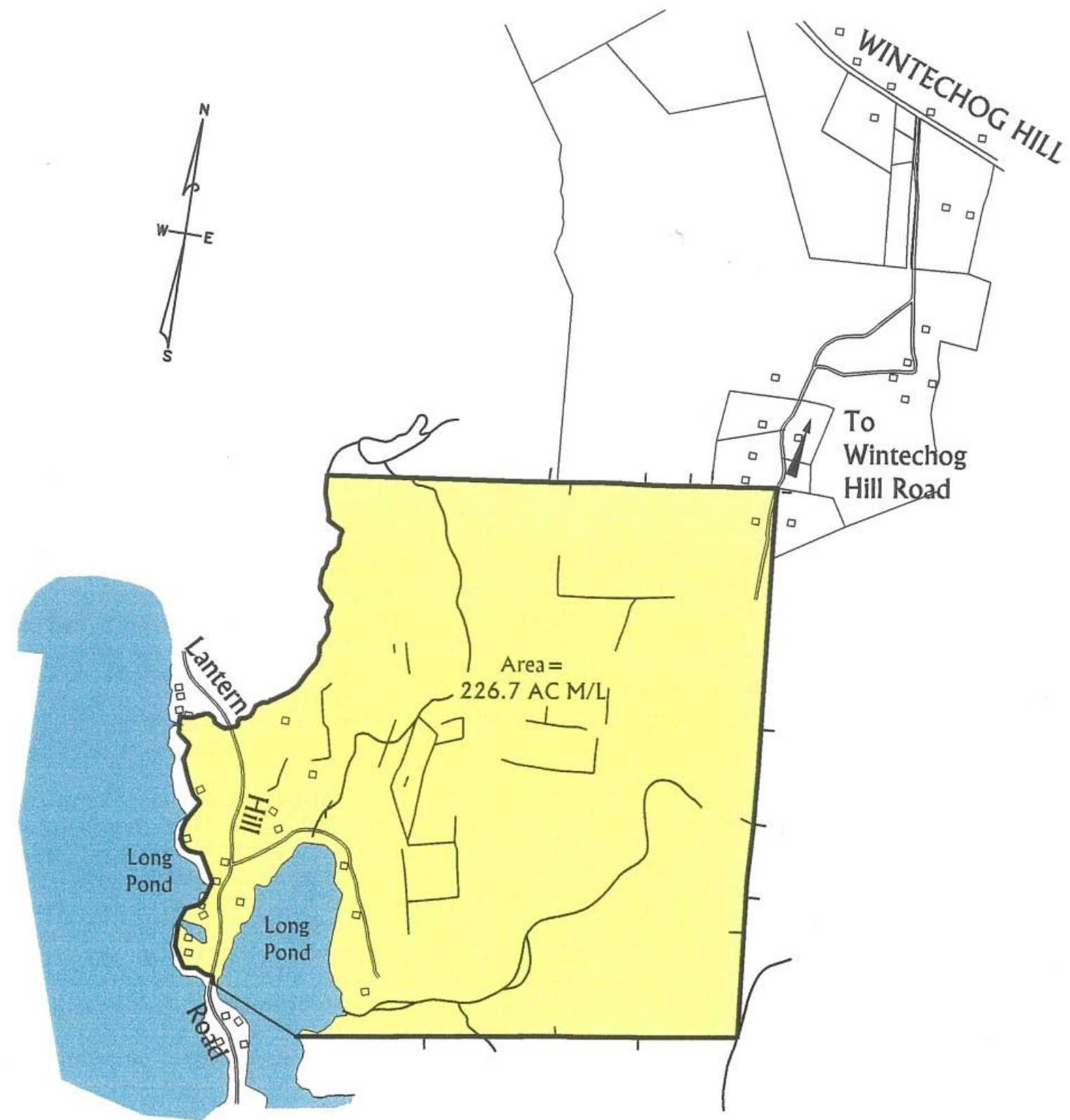
Just below the surface soil horizons, the Eastern Pequot Reservation site is comprised of deposits from the Pliestocene epoch, Wisconsin era glaciation. Between 25,000 and 13,000 years ago, major glaciers, known as the Laurentide ice sheet, covered the region with ice up to two miles in height. The glaciers acted as bulldozers shaping the landscape and as dump trucks depositing poorly sorted glacial till over the underlying bedrock. Deposition covered the bedrock with a discontinuous layer of lodgment and ablation till. Till is a poorly sorted and unstratified mixture of cobbles, stones, boulders, gravel, sand, and silts. Till hardpans may form due to compaction and the varying depth of bedrock create impermeable layers under the soil that are close to the ground surface in certain locations. Due to the compact till and shallow bedrock, wetlands may form on hillsides regardless of the slope. Other areas may be mesic or seasonally wet, but dry out shortly



**Location - Map 1
Prepared For The
Eastern Pequot Indians
Of Connecticut**

Scale: 1"-4000'
Date: January, 2000

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Site Area / Configuration - Map 2
Prepared For The
Eastern Pequot Indians
Of Connecticut

Scale: 1"=800'

Date: January, 2000

after spring. Still other areas may be very dry. Due to the poorly sorted and unstratified characteristics, it is not usually economical to excavate till for sand or gravel. Till soils are useful for road construction.

Metamorphic gneiss and schist form the bedrock geology under the till at this site (SCS 1983), with gneiss more common on the ground surface. Gneiss is a heavy, durable rock that is excellent for use in roads, ballast, and heavy construction (Palmer and Fowler 1975). Major deposits of silica such as those quarried near Lantern Hill were not observed on the approximate 227-acre site, however, detailed geologic investigations were not performed.

Table 4.1 shows the major soils identified by the SCS (1983), as well as soil features in relation to potential land use. The SCS (1983) mapping identified seven major soil types (see Table 4.1). These are Charlton-Hollis (CrC, CrD), Canton-Charlton (CcB, CcC, CdC, CdD), Ridgebury-Leicester-Whitman (Rn), Sutton (SwB, SxB), Hollis-Charlton-Rock (HrC, HrD), Haven (HcB), and Narragansett (NgB) (See Map 3). The vast majority of the site is mapped as Charlton-Hollis and Canton-Charlton. Charlton-Canton-Hollis soils are deep, well drained soils on undulating upland hilltops and side slopes of ridges (SCS 1983). Stones and boulders are common and many areas have bedrock outcrops, particularly where Hollis soils dominate. Ridgebury-Leicester-Whitman and Sutton soils are interspersed through the site, within the lower wetland swales and stream corridors. The Hollis-Charlton-Rock soils are limited to the southern and southeastern site limits. A wedge of Narragansett soil is shown on the northwest property corner, east of the wetland soils bordering Silex Pond. Haven soils are limited to a very small area on the southwest corner.

The site has four major soil conditions that limit use for agriculture and building development, including an abundance of rocks and boulders, steep slopes, shallow depth to bedrock, and wetlands. Agricultural uses are severely limited by the amount of stones and boulders. The soils are suitable for farming (SCS 1983), but topsoil quality is poor due the abundance of stones and boulders. The SCS (1983) survey described these soils as extremely stony, very stony, and very rocky. The Hollis soils typically have shallow root zones, as evidenced by downed trees in the southeast corner of the site. In general, available soil water capacity is low to moderate, erosion hazards are moderate, and wildlife habitat potential of the soil is poor (except for upland woodlands habitat). Residential development is more expensive compared to other sites

due to the need for blasting, boulder removal, slope considerations, and poor septic suitability in areas (SCS 1983).

VEGETATION

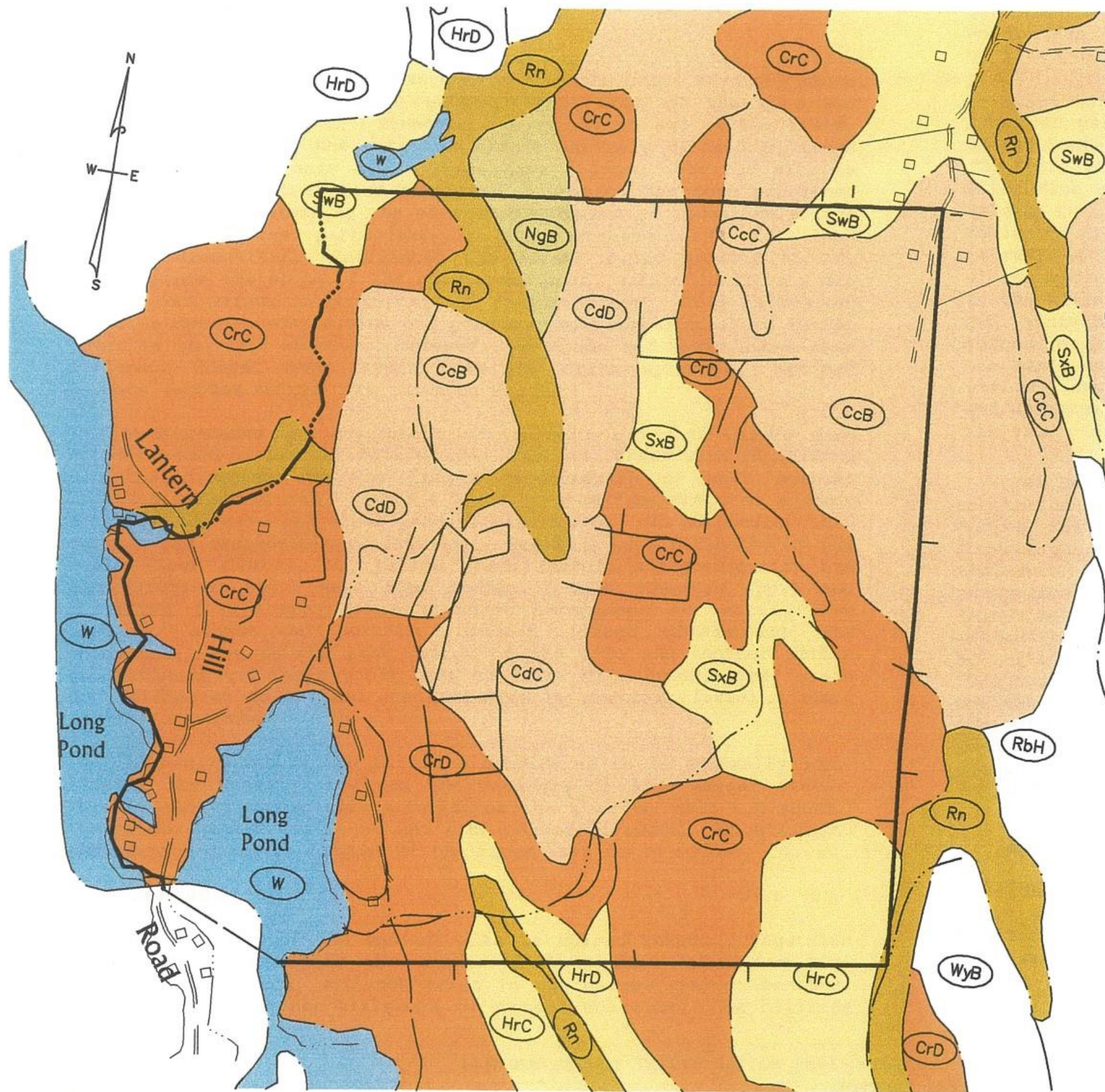
Four major habitats can be identified at the Eastern Pequot Reservation, Long Pond site. Hardwood forest is the dominant habitat type. Wooded swamps border Long Pond, Silex Mine Brook, and intermittent stream channels. Two small, but distinct stands of hemlock (*Tsuga canadensis*) occur within the hardwood forest. Aquatic habitats of Long Pond and Silex Mine Brook are also part of the property. Finally, rural residential lands exist next to Lantern Hill Road and a small part of the northeast site corner.

Five vegetation layers exist in most of the forest; trees, saplings and shrubs, vines, herbs, and mosses. Most of the major tree species identified on the site are shown in the following report section. Tree cover was moderate to dense, ranging from 85 to 100 percent. Shrub layers were dense in some of the wetlands to sparse cover in upland areas. Dense stands of mountain laurel (*Kalmia latifolia*) on the northwest section of the site were an exception to this. Shrubs identified on the site and not mentioned in the following report sections include multiflora rose (*Rosa multiflora*), smooth sumac (*Rhus glabra*), red cedar (*Juniperus virginiana*), barberry (*Berberis* spp.), ironwood (*Carpinus caroliniana*), and witch hazel (*Hamamelis virginiana*). Vines were not common and limited to poison ivy (*Toxicodendron radicans*), grape (*Vitis* spp.), Virginia creeper (*Parthenocissus quinquefolia*), and Asiatic bitterweet (*Celastrus* sp.). Herbaceous plants could not be fully inventoried in early-April, as many species had not started to grow and the previous year's plants were desiccated. Ground cover seen included Christmas fern (*Polystichum acrostichoides*), spinulose wood fern (*Dryopteris spinulosa*), cinnamon fern (*Osmunda cinnamomea*), tree clubmoss (*Lycopodium obscurum*), trailing clubmoss (*Lycopodium complanatum*), spotted wintergreen (*Chimaphila maculata*), raspberry (*Rubus* spp.), coltsfoot (*Tussilago farfara*), partridgeberry (*Mitchella repens*), trout lilly (*Erythronium americanum*), common mullin (*Verbascum thapsus*), spike rush (*Eleocharis* spp.), and various grasses. The following report sections further describe the site's habitat features, including forest cover and timber resources, wetlands, aquatic habitat, wildlife habitat, fisheries habitat, and rare and endangered species.

Table 4.1 Soil Characteristics of the Eastern Pequot Reservation, Long Pond Site, (SCS 1983)

September 23, 1999
Eastern Pequot Reservation, Long Pond Site

SOIL SERIES	TEXTURES	SLOPE (%)	HYDROLOGIC GROUP/ DRAINAGE CLASS	DEPTH TO BEDROCK (IN.)	CONSTRUCTION CONCERNS	WILDLIFE HABITAT	MANAGEMENT CONCERNS
Canton-Charlton	Fine sandy loam	3 to 35	B Well drained	>60	- Equipment limitations - Slopes - Boulders - Concrete corrodes	- Fair to Good for woodlands	- Slopes - Boulders
Charlton-Hollis	Fine sandy loam	3 to 45	B (Charlton) C/D (Hollis) Well drained to somewhat Excessively drained	>60 (Charlton) 10-12 (Hollis)	- Shallow to bedrock (Hollis) - Slopes - Concrete corrodes	- Good for woodlands	- Slopes - Boulders - Shallow to bedrock
Ridgebury-Leicester-Whitman	Fine sandy loam	0 to 3	C Poorly drained	>60	- Equipment limitations - Protected wetlands - Concrete corrodes	- Fair for woodlands and wetlands	- Protected - Wetlands - Tree windthrow hazards - Boulders - Wetness
Sutton	Fine sandy loam	0 to 8	B Moderately well drained	>60	- Equipment limitations - Concrete corrodes	- Fair to Good for woodlands	- Boulders - Seasonal Wetness
Hollis-Charlton-Rock	Fine sandy loam	3 to 15	B (Charlton) C/D (Hollis) Well drained to somewhat excessively drained	>60 (Charlton) 10-20 (Hollis)	- Equipment limitations - Shallow to Bedrock - Slopes - Concrete corrodes	- Poor	- Tree windthrow hazards - Slopes - Boulders - Shallow to bedrock
Haven	Silt loam	3 to 8	B Well drained	>60	- Concrete corrodes	- Good for woodlands and openlands	
Narragansett	Silt loam	3 to 8	B Well drained	>60		- Good woodlands	- Boulders



Soil Legend

CcB, CcC, CdC, CdD	Canton - Charlton
CrC, CrD	Charlton - Hollis
SxB, SwB	Sutton
NgB	Narragansett
Rn	Ridgebury - Leicester - Whitman
SwB, SxB	Sutton
HrC	Hollis - Charlton - Rock
W	Water

Soils - Map 3
Prepared For The
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Of Connecticut

Scale: 1"=500'
 Date: January, 2000

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Forest Cover and Timber Resources

The site is covered by mature mixed hardwoods, typical of lands in southern New England that were farmed in the past. Numerous stone walls and boulder piles are evidence that most of the site was cleared for agriculture. Based on the estimated age of the trees, it is believed that the site was almost entirely cleared of trees about 100 to 150 years ago. Trees have regrown over the site as agricultural practices were abandoned. Logging has been practiced historically and areas of the site show evidence of recent selective harvesting of trees, particularly to the south and east. Past land use has dramatically influenced the forest types growing at the site. Since the slope of the site faces west, warmer conditions are encountered versus on north or east facing slopes. This influences the tree species composition and growth. More influential to forest cover is the soil moisture, however. Wetlands and mesic areas show different forest cover types than the drier uplands. Wetland forests (wooded swamps) are shown on Map 4.

Measurements and assessment of the site's timber values were not performed as part of this study. Instead, trees were identified and the diameters of the largest individuals of most species observed were measured. Table 4.2 was created from the tree species noted at the site and other general references. No particular tree species was overwhelmingly dominant. Wetlands were dominated by red maple (*Acer rubrum*), but yellow birch (*Betula alleghaniensis*) and ash (*Fraxinus* spp.) were also common. Oaks (*Quercus* spp.) and hickories (*Carya* spp.) were abundant throughout the site. Two distinct stands of northern hemlock (*Tsuga canadensis*) are noteworthy, one at the east center of the site and another within the wetlands and mesic woods next to Silex Mine Brook. Other areas not delineated as wetland are dominated by mountain laurel (*Kalmia latifolia*) shrubs.

Timber values of the site are considered to be generally low, despite the density of trees and presence of some larger trees. This is due to the species existing at the site as Table 4.2 shows. The primary timber value of the site is for firewood. On average, approximate diameter of most of the trees is 8 to 10 inches.

Wetlands

The majority of the subject site is upland forest. Vegetated wetland habitats border the shores of Long Pond and Silex Mine Brook. In addition, wetlands exist in the narrow swales, benches, and terraces along the hillslope throughout the site. The hillside

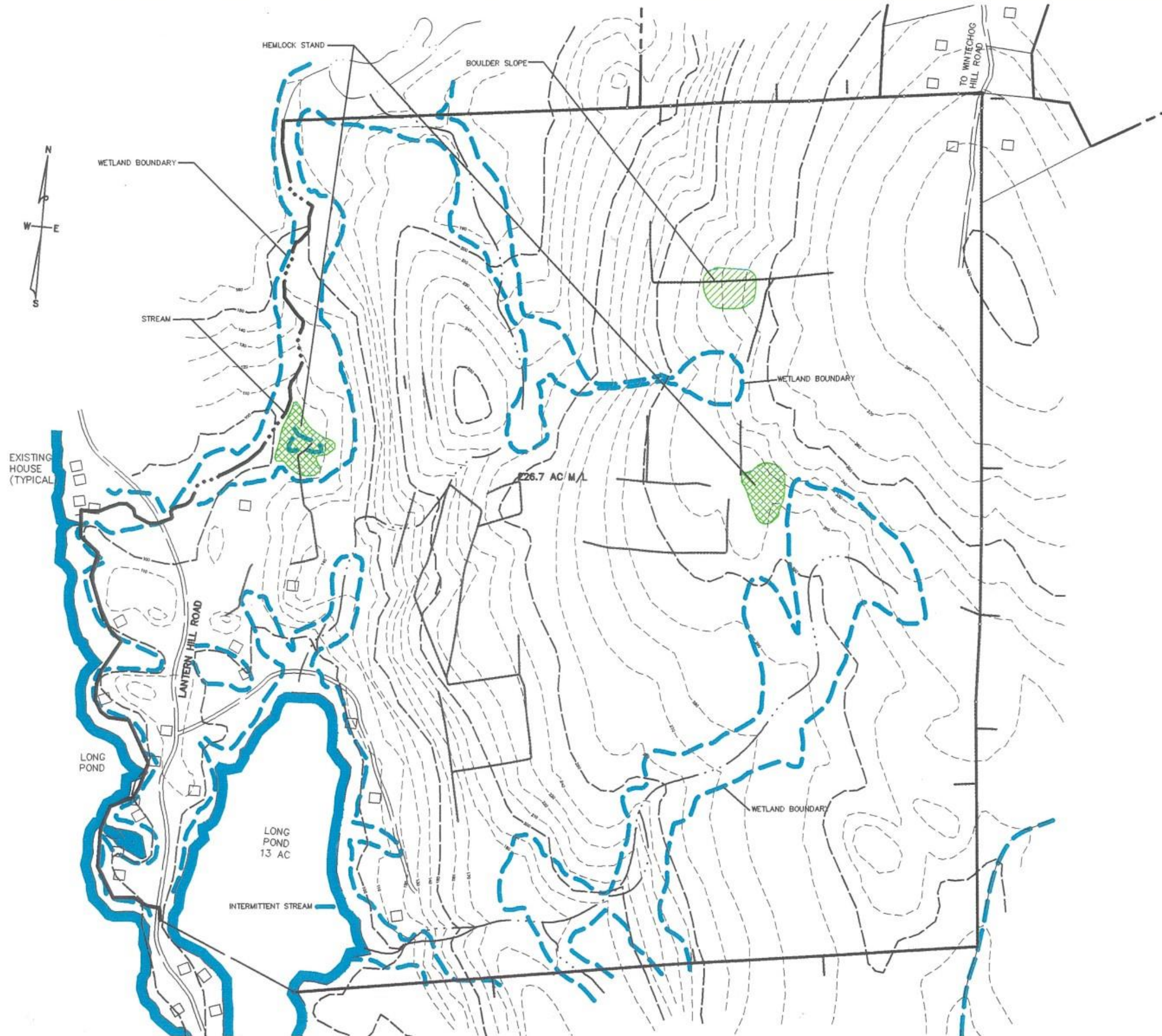
wetlands are drained by intermittent streams into Long Pond or Silex Pond. Map 4 shows the wetland boundaries and streams as determined by interpreting aerial photographs.

The only wetland type identified on the site is mature wooded swamp or palustrine forested overstory (PFO) as designated by the United States Fish and Wildlife Service, National Wetlands Inventory (Cowardin et al. 1979). Wetland habitats bordering Long Pond and Silex Mine Brook are important for providing numerous functions and values for these two surface water bodies. The wetlands are dominated by mature trees, consisting mostly of red maple (*Acer rubrum*) with scattered areas dominated by yellow birch (*Betula alleghaniensis*). Spicebush (*Lindera benzoin*) is an abundant shrub in the hillslope wetlands. Highbush blueberry (*Vaccinium corymbosum*) and winterberry holly (*Ilex verticillata*) were other abundant shrubs. Herbaceous plants could not be completely inventoried due to the early-spring, desiccated conditions. False hellebore (*Veratrum viride*), skunk cabbage (*Symplocarpus foetidus*), sedges (*Carex* spp.) and sphagnum moss (*Sphagnum* spp.) were common in the wetlands during the site visit.

Wetlands are areas that have hydric soils, hydrophytic vegetation, and are flooded or saturated for a specific time period during the growing season. Wetland habitats are protected by Connecticut and federal law. The United States Army Corps of Engineers holds the primary federal jurisdiction for wetlands protection under Section 404 of the Clean Water Act. Map 4 shows the approximate extent of jurisdictional wetlands on the site. The wetland boundaries shown are approximate only and any permitting for activities associated with wetlands requires field verification, flagging, and survey. Areas with poorly drained and very poorly soil drainage classifications (see Table 4.1) typically have associated jurisdictional wetlands. The wetlands on the subject site are predominantly poorly drained Ridgebury and Leicester soils. Very poorly drained Whitman soils may exist at the more deeply flooded wetlands adjacent to Long Pond and Silex Mine Brook.

Aquatic Habitats

The only aquatic habitats of note are Long Pond and Silex Mine Brook. Silex Pond is to the north and off-site according to the site boundaries provided (see Map 2). Certain aquatic animals from Silex Pond do utilize the site, such as frogs, salamanders, turtles, snakes, and ducks. Long Pond is controlled, and partly created, by dams.



*Natural Resources - Map 4
 Prepared For The
 Eastern Pequot Indians
 Of Connecticut*

Scale: 1"=400'
 Date: January, 2000

Table 4.2 Tree species identified
 at the Eastern Pequot Reservation, Long Pond Site

COMMON NAME	SCIENTIFIC NAME	MAXIMUM DIAMETER AT BREAST HEIGHT (dbh) (inches)	NOTES
White ash	<i>Fraxinus Americana</i>	34.4	Tool handles, oars, furniture, boats, carriages, valuable for commercial timber and fuel
American beech	<i>Fagus grandifolia</i>	30.7	Furniture and tool handles, excellent fuel, oil from nuts, nuts valuable for numerous wildlife species
Red oak	<i>Quercus rubra</i>	29.5	Heavy construction, railroad ties, interior decoration, cooperage, furniture, fuel, good shade tree, acorns valuable for wildlife
White oak	<i>Quercus alba</i>	23.1	Heavy construction, floors, furniture, cabinets, tool handles, baskets, railway ties, fences, fuel, boats, valuable timber species, acorns used for food and valuable for many wildlife species
Pin oak	<i>Quercus palustris</i>		Used for nails before metal, acorn valuable for wildlife
Black oak	<i>Quercus velutina</i>	34.8	Cooperage, furniture, heavy construction, interior finish, bark for tanning, acorns valuable for wildlife
Pignut hickory	<i>Carya glabra</i>	17.8	Timber and firewood, nuts edible and valuable for wildlife
Shagbark hickory	<i>Carya ovata</i>		Hard wood, wheel spokes and axles, tool handles, baseball bats, baskets, golf clubs, nuts are edible and yield oils, sap yield sweet gum and syrup, nuts valuable for squirrels and white-tailed deer
Black birch	<i>Betula lenta</i>	20.2	Furniture, fuel, sap yields sugar, oil for soft drinks and medicines, bark for tea, valuable wildlife tree
Yellow birch	<i>Betula alleghaniensis</i>	32.8	Flooring, furniture, interior finish, crates, veneers, oil, seeds are valuable wildlife food

Notes: ¹ from Palmer and Fowler (1975)

Table 4.2 (continued) Tree species identified
at the Eastern Pequot Reservation, Long Pond Site

September 23, 1999
Eastern Pequot Reservation
Long Pond Site

COMMON NAME	SCIENTIFIC NAME	MAXIMUM DIAMETER AT BREAST HEIGHT (dbh) (inches)	NOTES
Sugar maple	<i>Acer saccharum</i>		Maple syrup, wood ash for potash and to make soap, wood for furniture, flooring, interior finish, pulley blocks, broom and tool handles, fuel
Red maple	<i>Acer rubrum</i>	18.0	Fuel, gunstocks, cheap furniture, flooring, woodenware, crates
Hop hornbeam	<i>Ostrya virginiana</i>		Hard wood, tool handles, spokes, axes, wooden equipment, fuel
Basswood	<i>Tilia Americana</i>		Cordage fiber from inner bark and bark, inner bark and buds edible, flowers create superior honey, valuable as "whitewood", valuable for cottontail rabbits, white-tailed deer, woodpeckers
Sassafras	<i>Sassafras albidum</i>		Fence post, rails, cooperage, bark for tea, oil flavors candy, tobacco, gum, soap, perfume, medicine
Tulip poplar	<i>Liriodendron tupilifera</i>	32.5	Cabinet wood and "whitewood", boat building, exterior finishes, valuable for bobwhite quail, whitetailed deer, squirrel, rabbit
Black cherry	<i>Prunus serotina</i>		Cabinet wood, fruit edible, leaves poisonous to livestock, wildlife food plant for numerous species
Flowering dogwood	<i>Cornus florida</i>		Bark for toothpaste, quinine substitute, tool handles, golf clubs, shuttles, wildlife food plant for numerous wildlife species
Eastern white pine	<i>Pinus strobes</i>	27.4	Cabinet wood, shingles, wall, mats, barrels, woodenware, valuable timber, limited wildlife value
Eastern hemlock	<i>Tsuga Canadensis</i>	28.4	Coarse construction (where wood not exposed), inner bark for tanning, leaves for tea, valuable for woodland songbirds, squirrels, deer, and cottontail rabbits, owl nesting in hemlock at this site.

Notes: ¹ from Palmer and Fowler (1975)

Long Pond is actually lake habitat. The bay east of Lantern Hill Road reaches depths approaching six feet. West of Lantern Hill Road, depths approach 24 feet. Aquatic vegetation is extensive along the south shores of the lake. Dominate species include water milfoil (*Myriophyllum* spp.), Robbins pondweed (*Potamogeton robinsii*), bladderwort (*Utricularia* spp.), and white water lily (*Nymphaea* sp.). A complete analysis of aquatic habitat associated with Long Pond was not conducted due to the need for a boat and early-spring conditions during the site visit.

Silex Mine Brook is a perennial outlet to Silex Pond and a tributary to Long Pond. It is generally a fast flowing stream with riffle habitats predominant downstream to Lantern Hill Road. The channel substrate is cobble-gravel. Undercut banks and overhanging vegetation provide cover for aquatic and terrestrial organisms, as well as shade to moderate water temperatures. Width of the stream ranged from 10 to 12 feet at the top of bank and 8 to 10 feet at low water levels. The banks were between one and two feet high and are steep. Forested wetlands exist within the narrow valley bordering the stream.

Wildlife and fisheries resources associated with Long Pond and Silex Mine Brook are discussed in the following report sections. Both Long Pond and Silex Mine Brook are considered valuable aquatic habitats.

WILDLIFE

Species Inventory

The comprehensive text by DeGraaf and Rudis (1987) provided information to compile a list of potential wildlife species that may utilize the site. Two forest types were reviewed for use by amphibians, reptiles, birds, and mammals: red maple and northern red oak. Red maple forests are associated with wet sites, such as the wetland habitats mapped on the site. Northern red oak forests include other species of oaks, hickory, red maple, white ash, American beech, black cherry, and sugar maple; and is considered a sub-climax forest type with beech and sugar maple increasing in numbers over time. As such, the northern red oak cover type has mostly shade tolerant tree species (DeGraaf and Rudis 1987).

Table 4.3 was compiled from DeGraaf and Rudis (1987) to show wildlife potentially found in these forest types. In addition, wildlife species associated with Long Pond are noted on Table 4.3. The list is not comprehensive and other species of wildlife may have been noted previously on this or neighboring properties. Table 4.3 may also include wildlife that have never been observed at the site, but which could potentially exist due to the habitat types. Scientific names of the wildlife species observed on the site are not included in this report section as they are shown on Table 4.3.

Overall, the site has lower wildlife values due to the lack of habitat interspersions and diversity, particularly open habitats. Long Pond and its shoreline provide more valued wildlife habitat, especially shoreline wetlands as an ecotone between lacustrine (lake) environs and terrestrial uplands. Waterfowl observed on Long Pond included a pair of mute swans, Canada geese, and cormorants. Forested habitats of the site are primarily valuable for birds.

Wildlife observed in the forested regions of the site during the April 2, 1999 site visit included garter snake, turkey vulture, phoebe, cardinal, black-capped chickadee, blue jay, hairy woodpecker, downy woodpecker, pileated woodpecker, northern flicker, white breasted nuthatch, tufted titmouse, turkey, grouse, red-tailed hawk, gray squirrel, raccoon, and white-tailed deer. In addition, wood ducks and mallards were observed on Silex Pond. Wildlife observations worthy of specific mention included a great horned owl nest in the central hemlock stand, potential den sites at a dense boulder slope (see Map 4), and an abundance of redback salamanders, which seemed to appear under every overturned rock on the southern half of the site. The boulder slope is excellent habitat for timber rattlesnakes and copperheads. These snakes were not observed during the site visit, but a tribal member reports historic populations here. The timber rattlesnake is listed as endangered in Connecticut (DEP 1993).

Red-tailed Hawk (*Buteo jamaicensis*)

As requested, elaboration on the red-tailed hawk is provided here due to its cultural significance. A pair of red-tailed hawks were observed soaring over the forest in the southern half of the site. It was not known whether the hawks were hunting or nesting at the site. Red tailed hawks can be found from Alaska and Canada to Panama and the

TABLE 4.3

POTENTIAL WILDLIFE SPECIES

EASTERN PEQUOT RESERVATION

LONG POND SITE

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
AMPHIBIANS					
Marbled salamander	<i>Ambystoma opacum</i>	◆	X		
Four-toed salamander	<i>Hemidactylium scutatum</i>	◆	X		X
Northern two-lined salamander	<i>Eurycea b. bislineata</i>	X	X		◆
Spotted salamander	<i>Ambystoma maculatum</i>	◆	X		X
Red-spotted newt	<i>Notophthalmus v. viridescens</i>	X	X	◆	X
Northern dusky salamander	<i>Desmognathus f. fuscus</i>	X	X		◆
Redback salamander	<i>Plethodon cinereus</i>	X	X		
Eastern American toad	<i>Bufo a. americanus</i>	X	X	X	X
Fowler's toad	<i>Bufo woodhousii fowleri</i>	X	X	◆	◆
Northern spring peeper	<i>Hyla c. crucifer</i>	X	X	X	X
Gray treefrog	<i>Hyla versicolor</i>	X	X	X	
Bullfrog	<i>Rana catesbeiana</i>	X	X	◆	
Green frog	<i>Rana clamitans melanota</i>	X		◆	X
Wood frog	<i>Rana sylvatica</i>	◆	X		X
Pickerel frog	<i>Rana palustris</i>	X	X	◆	◆

NOTES:

- ◆ represents preferred habitat
- X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
BIRDS (continued)					
American woodcock	<i>Scolopax minor</i>	◆			
Rock dove (pigeon)	<i>Columba livia</i>	areas closer to human habitation			
Mourning dove	<i>Zenaidura macroura</i>	X	X		
Black-billed cuckoo	<i>Coccyzus americanus</i>		◆		
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	X	X		
Common barn owl	<i>Tyto alba</i>	Possibly on northeast corner			
Eastern screech-owl	<i>Otus asio</i>	◆	X		
Great horned owl	<i>Bubo virginianus</i>	◆	X		
Barred owl	<i>Strix varia</i>	◆	X		X
Long-eared owl	<i>Asio otus</i>	X	X		
Northern saw-whet owl	<i>Aegolius acadicus</i>	◆	X		
Common nighthawk	<i>Chordeiles minor</i>	X	X		
Whip-poor-will	<i>Caprimulgus vociferus</i>	X	◆		
Chimney swift	<i>Chaetura pelagica</i>	chimney nests, feeds in surrounding lands			
Belted kingfisher	<i>Ceryle alcyon</i>			X	X
Ruby-throated hummingbird	<i>Archilochus colubris</i>	◆	◆		
Red-headed woodpecker	<i>Melanerpes carolinus</i>	◆	X		
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	◆	X		
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	X	X		
Downy woodpecker	<i>Picoides pubescens</i>	◆	X		
Hairy woodpecker	<i>Picoides villosus</i>	◆	X		
Northern flicker	<i>Colaptes auratus</i>	X	X		
Pileated woodpecker	<i>Dryocopus pileatus</i>	◆	◆		
Eastern wood-pewee	<i>Contopus virens</i>	X	X		
Olive-sided flycatcher	<i>Contopus borealis</i>	X			
Acadian flycatcher	<i>Empidonax virescens</i>	X			
Alder flycatcher	<i>Empidonax alnorum</i>	◆	X		
Willow flycatcher	<i>Empidonax traillii</i>	X	X		
Least flycatcher	<i>Empidonax minimus</i>	◆	X		
Eastern phoebe	<i>Sayornis phoebe</i>	X	X		
Great crested flycatcher	<i>Myiarchus crinitus</i>	X	X		
Eastern kingbird	<i>Tyrannus tyrannus</i>	X	X		

NOTES:

- ◆ represents preferred habitat
- X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
BIRDS (continued)					
Purple martin	<i>Progne subis</i>	X	X	X	X
Tree swallow	<i>Tachycineta bicolor</i>	◆	X	X	X
Northern rough-winged swallow	<i>Steigodopteryx serripennis</i>	X	X		X
Bank swallow	<i>Riparia riparia</i>	X	X		X
Cliff swallow	<i>Hirundo pyrrhonota</i>	X	X		
Barn swallow	<i>Hirundo rustica</i>	X	X		X
Blue jay	<i>Cyanocitta cristata</i>	◆	◆		
American crow	<i>Corvus brachyrhynchos</i>	X	X		
Black-capped chickadee	<i>Parus atricapillus</i>	◆	X		
Tufted titmouse	<i>Parus bicolor</i>	X	X		
Red-breasted nuthatch	<i>Sitta canadensis</i>	X			
White-breasted nuthatch	<i>Sitta carolinensis</i>	◆	X		
Brown creeper	<i>Certhia americana</i>	X	X		
Carolina wren	<i>Thryothorus ludovicianus</i>	◆	X		
House wren	<i>Troglodytes aedon</i>	X	X		
Winter wren	<i>Troglodytes troglodytes</i>	◆	X		
Golden-crowned kinglet	<i>Regulus satrapa</i>	X	X		
Ruby-crowned kinglet	<i>Regulus calendula</i>		Winter only		
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	◆	X		
Eastern bluebird	<i>Sialia sialis</i>	X	X		
Veery	<i>Catharus fuscescens</i>	◆	X		
Hermit thrush	<i>Catharus guttatus</i>	X	X		
Wood thrush	<i>Hylocichla mustelina</i>	X	X		
American robin	<i>Turdus migratorius</i>	X	X		
Gray catbird	<i>Dumetella carolinensis</i>	◆	X		
Northern mockingbird	<i>Mimus polyglottos</i>	◆			
Brown thrasher	<i>Taxostoma rufum</i>	X	X		
Cedar waxwing	<i>Bombycilla cedrorum</i>	◆	X		
Northern shrike	<i>Lanius excubitor</i>	X	X		
European starling	<i>Sturnus vulgaris</i>	X	X		

NOTES:

- ◆ represents preferred habitat
- X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
BIRDS (continued)					
White-eyed vireo	<i>Vireo griseus</i>	◆	X		
Yellow-throated vireo	<i>Vireo flavifrons</i>	◆	X		
Warbling vireo	<i>Vireo gilvus</i>	◆	X		
Red-eyed vireo	<i>Vireo olivaceus</i>	X	X		
Blue-winged warbler	<i>Vermivora pinus</i>	X	X		
Golden-winged warbler	<i>Vermivora chrysoptera</i>	X	X		
Nashville warbler	<i>Vermivora ruficapilla</i>	X	X		
Yellow warbler	<i>Dendroica petechia</i>	◆	X		
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>	◆			
Black-throated blue warbler	<i>Dendroica caerulescens</i>	X	X		
Yellow-rumped warbler	<i>Dendroica coronata</i>			Winter only	
Black-throated green warbler	<i>Dendroica virens</i>	X	X		
Blackburnian warbler	<i>Dendroica fusca</i>		◆		
Prairie warbler	<i>Dendroica discolor</i>		X		
Black-and-white warbler	<i>Mniotilta varia</i>	X	X		
American redstart	<i>Setophaga ruticilla</i>	X	X		
Prothonotary warbler	<i>Protonotaria citrea</i>	◆			
Worm-eating warbler	<i>Helmitheros vermivorus</i>		X		
Ovenbird	<i>Seiurus aurocapillus</i>	X	◆		
Northern waterthrush	<i>Seiurus noveboracensis</i>	◆	X		X
Louisiana waterthrush	<i>Seiurus motacilla</i>	◆			
Common yellowthroat	<i>Geothlypis trichas</i>	◆	X		
Hooded warbler	<i>Wilsonia citrina</i>	◆	X		
Canada warbler	<i>Wilsonia canadensis</i>	X	◆		
Yellow-breasted chat	<i>Icteria virens</i>	X	X		
Scarlet tanager	<i>Piranga olivacea</i>	◆	X		
Northern cardinal	<i>Cardinalis cardinalis</i>	◆	X		X
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	X	◆		
Indigo bunting	<i>Passerina cyanea</i>	X	X		
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>	X	◆		

NOTES:
 ◆ represents preferred habitat
 X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
BIRDS (continued)					
American tree sparrow	<i>Spizella arborea</i>	X	X		
Chipping sparrow	<i>Spizella passerina</i>	X	X		
Field sparrow	<i>Spizella pusilla</i>	X	X		
Vesper sparrow	<i>Poecetes gramineus</i>	Possibly at northeast corner of site			
Fox sparrow	<i>Passerella iliaca</i>	Winter only			
Song sparrow	<i>Melospiza melodia</i>	◆	X		
White-throated sparrow	<i>Zonotrichia albicollis</i>	X	X		
Dark-eyed junco	<i>Junco hyemalis</i>	X	X		
Snow bunting	<i>Plectrophenax nivalis</i>	Winter only			
Red-winged blackbird	<i>Agelaius phoeniceus</i>	X			
Eastern meadowlark	<i>Sturnella magna</i>	Possibly at northeast corner of site			
Rusty blackbird	<i>Euphagus carolinus</i>	Winter only			
Common grackle	<i>Quiscalus quiscula</i>	◆	X	X	
Brown-headed cowbird	<i>Molothrus ater</i>	X	X		
Orchard oriole	<i>Icterus spuris</i>	X			
Northern oriole	<i>Icterus galbula</i>	X	X		
Pine grosbeak	<i>Pinicola enucleator</i>	Winter only			
Purple finch	<i>Carpodacus purpureus</i>	X	X		
House finch	<i>Carpodacus mexicanus</i>				
Common redpoll	<i>Carduelis flammea</i>	Winter only, northeast corner of site			
Hoary redpoll	<i>Carduelis homemanni</i>	Winter only, northeast corner of site			
Pine siskin	<i>Carduelis pinus</i>	Winter only			
American goldfinch	<i>Carduelis tristis</i>	◆	X		
House sparrow	<i>Passer domesticus</i>	Forest edges, avoids heavily forested areas			
Snowy egret	<i>Egretta thula</i>	Long Pond and possibly Silex Pond shoreline			
Great egret	<i>Casmerodius albus</i>	Long Pond and possibly Silex Pond shoreline			

NOTES:
 ◆ represents preferred habitat
 X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
MAMMALS					
Masked shrew	<i>Sorex cinereus</i>	X	X		
Water shrew	<i>Sorex palustris</i>	X		◆	◆
Northern short-tailed shrew	<i>Blarina brevicauda</i>	X	X		
Hairy-tailed mole	<i>Parascalops breweri</i>	X	X		
Eastern mole	<i>Scalopus aquaticus</i>	X	X		
Star-nosed mole	<i>Condylura cristata</i>	X		X	X
Little brown myotis	<i>Myotis lucifugus</i>	X	X	◆	◆
Keen's myotis	<i>Myotis keenii</i>	X	X	◆	◆
Silver-haired bat	<i>Lasionycteris noctivagans</i>	X	X	◆	◆
Eastern pipistrelle	<i>Pipistrellus subflavus</i>	X	X	◆	◆
Big brown bat	<i>Eptesicus fuscus</i>	X	X	◆	◆
Red bat	<i>Lasiurus borealis</i>	X	X	X	X
Hoary bat	<i>Lasiurus cinereus</i>	X	X	X	X
Eastern cottontail	<i>Sylvilagus floridanus</i>	X	X		
New England cottontail	<i>Sylvilagus transitionalis</i>	◆	X		
Snowshoe hare	<i>Lepus americanus</i>	X	X		
Eastern chipmunk	<i>Tamias striatus</i>	X	X		
Woodchuck	<i>Marmota monax</i>	X	X		
Gray squirrel	<i>Sciurus carolinensis</i>	X	◆		
Red squirrel	<i>Tamiasciurus hudsonicus</i>	X	X		
Southern flying squirrel	<i>Glaucomys volans</i>	X	◆		
White-footed mouse	<i>Peromyscus leucopus</i>	X	◆		
Southern red-backed vole	<i>Clethrionomys gapperi</i>	X	X		
Meadow vole	<i>Microtus pennsylvanicus</i>	X	X		
Woodland vole	<i>Microtus pinetorum</i>	X	X		
Southern bog lemming	<i>Synaptomys cooperi</i>	X	X		
House mouse	<i>Mus musculus</i>	within and periphery of developed areas			
Meadow jumping mouse	<i>Zapus hudsonius</i>	X	X		

NOTES:

- ◆ represents preferred habitat
- X represents utilized habitat

Common Name	Scientific Name	Red Maple	Red Oak	Lakes	Streams
MAMMALS (continued)					
Beaver	<i>Castor canadensis</i>	◆	X	◆	◆
Muskrat	<i>Ondatra zibethicus</i>			X	X
Coyote	<i>Canis latrans</i>	X	X		
Red fox	<i>Vulpes vulpes</i>	◆	◆		
Gray fox	<i>Urocyon cinereoargenteus</i>	◆	◆		
Raccoon	<i>Procyon lotor</i>	◆	X		
Ermine	<i>Mustela erminea</i>	X	X		
Long-tailed weasel	<i>Mustela frenata</i>	X	X		
Mink	<i>Mustela vison</i>	◆	X	◆	◆
Striped skunk	<i>Mephitis mephitis</i>	X	X		
Norway rat	<i>Rattus norvegicus</i>	within and periphery of developed areas			
Virginia opossum	<i>Didelphis virginiana</i>	◆	X		
River otter	<i>Lutra canadensis</i>	X	X	◆	◆
Bobcat	<i>Felis rufus</i>	X	X		
White-tailed deer	<i>Odocoileus virginianus</i>	X	X		

NOTES:

- ◆ represents preferred habitat
- X represents utilized habitat

West Indies. Connecticut is within the permanent range of the species (i.e., breeding and wintering range). Adult lengths are to two feet, wingspans to 56 inches, and weight to four pounds. Courtship begins in February and this species selects one mate for life (Palmer and Fowler 1975). Nests are made of coarse sticks in trees typically 35 to 90 feet above the ground. One to five eggs are laid and incubated an average of 28 days (early-March to mid-May). Only one brood is raised per year. The young are four to five weeks old when taking their first flight (DeGraaf and Rudis 1987). Diet is primarily small mammals, especially rodents such as meadow mice, chipmunks, squirrels, and rabbits. Red-tailed hawks will also eat insects, amphibians, reptiles, nesting birds, and carrion. Individuals have been known to take chickens and small domestic animals when other food is not available (Palmer and Fowler (1975), and DeGraaf and Rudis (1987).

Breeding and wintering habitats of red-tailed hawks include deciduous and mixed woodlands interspersed with meadows, brushy pastures, open bogs, and swampy areas (DeGraaf and Rudis 1987). Large trees are required for nesting and perching. Nesting sites are usually tall trees in or at the edge of a woodland, or in an isolated tree in an open setting. They often nest in the tallest and largest trees. Oak or white pine are preferred nest trees in Massachusetts. Beech, birch, and maple are commonly used in New York (DeGraaf and Rudis 1987). Territory size is between 80 and 120 acres in California and home ranges are 0.3 to 2.15 square miles in the mid-west. Winter ranges up to four square miles were measured in Michigan. Preferred feeding habitats are open fields with short grasses and weeds, and scattered trees for perching (DeGraaf and Rudis 1987).

Habitat descriptions suggest that the subject site is not as suitable for red-tailed hawks due to the lack of open habitats such as meadows, pastures, and bogs. Exceptions to this are the northeast corner of the site, which has open areas next to woodlands, and forests next to Long Pond and its wetlands. ENSR scientists did not fully investigate these parts of the site for red-tailed hawk nests or roosts.

Fisheries Habitat

Similar to aquatic habitat, both Long Pond and Silex Mine Brook provide important fisheries habitat at the subject site. Silex Mine Brook does not have high values for fisheries, but does have fisheries habitat. Silex Mine Brook also provides a food supply for fish in Long Pond. Fish, including trout, could reside in Silex Mine Brook based on the habitat characteristics, although none were observed during the site visit. A major barrier to fish passage between Long Pond and Silex Pond exists in Silex Mine Brook at an old road crossing with malfunctioning culvert, approximately 750 feet upstream of Lantern Hill Road. Removal of this barrier and stream restoration at this location would dramatically increase the fisheries values of Silex Mine Brook and Silex Pond.

Long Pond has significant fisheries resources and recreational fishing is an important value. Boats can be launched at a public access ramp. Long Pond is stocked with brown and rainbow trout. Other important fisheries include chain pickerel, trout, largemouth bass, calico bass, yellow perch, and sunfish (bluegills and pumpkinseeds).

Historic fisheries resources of Long Pond require further investigation. Most important is the historic link between the lake, its outlet (Whitford Brook), the Mystic River, and Atlantic Ocean. Dams have interrupted the hydrodynamics of the entire upper-Mystic River watershed that formed the original habitat and associated fisheries. This report did not examine the potential for historic runs of anadromous (Atlantic salmon, trout, sturgeon, shad, lampreys, and herring) and catadromous (eels) fish between Long Pond and the Atlantic Ocean. Dams acted to create and/or enlarge ponds such as Long Pond, Whitford Pond, and Hyde Pond. These ponds and Whitford Brook would have much different habitat characteristics without the dams. Whether Whitford Brook had the necessary stream morphology, flow volumes, and absence of barriers to fish migration prior to dam construction would be an interesting study in relation to Long Pond and its historic/cultural fisheries values. Anadromous and catadromous fish runs may have extended into Silex Pond and upstream as well.

Rare and Endangered Species

The DEP, Natural Resources Center "State and Federal Listed Species and Significant Natural Communities" map on file with the North Stonington Planning and Zoning Office was reviewed for potential endangered, threatened, and special concern species. This map identifies the northwest corner of the site as within a Natural Diversity Data Base (NDDB) zone. A copy of the map section and legend is included as Appendix A. The NDDB zone encompasses all of Lantern Hill, Lantern Hill Pond, and the northern 70 percent of Long Pond, including surrounding lands (see Appendix A).

The DEP has responded to a request to review records of endangered, threatened, and special concern species (see Appendix A). There are no known populations of Federal or State Endangered, Threatened, or Special Concern Species at the Eastern Pequot Reservation site. Two State Special Concern Species and one State Threatened species exists in Long Pond. All three rare species are aquatic plants identified within Long Pond.

Rare wildlife species are included in Table 4.3, but the property should not be considered as habitat for these species unless consultations with the DEP, Natural Resources Center or other regional expert prove otherwise. The DEP information provided in Appendix A is not based on comprehensive or site-specific field investigations, so the potential for certain rare species exists at the site. Of the species listed in Table 4.3, the following are rare species in Connecticut (DEP 1993):

- Reptiles - timber rattlesnake, eastern hognose snake, and eastern ribbon snake;
- Birds - bald eagle, osprey, Cooper's hawk, sharp-shinned hawk, red-shouldered hawk, long-eared owl, barn owl, northern saw-whet owl, common nighthawk, great blue heron, black-crowned night-heron, snowy egret, great egret, common loon, pied-billed grebe, whip-poor-will, red-headed woodpecker, olive-sided flycatcher, purple martin, yellow-breasted chat, Vesper sparrow, and golden-winged warbler; and

- Mammals - silver-haired bat, red bat, hoary bat, and southern bog lemming.

All of the above animal species are listed as "Special Concern" in Connecticut, except the following: timber rattlesnake, bald eagle, pied-billed grebe, long-eared owl, red-headed woodpecker, yellow-breasted chat, and vesper sparrow are "Endangered"; and sharp-shinned hawk, Cooper's hawk, barn owl, snowy egret, and great egret are "Threatened". Only the bald eagle is on the federal endangered species list as "Threatened". It was proposed that the bald eagle be removed from federal listing in July 1999 due to population recovery.

Lady's Slippers

The Eastern Pequot Tribe expressed an interest in the potential for lady's-slippers at the site. Unfortunately, the early-April site visit by ENSR was not conducive to observing this perennial flower. These orchids are typically present above ground from May through August. There are five species of lady's-slippers that occur in Connecticut. The most common is pink lady's-slipper (*Cypripedium acaule*) and this is the only lady's-slipper with basal leaves. Flowers can be deep rose to pink to white on this species. Ram's-head lady's-slipper (*C. arietinum*) is a Special Concern Species and is noted as being extirpated in Connecticut. Showy lady's-slipper (*C. reginae*) is an Endangered species in Connecticut. Small white lady's-slipper (*C. candidum*) prefers bogs and meadows; habitats not found on the Reservation site. Finally, yellow or downy lady's-slipper (*C. calceolus*) has a yellow or yellow-green flower. None of the lady's-slippers are on the Federal rare species list.

Habitat preferences for lady's-slippers include moist or wet forests (i.e., wooded swamps), except the pink lady's-slipper prefers dry or moist woods, usually under oaks or pines. All but the pink lady's-slipper are wetland indicators. The Eastern Pequot Reservation site undoubtedly has pink lady's-slippers, but the presence of other species is unlikely.

LANDFORMS/SLOPES

The approximately 227 acre site slopes upward from the shores of Long Pond from a elevation of approximately 100 in the vicinity of Lantern Hill Road to a high point in the northeast corner of the site (elevation 400±) in the vicinity of the pow wow area (See Map 5). The site is relatively flat (0-10% slopes) along the western boundary and

at several areas in the eastern section; slopes are more dramatic (10 to 15 %) in the central western portion of the site. These steeper areas create a divide between the flatter areas mentioned above. The Slope Analysis (Map 6) shows the areas in more detail.

5.0 CULTURAL RESOURCES

Introduction

This summary final report includes a slightly amended version of the progress report prepared on May 31, 1999, and the results of tasks completed after that date. Information collected after May 31 was extremely limited, due primarily to incomplete scheduling/coordination of interviews with older tribal members who may have information on historic sites.

Complete Tasks

A. First Walkover Inspection

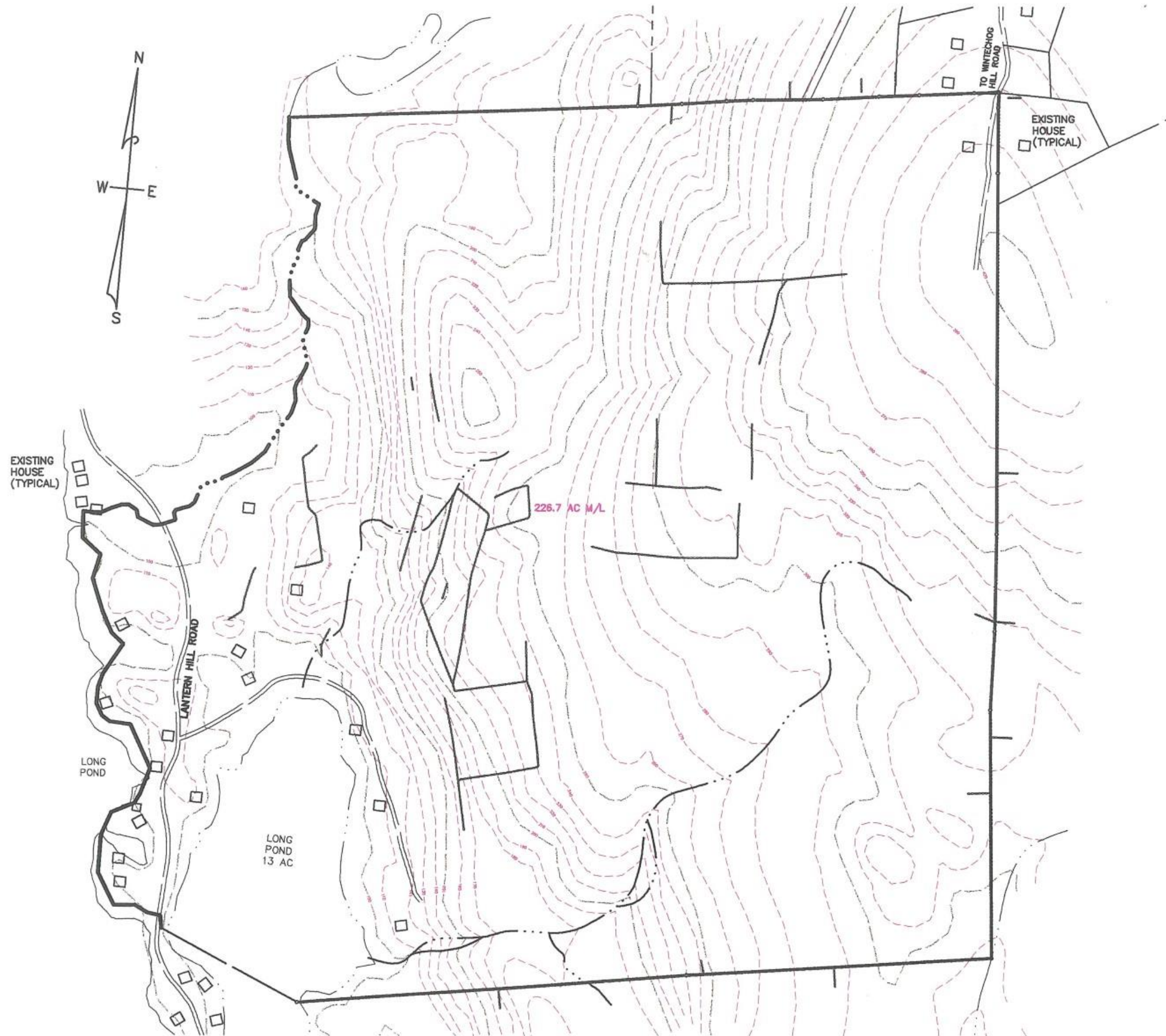
Principal investigator Michael S. Raber, assisted by archaeologists Daniel Forrest and Timothy Ives, met with tribal members and conducted a walkover inspection of the entire reservation on March 26, 1999. Walkover objectives included:

- Inspection of visible physical remains of past post - contact activities, and of other cultural features, presented by tribal members
- Identification of other, similar physical remains

- Identification of landforms and/or rock formations sensitive for possible archeological remains of subsurface prehistoric or historic sites
- Rough mapping of all result on a U.S. Geological Survey map showing the reservation, using a compass and a 1:1200-scale blue-line copy of a 1996 aerial photograph for approximate orientation/location

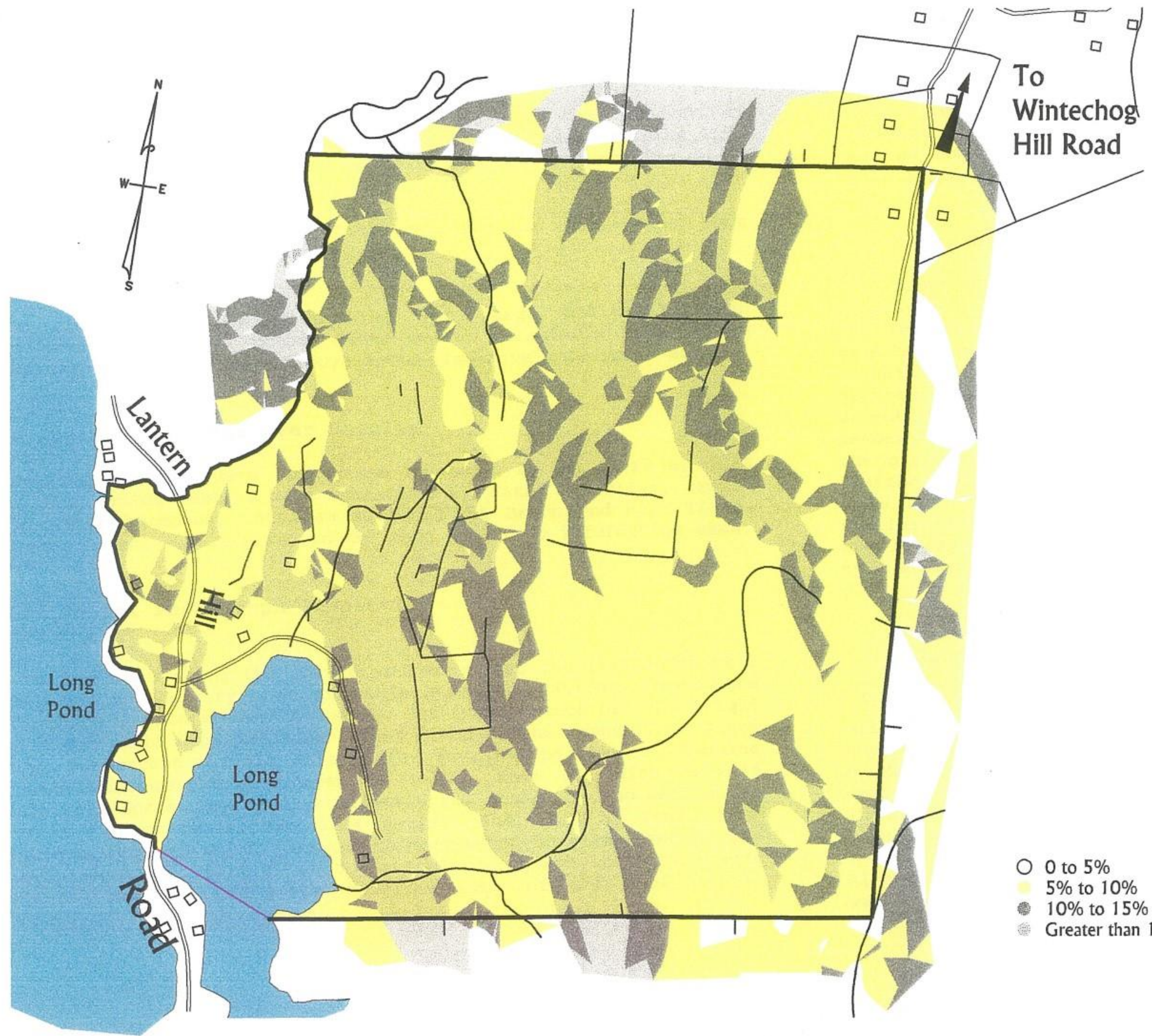
In addition to the principal tribal cemetery near the reservation's northeast corner, and existing residences in the northeast and western reservation edges, walkover inspection noted the following features:

- Five obvious, and one possible, rubble foundations associated with as-yet-updated post-Contact residential sites. These sites were distributed over all except the southeast quarter of the reservation. Most foundations appeared to be 15-18 x 15-30 feet in area. At several of these sites, low mounds suggested possible adjacent house areas without basements, with the foundation east of the sections without basements. One of these sites, in the south-central part of the reservation, included additional rubble remains of what appeared to be a large outbuilding, and 20th century artifacts at the house remains.
- A complex and extensive network of fieldstone walls was noted throughout the reservation, running through all but the approximate southeastern quarter and the northeastern eighth of the parcel. Given the extent of the walls, no attempt was made to map them in the field.
- An earth-and-rubble dam impounding the Silex pond, at the northwestern corner of the reservation, appears to extend into the reservation.
- Potential rockshelter archaeological sites were noted at two ledge outcrops, near the southeastern corner and in the north-central portion of the reservation.
- At least three area sensitive for small, short-term Native American archaeological sites were noted:



*Topography - Map 5
Prepared For The
Eastern Pequot Indians
Of Connecticut*

Scale: 1"=400'
Date: January, 2000



- 0 to 5%
- 5% to 10%
- 10% to 15%
- Greater than 15%

Slope Analysis - Map 6
 Prepared For The
Eastern Pequot Indians
 Of Connecticut
 Scale: 1"=500'
 Date: January, 2000



1. Around the wetland margins of the Whitford Brook drainage basin on the southeast edge of the reservation
2. A small knoll near the southwestern edge of the reservation, located 6-800 feet from Long Pond along a stream draining into the pond from the east-central portion of the reservation
3. Along the margins of the stream defining the northwestern edge of the reservation

No undisturbed areas sensitive for large Native American archaeological sites were noted. Other small, relatively level areas near the stream noted in No. 2 above could also have very small sites.

B. Briefing on Walkover Results

Walkover results were summarized by Raber at an April 6, 1999 meeting with tribal members Mark Sebastian and Kathy Sebastian, tribal assistant Seth Thompson, and team member Clint Brown and Mark Titus. Mapped results were transferred to the land use study information base.

C. Aerial Photograph Inspection

To begin assessing the nature and extent of the fieldstone wall network, and to identify other possible house foundations, Raber used a small stereoscopic viewer to compare 9x9-inch contact prints of 1996 and 1934 aerial photographs, the latter filed at the Connecticut State Library. The recent aeriels allowed for detailed preliminary mapping of several thousand linear feet of walls, some of which defined quadrilateral enclosures of approximately two acres. No two enclosures had similar proportions. The 1934 aeriels indicated at least four foundations, none of which appeared to correspond to sites seen on the walkover inspection. Results of the aerial photograph inspection were transferred to a 1:1200-scale blueline copy of the 1996 aerial photograph.

D. Review of 1998 Petition for Federal Acknowledgement

Review of this document suggested that at least some of the walls on the reservation were built by tribal members, but that some walls may represent former pasturage leases made to non-Indians during the 18th and 19th centuries (pp.54 and 121). Some information on the latter may be found in overseer accounts, which have not been reviewed for this scope of work.

E. Preliminary Interview with Tribal Members

Raber attended a tribal elders meeting on June 16, 1999, and displayed a marked-up blueline copy of the 1996 aerial photograph with the information noted in II.C above. Tribal members present did not have additional information on the mapped sites, though the preliminary graphic quality of the display made quick visual comprehension difficult for most members. Some of those present identified other absent members who might have better information. Tribal council members and staff were to contact these potential informants, but at the present time no additional interviews have been scheduled. A more finished version of the map with former residential sites was presented at a later elders meeting by Clint Brown of DiCesare-Bentley, with similar results. It appears that only a small number of tribal members are likely to have much additional information on sites identified in this study.

F. Review of Historic Photographic and Second Walkover Inspection

In an attempt to identify sites viewed during the March 26, 1999 walkover, tribal council members and staff obtained digitally-printed copied of several dozen historic photographs from two collections held by Mashantucket Pequot sources. Raber reviewed these copies with tribal members Mark Sebastian and Larry Wilson, and tribal assistant Seth Thompson, on October 13, 1999. The views included images of a number of houses and at least one belowground structure, none of which could be located or correlated with sites identified during the first walkover. Along with these tribal members and staff, Raber then made a second walkover inspection with two objectives:

- Location of sites visible on the 1934 aerial photograph

- Presentation to the two tribal members of sites located during the first walkover, to see if they had personal or other knowledge of site identities

One of the four sites on the 1934 aerial photographs was located, which now consists of an approximately 15 x 20 foot area defined by rubble walls at ground level. This unidentified historic structure, probably a former building, is located along the east edge of the reservation several hundred feet north of a site located during the first walkover. The latter structure had only been mapped approximately, given the lack of ground control. Assuming the site found on October 13 was correctly mapped from the 1934 aerial photograph, Raber paced off the distance from this site to the one found earlier, allowing for a slightly more accurate location of the latter. The attached map segment shows the revised location.

Time constraints did not allow for re-inspection of all sites in the first walkover. None of the other three sites noted on the 1934 aerial photographs were located. The largest of the historic sites found on the first walkover, which includes what appears to be foundations for a large outbuilding, was revisited. Tribal members Sebastian and Wilson were unsure about the identity of the site, but thought it might be associated with the site of religious/social meetings held by tribal members earlier in the 20th century. In the 1998 petition for federal recognition of the tribe, these meetings were identified as having been held from 1921 to 1937 at the home of Tamer Emeline Sebastian Williams (pp.50-51).

TASKS

Not Completed

As noted, no review of historic maps with possible information on reservation sites or features was conducted. Keegans Associates, which is to collect such maps under a separate contract with the tribe, has not initiated any substantive work as of November 4, 1999.

Recommendations

A. Reservation Mapping

None of the sites located in this assessment have been mapped with much precision. For future management of these or other cultural resources on the reservation, it is essential that more precise site locations be determined. Better locations will allow for more informed land planning choices, easier site visits by future researchers and potential tribal informants, and perhaps readier comparisons of site locations with information on historical maps. Short of a complete topographic mapping program requiring the expense of an aerial survey, better site locations can be achieved with some combinations of:

- Transit mapping of field wall locations, and location of specific sites relative to wall intersections, beginning with the field wall locations already taken by Raber from the 1996 aerial photographs
- Global Positioning System (GPS) location of specific sites

Mapping of the field walls may also allow for future identification of any historical parcels noted in documentary or informant sources on reservation land use.

B. Completion of Interviews with Tribal Members and Improvement of Site Access.

Interviews with the small number of tribal members, at least some of them elderly or infirm, with possible direct knowledge of the sites discussed as above is strongly recommended. Since few members seem to have this knowledge, prompt recovery of informant data is essential or it will disappear. Interviews can use mapping prepared for this study and the historic photographs noted above as prods to memories, but it may also be essential in some cases to show the sites to informants. All of the sites located to date appear to be on or very near former paths or roadways, many of which are not now maintained. It is recommended that these paths be cleared and brought to a state

allowing for travel by four-wheel-drive or all-terrain vehicles, with which elderly informants could be brought to the sites. There are other potential advantages in path improvements as the tribe begins to make more concerted use of interior reservation areas.

C. Assessment of Informant and Historic View Data on House Forms

If informant interviews succeed in identifying sites and/or correlating sites with structures shown in historic views, these results can be compared with previous studies of Native American dwelling elsewhere in southern new England to assess the persistence and/or alteration of traditional material cultural on the Eastern Pequot reservation (cf. page 54 of the 1998 tribal petition).

D. Comparison of Known Sites and Parcel Boundaries with Historical Maps

It is recommended that the use of historical maps initially planned for this assessment be completed in a timely manner.

E. Subsurface Archaeological Investigations

While archaeological survey and excavation would probably produce useful new information about prehistoric or historic reservation sites; it should be remembered that excavation removes or destroys cultural materials, requires the use of laboratory and curation facilities, and can increase site visibility to non-tribal members in undesirable ways. Until there is either a land management plan suggesting potential development in archaeologically/culturally-sensitive materials, or a well defined archaeological program including measures of protecting and conserving site materials, no subsurface excavations are recommended. It is possible that some non-intrusive geophysical survey methods could be usefully applied to reservation resources as preliminary definition of cemetery limits.

6.0 WATER RESOURCES

Long Pond is the primary water resource associated with the approximate 227-acre parcel. The lake is just under 100 acres in size with an average depth of just over 15 feet and maximum depth of 72

feet. Total water storage is 65.2 million cubic feet. Lake levels have been raised approximately 12 feet by a dam. Long Pond is a surface water supply and wells on the lake's perimeter supply water to residences. Connecticut water quality classification of Long Pond is "A". Historic water quality problems caused by biologic pathogens have been documented. Old and failing subsurface septage disposal systems are suspected.

Streams are a prominent feature of the Eastern Pequot Reservation site. Most important is Silex Mine Brook, the northwest property boundary. This is the only perennial stream on the site. The stream provided an historic drinking water supply at the Lantern Hill Road crossing. Flows estimated during the April 2, 1999 site visit were between three and four cubic feet per second. April stream levels were extremely low in 1999 due to the lack of snowmelt and precipitation. It is suspected that flows of three to four cubic feet per second would be a typical summer volume of water for Silex Mine Brook. Water clarity was influenced by tannic, humic, and fulvic acids creating a tan or brownish color due to the natural decomposition of organic material. Silex Mine Brook is an outlet to Silex Pond and a tributary to Long Pond. Silex Pond receives stream flow from lands to the north, extending to Winchetog Hill Road.

Three distinct intermittent stream channels were also identified on the site (see Map 4). These streams drain wetland areas on the till hillslope. Two streams flow from east to west and into Long Pond. Another stream flows from south to north and into Silex Pond. The three intermittent streams did not have measurable flow on the date of the site visit. Further water quality or water yield analyses for Long Pond, Silex Mine Brook, and the intermittent streams were not performed for this report.

In general, till soils over bedrock have low water yields. Development of water supply wells is complicated by the need to locate seeps and fractures in the bedrock, drilling through rock, and abundance of boulders. Sizable groundwater resources that could be tapped to supply water would only be located adjacent to Long Pond and the lower sections of Silex Mine Brook.

7.0 ACCESS

As previously indicated, the reservation has frontage on or access to Wintechog Hill Road (North) and Lantern Hill Road (West). The access from Wintechog Hill Road is via a 2,400± foot long gravel road that enters the northeast area of the site giving access to the eastern and middle portions of the site. While this road is adequate for current level of site activity, it would need to be upgraded (widened and paved) to support additional development. The Eastern Pequots have prepared preliminary plans and received environmental permits to reconstruct this road in a location somewhat west of its current location.

Wintechog Hill Road is a Town maintained, two lane rural road that connects easterly to Mystic Road (Route 201) and westerly to Route 2. Lantern Hill Road is a Town maintained, two-lane rural road that runs north-south along Long Pond and connects to Shewville Road to the south and Indiantown Road (Conn. Route 214) to the north. Due to site topography, this road provides access only to a limited portion of the westerly area of the reservation where there are existing residences of tribal members.

State numbered roads in the vicinity of the site include Conn. Route 2 and State Roads 201 and 214. Route 2 is a major artery that provides east-west connections between Norwich and Westerly areas. It also intersects Conn. Route 184 and Interstate 95 approximately five (5) miles from the site. Portions of Route 2 have been identified for reconstruction or improvements to accommodate increased traffic in the area. State Roads 201 and 214 are secondary roads that provide connections to south (Stonington) and west (Ledyard). There are no major improvement projects planned for either of these routes.

The nearest airport facility of T.F. Green is Warwick, RI (50± miles) and Groton-New London Airport in Groton (15± miles). Railroad service is available in Westerly, Mystic and New London. Bus service is available to connect to regional points (Via SEAT) and to other areas via commercial carriers. All of these modes of transportation connect to the site via the local highway system.

8.0 UTILITIES

As part of the environmental assessment, a preliminary investigation of utility availability - water, sewer, other was undertaken. At the present time, there are no community or public water supply or sewage utilities available at the site. The nearest such facilities are those associated with the Mashantucket Tribal Reservation approximately two (2) miles from the site. The only systems in North Stonington are small community water systems; in Ledyard, there is a municipally operated water and sewer system but it is limited to its service area and is somewhat distant from the site-two (2)miles.

One option for providing community water and sewer service to the site is by extending an existing system. At this time, it is unclear if existing systems have the excess capacity and if the size and development potential of the site would justify such an extension. Another option is to independently develop water supply and sewage disposal capability to service the site. While it would be desirable to place such facilities on tribal owned property, the technical requirements for such systems could preclude many of the desired uses. Therefore it may be necessary to identify other locations that would be suitable for such uses if reservation site is to be fully developed.

In order to develop the reservation properly, it will also be necessary to provide power, communications, and other types of electronic utilities. Since the site is somewhat isolated, these facilities may not be available nearby and may have to be extended to the site. It is reasonable to assume that these utilities are available in the immediate area and could be extended to the site. The exact means for doing so would depend on the magnitude of the need, distance to supply, and the policies and practices of the franchise provider. It might also be possible for the Tribe to initiate its own utility entity to provide some of these services.