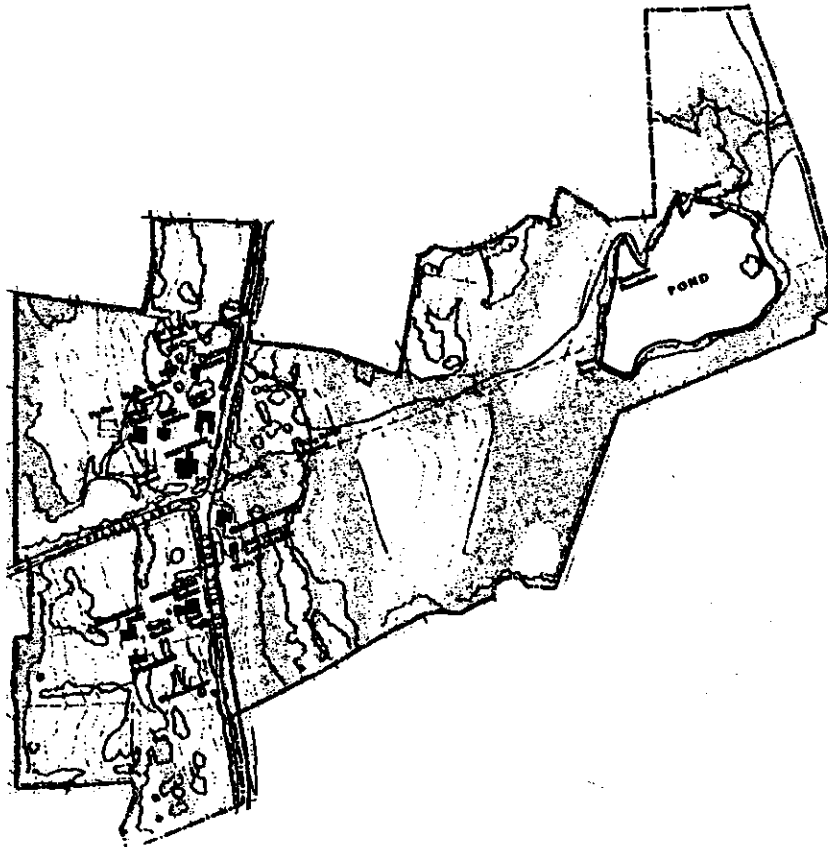


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THE WEIR FARM

Natural Resource Evaluation Project

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**WEIR FARM - NATIONAL HISTORIC SITE
WILTON, CONNECTICUT
ARTICLE II: ITEM 3.0**

RESOURCE EVALUATION OF WEIR POND

Field examinations of Weir Pond were performed on September 22, 1994, March 2, 1995, June 21, 1995, and August 31, 1995. The objective of these visits was to collect basic information about the physical and biological characteristics of the pond.

INTRODUCTION

Weir Pond is a shallow, surface water body approximately 3.68 acres in size, with a surface water watershed of approximately 33.6 acres (see Figure 1). The pond has an irregular shoreline of approximately 1,774 feet. The shoreline to surface area ratio is 482 feet per acre. The pond's elevation is 573 feet above mean sea level. Three intermittent streams feed the pond during periods of runoff. Ground water provides most of the inflow during low runoff periods. The dam which impounds Weir Pond is constructed of boulders. Over time, water moving through flow paths in the dike has removed fine material from the packing, causing the dike to leak. A concrete retaining wall was built at the toe of the dike, presumably to stabilize the structure. During the September 22, 1994, June 21, 1995, and August 31, 1995, inspection dates, the water level was observed at approximately 1-2 feet below the average pond depth, as determined by the elevation of the muddy shoreline. No surface water inflows were observed.

**DESCRIPTION OF
WEIR POND**

Buttonbush, willow, red maple, marsh fern, and royal fern dominate the pond perimeter at elevations between 1-2 feet

above the high water line. Other species in this zone include highbush blueberry, wild grape, winterberry, and bayberry. The small island is populated with red maple, buttonbush, willow, red oak, tupelo, gray birch, winterberry, highbush blueberry, bayberry, sweet pepperbush, and hickory.

The shoreline and pond bottom are composed of shallow mud (mineral) and/or muck (organic) sediments. Sediment depth varies from 2 inches to 1 foot, as estimated by probing while measuring water depths along five transects. Exact sediment depths were not recorded, but appeared generally deeper along the pond edges, and shallower toward the center of the pond. The relatively shallow sediment depths suggest that runoff into the pond does not carry significant volumes of sediment as deposition rates are less than .01 foot per year (over the pond's 100 year life), assuming that all of the material is transported by runoff.

On the September 22, 1994, visit, water and grab samples of plants were collected and examined in the field for invertebrates, macrophytes, and algae. A dip net was used to collect benthic macroinvertebrates. Following are the observations made during examination:

- * 85% of the pond littoral zone is shallow water (water depths are 5 feet or less) covered with floating aquatic plants. Buttonbush extends into this zone.
- * 15% of the pond is open water with depths greater than 5 feet. (Rooted aquatics dominate the pond bottom in this deeper water zone).
- * The entire pond surface is seasonally covered with water meal (*Wollfia* sp.). These tiny, floating plants

are blown by the wind across the pond and into the corners. The dominant floating aquatic plant is watershield (*Brasenia* sp.). Submerged aquatic plants are dominated by coontail (*Ceratophyllum* sp.), bladderwort (*Utricularia* sp.), and Elodea. Periphyton included large mats of *Spirogyra* and clumps of blue/green algae.

- * Damselfly and dragonfly larvae were observed, as well as amphipods, Halipid beetles, water strider (*Microvelidae* sp.), planaria, red worms, caddisfly larvae (*Tricoptera*), Diptera larvae including mosquito, midges, other *Coleoptera* larvae, *Daphnia*, Water mites, and backswimmer. The *Brasenia* leaves were being eaten by an unidentified leaf beetle larvae. Several life stages of these were observed from adult to eggs.
- * No mollusks or crustaceans were observed, however, ponds with similar plant and animal associations usually have small fresh water clams and muscles. Therefore, it can be assumed that the pond has viable populations of both.
- * Amphibians observed were pickerel frogs and bull frogs. Ponds such as Weir Pond usually contain populations of other amphibians (such as the red-spotted newt, and others that use the pond seasonally for breeding, as a source of water and/or food, or for shelter).
- * No reptiles were observed, but it can be assumed the pond has viable populations of turtles such as the eastern painted turtle, spotted turtle, common snapping turtle, and stinkpot; and snakes such as the northern water snake, and the garter snake.

-
- * No fish were observed during the September 22, 1994, visit. On June 21, 1995, however, we observed pond shiners and large mouth bass. Typically, ponds of this type contain bluegills, pond shiners, sunfish, and possibly large mouth bass. The pond does not presently appear to be heavily fished. Conversations with local residents indicate that fishing for large mouth bass has, historically, been successful.
 - * Birds observed during the June 21, 1994, visit included swallows (and a possible marsh wren) in the emergent vegetation along the shoreline. Typically, ponds like this attract great blue heron, swallows, ducks, belted kingfisher, flycatcher, and others.
 - * Evidence of raccoon and deer were also observed during the June 21, 1995, visit. Typically, raccoon, bats, beaver, muskrat, mink, river otter, deer, red fox, and coyotes are among the larger mammals to utilize this type of pond.

PHYSICAL AND BIOLOGICAL ASSESSMENT

Trophic Status - The trophic status can be described as eutrophic. Eutrophic ponds are generally shallow, have an extensive littoral zone with abundant submerged and/or emergent aquatic vegetation, and have elevated levels of nutrients. In Weir Pond, this state is most likely the result of natural processes due to the shallow water depths rather than elevated levels of nutrients in contaminated stormwater runoff. Ponds are efficient traps for sediments and nutrients. Shallow ponds have less water volume than deeper ponds; therefore, nutrients in shallow ponds are more concentrated in the water column and are recycled more efficiently. This occurs because shallow depths allow light to penetrate to the sediments at

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the bottom, which in turn allow rooted aquatic plants to grow. Rooted aquatics can utilize nutrients in the sediments as well as the water column; thus a much higher level of productivity occurs. Dead plant material sinks to the pond bottom, decomposes, and releases nutrients to both the water column and sediments, which are then available for the next year's growth. As this natural process accelerates, the pond eventually becomes a marsh, then a swamp, and ultimately an upland. The shallow sediment depths suggest that Weir Pond has always been a shallow water body dominated by rooted, submerged, and floating aquatic vegetation. If nutrient inputs remain low, the eutrophication process will continue to proceed at a very slow pace.

Water clarity was measured at several points and ranged from 4-5 feet. There did not appear to be evidence of a plankton algae bloom caused by high levels of phosphorus during the September 1994 visit, although blooms may occur at other times of the year.

Fishery - Fish species observed during the June 21, 1995, trip were described previously. From limited observations, Weir Pond appears to support a fishery typical of shallow eutrophic ponds in the Southern New England region. There is little information to indicate that fish are currently harvested here on a regular basis. There is also little evidence to indicate the fishery resource is managed in any manner. This information, coupled with the physical characteristics of the pond, leads to the following conclusions and recommendations:

- * The predominance of rooted aquatic plants allows young fish to evade capture and predation. This results in too many fish in one size class.

-
- * The abundance of aquatic invertebrates indicates that fish food is abundant.
 - * The low fishing pressure indicates a lack of harvest.
 - * Although observations indicate only one redd or fish nest along the pond perimeter to indicate that reproduction is taking place, there are many inaccessible areas where redds are likely to be found. From the number of fish observed, it can be safely assumed there is no lack of reproductive sites in the pond.
 - * No juvenile fish (1-2 inches) were observed.

The combination of these conditions result in a fishery (predator fish to prey fish) that is out of balance. The pond most likely has a bass and bluegill structure. More bluegill or shiners than bass should be harvested. The conclusion is that too many bluegills in the 3-5 inch class are present, and most of these are small (less than 10 inches). The result is an ecologically stable condition typical of small, unmanaged ponds — but one which is undesirable from a sport fishery point of view.

Wildlife - From limited observations during the September 22, 1994, and June 21, 1995, visits, Weir Pond appears to be utilized by mammals (as described previously) that typically inhabit or utilize ponds in the Southern New England region.

Water Flows - During the September 22, 1994, and June 21, 1995, visits, water flow out of the pond was observed as leakage through the dike.

On August 31, 1995, only a trickle was observed as discharge from the bottom, outside edge of the retaining wall. The pond water level on this date was estimated to be 15-18 inches below the average depth. The three month period prior to this observation was extremely dry, with rainfall well below normal. A 4 foot boring was taken in the material on the pond side of the retaining wall. The material was moist, but no free water was observed. This suggests that leakage from the pond occurs through the top 18 inches of the dike, which may coincide with the material added to increase the dike height. Further investigation of the leakage pattern is suggested.

Only minimal surface water inflows were observed, although there are three intermittent streams flowing into the pond. It is apparent these streams convey surface water to the pond during runoff events. Groundwater contributes a substantial fraction of the water flowing into Weir Pond. During drier periods when surface flow ceases, the pond discharge slightly exceeds the inflow of ground water, resulting in a lowered water level.

Water Depths - The shoreline slopes into the pond at approximately 6 inches vertical for each 1 foot horizontal (2 to 1). Maximum water depths of 5-6 feet occur 20-30 feet from shore. Five transects (A-E) were taken across the pond where water depths were measured and mud depths estimated. Figure 2 shows the locations of the transects across the pond, while Figure 3 shows water depth profiles.

LAND USE CONSIDERATIONS AND WATER QUALITY

Surrounding Land Uses - The watershed of Weir Pond is estimated at 33.6 acres. The watershed boundary shown on Figure 1 was produced using aerial photographs and ground truthing during the September 21, 1994, and June 21, 1995, visits. There is evidence that portions of wetland areas have been filled and watercourses altered over time. This made delineation of the watershed boundary difficult. Some of the alterations appear to bypass the pond during low flow periods, but may overflow into the pond drainage area during larger storm events. Sixty percent of the watershed (20.1 acres) is low density residential with uncurbed road surfaces, lawns, driveways, roofed areas, landscaped areas, wooded areas, and on-site subsurface sewage disposal (Tall Oak Drive and Thunder Lake Road). The remainder of the watershed (13.5 acres) is wooded with brushy undergrowth (NPS land).

Land Use Compatibility - The impact of surrounding land uses on water quality in Weir Pond is difficult to determine other than to use general guidelines. The land use with the least potential impact is mature, unmanaged forest. The impact of low density residential areas can be minimized by maximizing the amount of unmanaged wooded areas on individual lots. This may be accomplished using the following best management practices or BMPs:

1. Limit or reduce paved areas and lawn areas, and use low maintenance lawn practices such as limiting annual nitrogen fertilizer applications to the minimum recommended for maintenance; limiting phosphorus applications to the minimum recommended by soil testing; and limit use of pesticides (herbicides and insecticides) to spot treatment of problem areas rather than regular or scheduled applications over the entire lawn area. (If lawn maintenance contractors are used,

hire only those that utilize integrated pest management principles to guide their recommendations for pest control;

2. Establish or maintain wooded buffer areas along watercourses and drainage ways, and don't deposit lawn clippings or leaves in watercourses or drainage ways. Instead, compost these materials in locations at least 50 feet from sensitive areas;
3. Perform timely maintenance and inspection of septic systems, including inspection of leaching areas for evidence of seepage which indicates a potentially failing system; and
4. Avoid concentration of runoff flows due to curbing and storm drains. There are no curbs along road edges. Three pairs of catch basins are located adjacent to cross culverts. Maintenance of catch basins should be discussed with the local public works department to ensure regular removal of sediment and debris.

There appear to be eight residences in the Weir Pond Watershed. The National Park Service staff should consider an information session for the town and residents on ways to protect Weir Pond from nonpoint source pollution. There are many excellent guides for identifying ways homeowners can reduce environmental risks, including a 1986 publication entitled, "The Guide," published by the Fairfield County Soil and Water Conservation District.

RESOURCE EVALUATION OF FIELDS

ARTICLE II: ITEM 4.0

The fields at Weir Farm National Historic Site (NHS) were inventoried May-June 1995. These fields exist at three locations: 1) a tract of five fields, located immediately south of Pelham Lane and west of Nod Hill Road, surrounds the Burlingham complex; 2) a single field located east of Weir House, along Old Wagon Road; and, 3) a single field situated at the northerly limit of the NHS lands. Other grass areas occur near Weir House, the studio, in the barnyards, and along trails.

LANDSCAPE FEATURES

A bird's eye view of the fields near the Burlingham House reveals a single, rectangular shape subdivided by stonewalls into five rectangular fields. Access to these fields is through interior openings of "barways" located in the walls. All the stone walls are lined with trees and shrubs. Within the fields, bedrock outcrops often interrupt the landscape. Some of these outcrops are sharp and angular and are frequently surrounded by small trees and shrubs.

The landscape is rolling and fields generally have a south and west exposure. The field along Old Wagon Road is oriented north to south, as is the field at the northerly limit of NHS lands.

Soils within all of the fields are shallow, and well-drained to droughty. Hollis and Charlton are the two primary soil series. These two soils were mapped as a complex because it is difficult to distinguish them individually on the landscape. The Charlton soil is dominant where deeper pockets of soil exist; while Hollis

SOIL CONDITIONS

occurs where the soil surface is within one to two feet of bedrock. Both the Charlton and Hollis soils are naturally acid. Surface stones have been removed within the fields where these naturally stony soils are found. The shallow topsoil is less than 6 inches in depth, and is low in organic matter. These soils do not retain moisture for crops and do not respond well to fertilization; consequently, they are not considered highly productive. Historically, most of this land would have been in permanent grasses and would not have been tilled for annually grown crops. Gardens and small grains would have been grown in the deeper "pockets" of soil. Through experience, farmers learn to read the landscape and distinguish the areas suited to annual crops.

CURRENT MANAGEMENT

Management of fields in recent years has been limited to yearly mowing which keeps perennial weeds and woody growth from invading - or at least from becoming dominant. A walking path, which winds through and interconnects fields, is maintained by frequent mowing to keep the grass short and eliminate weeds. Fertilization and liming have not been practiced. As a result of these management actions, grasses and herbaceous weeds dominate the fields.

EXISTING VEGETATION

The fields are dominated by cool season, sod forming grasses, however, closer investigation reveals a diverse mix of herbaceous plants in the understory. Cool season grasses present include perennial ryegrass, fine bladed fescues, bluegrass, orchardgrass, timothy and redtop, and, to a lesser extent, bromegrass, and white and red clover. Little bluestem and deertongue are warm season bunch grasses which are present, but less common. The production level of all grasses is low, being dependent upon limited moisture and nutrients.

Native and naturalized herbaceous plants (weeds) volunteer in these fields because they require fewer nutrients, less moisture, and little or no management for growth. These are the "pioneer plants" in New England's old fields, reverting from agricultural crops to natural vegetation. They would be the dominant vegetation if mowing, as a management tool, stopped. These plants occur with great diversity and include, but are not limited to, Virginia creeper, dewberry, wild strawberry, yarrow, cinquefoil, poison ivy, nut sedge, duck potato, milkweed, goldenrods, and hawkweed. In addition, hay scented and bracken fern, roses, sumac, locust, sassafras, bayberry, greenbriar, bittersweet, grape vine, and junipers, all of which are shrubby plants and volunteer within these fields. The extent of their growth and the degree of spread is controlled by annual mowing. Exposed bedrock is often covered by a compact growth of moss and lichens.

Field edges and borders surrounding stone walls and outcrops are a thick growth of shrubs, vines, and young tree seedlings and saplings. Canopies of large shade trees which grow along the stone walls and the road edge extend over the fields, limiting sunlight needed for grass growth. Shrubs and young trees which can tolerate shade volunteer here. They include multiflora rose, bittersweet, winged euonymus, mock orange, sassafras, forsythia, grape, bayberry, juniper, thorn apple, black birch, black cherry, sugar maple, white ash, American elm, red oak, red cedar, and black gum or tupelo.

A comparison of aerial photos over a 15 year period shows open fields diminishing in size, even though mowing occurs at least annually.

ALTERNATIVES FOR GRASS MANAGEMENT

The National Park Service has selected a management plan for these lands which "emphasizes the relationship of art to landscape in two ways: 1) by reuniting works of art with the landscapes that inspired them; and 2) by presenting the farm's buildings and landscape to the visitor as nearly as possible to the way they must have appeared to their historic occupants." To accomplish this objective, the treatment process will expose the stonewalls by removing shrubs, vines, and young trees, and replacing them with grass (which is the likely field condition of the early 1940's).

Large shade trees are assumed to remain or be selectively removed based on the health and vigor of the tree.

ALTERNATIVE #1

Alternative #1 is the least intensive. It capitalizes on improving the existing stand of grass by reducing competition from weeds and shrubby growth. Grass quality is improved by frequent mowing, which increases root growth and plant vigor. During the first year, mowing should be done monthly during April, May, June, August, and September. Mowing reduces herbaceous plant competition and improves grass density and vigor by avoiding plant senescence. In subsequent years, mowing should be done in May, late July, and late September. Renovation of the grasses may take three to four years. Trees and shrubs around the borders are trimmed and/or selectively removed to allow sunlight penetration for better grass growth.

ALTERNATIVE #2

Alternative #2 increases the frequency of mowing, which achieves the goals of Alternative #1 and potentially improves growth by practicing fertilization and liming. These measures will improve the density and vigor of grasses, while reducing weed competition. The fields should be fertilized with a

complete commercial fertilizer at a rate of 300 lbs. of 10-10-10 (or equivalent) per acre; and lime should be applied at a rate of 2 tons per acre. Both of these practices should be applied in early April, or as soon as the frost is out of the soil. Grass growth begins when the soil temperature exceeds 40° F. Subsequent fertilizing and liming should be done according to a soil testing program. Testing should be done every other year, and is available through the University of Connecticut's Cooperative Extension System. Fertilization will increase the growth of grass, shrubs, and other plants. Increased grass growth will require more frequent mowing of fields, especially in the spring when grass grows fastest. Follow the mowing schedule as outlined in Alternative #1. Mowing, over time, will control the herbaceous weeds within the field. Weeds deplete their nutrient reserves with frequent mowing, causing them to grow slowly and be less able to compete with the rapidly growing grass. Mowed grass should be removed from the fields to prevent smothering new growth. This alternative promotes the removal or control of the woody growth along the field edges.

Alternative #3 seeks to improve the grass stand by either reseeding or topseeding grasses to increase stand density. Normal, cultural techniques reestablish grass by plowing, harrowing, and reseeding the fields. These actions destroy the existing grasses and herbaceous plants while preparing the soil for optimum seed germination and seedling growth. Ideally, the newly emerged grass seedling has little or no competition and adequate moisture. On most fields, this process can be done in the early spring or late fall; although early spring has the greatest opportunity for adequate moisture. Late fall may result in failure due to dry conditions. The shallow to bedrock conditions of Weir Farm make plowing an

ALTERNATIVE #3

RESOURCE EVALUATION OF WETLANDS

ARTICLE II: ITEM 5.0

Wetlands at the Weir Farm National Historic Site were inventoried and classified on August 22, 1994. The inventory included an on-site investigation to verify the existence and location of wetlands. The presence of all three wetland criteria (hydrology, hydric soils, and hydrophytes) defines wetlands from a federal perspective. Connecticut statutes identify wetlands according to soil type. Field conditions were compared to aerial photographs to verify wetland type and location. No attempt was made to flag or precisely locate the wetland boundary on the land. However, wetland position within the landscape and drainage patterns were noted. A description of the land form on which wetlands occur and the influence of geology and man's activities is provided.

INTRODUCTION

Wetlands were classified by type according to the U.S. Fish and Wildlife Service methodology, as described in the publication *Classification of Wetlands and Deep Water Habitats of the United States*. Prior to field work, wetland investigations by others (including The Nature Conservancy and the U.S. Fish and Wildlife Service) were reviewed.

To better understand wetlands in the context of Weir Farm, it is helpful to know something of the landscape on which the wetlands occur. Wetlands are a reflection of the land form or landscape and modifications of humanity. A meaningful way to understand the landscape is to group together and describe areas with similar biological and physical characteristics. This is the concept of the ecoregion. In Connecticut, ecoregions have been identified in the Connecticut Department of

THE ECOREGION CONCEPT

Environmental Protection's natural history publication entitled, Rare and Endangered Species of Connecticut and Their Habitats.

ECOREGION AND WETLANDS AT WEIR FARM

Weir Farm, situated in the Towns of Wilton and Ridgefield (near the Ridgefield town line), is within an area defined as the Southwest Hills Ecoregion. This ecoregion is a coastal upland lying within 25 miles of Long Island Sound. It is a sub-area within a larger ecoregion classified as the Southern Hills Central Hardwoods Zone. The ecoregion sub-area is characterized as having low rolling to locally rugged hills of moderate elevation. The topography can be steep and rugged. Where this occurs, the bedrock is commonly exposed at the surface. It is primarily metamorphic, composed of gneisses and schists, which are complexly folded into north trending belts. Weir Farm exhibits exactly this type of landscape. The elevation of lands and waters in the area of the waterfall just north of Weir Pond is approximately 550 feet above MSL, while the farmstead is nearly 100 feet higher at elevation 650 feet above MSL. Bedrock is commonly exposed, having short steep slopes to nearly vertical faces. This landscape is often referred to as bedrock controlled, meaning the land form we see and the water with vegetative features are very much the result of the bedrock and its configuration. The mineral soil is developed on shallow glacial till. It is shallow in depth to bedrock over much of the farm. When this occurs, the bedrock often impedes drainage by not allowing the precipitation which falls on the soil to percolate deep into the ground. Rather, the bedrock holds the water up near the surface and causes it to pond. On sloping areas, the water becomes surface runoff and shallow ground water, which concentrates in the valleys and low areas. When sufficient volume of water is present (as in the winter and early spring and during significant storm

events), the waters flow through defined channels as stream flow. On Weir Farm, the lands are headwaters for three watersheds which drain away from the site. Consequently, streams have small land areas to contribute runoff and do not maintain perennial flows. Streams are considered ephemeral, carrying storm flows or intermittent flow only on a seasonal basis. The rolling hilltops are often droughty due to the shallow soil's inability to store water. Vegetation in these areas is adapted to droughty conditions.

In this ecoregion of Weir Farm, wetlands are located between bedrock ridges, and in pockets within the bedrock where organic matter, shallow ground water, and runoff collects. Wetlands are also located in the drainage ways where stream channels develop, on adjacent lands which concentrate surface flows, and where shallow ground water keeps the soil saturated. Wetlands develop when the soil is continuously saturated with water for a frequency and duration sufficient to support wetland vegetation and develop wetland hydric soil conditions. During dry periods and when evaporation exceeds precipitation, some of these wetland areas may appear to have a reduced surface area, only to extend over a greater area during wet periods and seasonally in the late winter and early spring.

Within this ecoregion, there is a frost-free growing season averaging 160 days. The mean annual temperature is 49.5° F. Average annual precipitation is 45 inches, which is distributed evenly throughout the year. Seasonal snowfall accumulation is nearly 40 inches.

The vegetation on Weir Farm is mixed hardwood trees within woodland areas, and native and naturalized grasses in the fields. On well drained soils, red, white, and black oaks, hickories, and birches are common. Conifers are primarily hemlock.

White pine is scarce on the property, and red cedar (a remnant of old field succession) occurs occasionally. Shallow to bedrock soils have limited growth potential for hardwoods, but the Charlton soils show a much better growth potential. On these soils, 50 year old hardwoods can be expected to grow in heights exceeding 60 feet. In fact, many trees have straight boles or stems which exceed 2 feet in diameter, and are at least 60 feet tall. These trees were not aged; however, their diameter suggests ages exceeding 50 years. Some trees appear to be specimen quality, and seem to have matured within a forest canopy. Consequently, limbs have not spread out as trees often do in old pastures (earning the title "wolf trees").

WETLAND DESCRIPTION

Wetlands on Weir Farm are palustrine. In the classification system described in the referenced U.S. Fish and Wildlife Service publication, palustrine wetlands are all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below .5 parts per thousand. The palustrine system was developed to group together all wetlands - traditionally called swamps, marshes, bogs, fens, etc. It also includes shallow permanent or intermittent water bodies commonly called ponds. Palustrine wetlands are further subdivided into classes which include emergent, forested, scrub shrub, and open water. Emergent wetlands are further divided into two subclasses - persistent and nonpersistent. Emergent wetlands are characterized by rooted, upright, herbaceous plants, usually perennial and present for the entire growing season. Persistent emergents remain upright until the next growing season (example cattail and bulrush). Nonpersistent emergents are grass-like and fall to the surface or fall below the surface at

the end of the growing season. Two other classes of wetlands are present. The scrub shrub wetland includes areas dominated by woody vegetation less than 20 feet tall. Forested wetlands include woody vegetation which is 20 feet or taller. Forested wetlands may be deciduous or coniferous. At Weir Farm, forested wetlands are characterized by red maple, blackgum, and ash. Scrub shrub wetland vegetation includes sweet pepperbush, alder, winterberry, silky dogwood, blueberry, and willow.

Weir Farm lands are the headwaters for three watersheds, two of which drain to the north on somewhat parallel courses and outlet at Candees Pond in Branchville, and join the Norwalk River approximately 2,500 feet downstream. The third watershed collects drainage as it flows to the south. This drainage forms the headwaters of Barrett's Brook, a tributary to Comstock Brook, which flows to and joins the Norwalk River in Wilton Center. Weir Farm lands immediately east and west of Nod Hill Road, and southwest of the park interpretive center (Burlingham House) drain to Barrett's Brook. Lands north of Pelham Lane and West of Nod Hill Road drain to Candees Pond, as does the easterly most land, which drains to and from Weir Pond.

DRAINAGE DESCRIPTION

Looking at the landscape, it appears past activities of man have altered two drainage patterns on Weir Farm. Specifically, the drainage marked D-1 on the Weir Farm NHS Wetlands Map accompanying this report appears altered. During storm events and possibly seasonally high water conditions, portions of surface flows which originally traveled northeast and bypassed the pond can now flow easterly into the main drainage to Weir Pond. In the same watershed at a second location

DRAINAGE MODIFICATIONS

marked D-2 on the map, a natural watershed divide has been altered by excavating a low point or sill, such that flows associated with storm and seasonally high water conditions enter the Weir Pond Watershed. It is possible this feature has become filled in over time, and that at its original dimensions it diverted flows during drier periods. These changes were probably made to provide the pond with additional recharge. The alterations are in the headwaters region of this drainage; consequently, their historic effectiveness is questionable.

WETLAND INVENTORY

The wetlands described in this inventory are numbered and identified on an accompanying map entitled, Weir Farm NHS Wetlands. All wetlands inventoried exhibit soils, which are either poorly drained or very poorly drained, thus meeting the criteria for wetlands according to the State of Connecticut's Department of Environmental Protection. Similarly, these wetlands have the three criteria for wetland definition at the federal level, i.e. hydric soils, wetland hydrology, and hydrophytic plant communities. All the wetlands are classified as palustrine wetlands.

WETLAND #1

Wetland #1 is in the headwaters of Barrett's Brook. It is located near the watershed divide in the southwest portion of the farm, near the NHS boundary. The wetland extends in a southerly direction off-site. It is a palustrine emergent marsh of the nonpersistent variety. The vegetation is primarily grasses, which are managed by mowing at least yearly. Due to the management of mowing, it is easy to miss this small, 1/4 acre, finger-shaped wetland dominated by grasses, spikerush, and sensitive fern. The wetland is located in a natural drainage way where it collects surface runoff, and where surrounding topography of bedrock is either exposed or near the surface.

During the drier times of the year, this wetland may not exhibit saturation or typical wetland conditions. The wetland is stable and one of the few open wetlands at Weir Farm.

Wetland #2 is located in the southwest portion of the same field complex as Wetland #1, and is a fringe wetland occurring at the edge of the field. The wetland extends westerly off the NHS property where it is primarily wooded and shrubs grow on hummocks within the ponded interior. The wetland interior is relatively flat, and drainage flows to the south into the Barrett's Brook Watershed. The wetland is at the headwaters of the stream system. At the edge of the field, the wetland is classified as palustrine, deciduous, forested, with a scrub shrub understory. The shrub component makes up better than 30% of the understory vegetation, while the trees provide the dominant character. Red maple is the common tree; while blueberry, spicebush, grape, and apple make up the lesser vegetation. At the edge of the sloping field, the soil is saturated - but not ponded. The added sunlight on the edge of the field increases the shrub component.

WETLAND #2

Wetlands #3, #4, #5, and #6 are connected and function as one overall wetland unit; however, each component is significant and distinctly different. The wetland unit is located in the northwest portion of the NHS and continues beyond its boundaries. The wetland begins at the watershed divide and forms the headwaters of an unnamed tributary which flows north into Lake Noreneke, Candees Pond, and finally into the Norwalk River. Surface runoff from Pelham Road and surrounding lands, as well as shallow groundwater feed this wetland complex. Wetland #3 is a ponded wetland which is depressional, serves to retain runoff, and stores shallow groundwater. Wetland #4 appears controlled by bedrock,

WETLANDS #3, #4, #5, AND #6

serves to convey surface runoff to Wetland #3, and may be seasonally ponded. Wetland #5 connects and creates the wetland corridor, and is saturated with seasonal flows and shallow groundwater. Wetland #6 is an open water wetland. It was excavated in the 1960's to create open water. Collectively, these wetlands are longer than wide, and occupy the low points on the landscape, creating a natural drainage way.

Wetland #3 is a complex of forested deciduous, scrub shrub, open water, and aquatic bed. The outer-most wetland edge or fringe of this wetland is forested. Here, saturated soil conditions exist - but not ponded conditions. Red maple is the dominant tree species. Progressing inward, a concentric ring of scrub shrub vegetation including sweet pepperbush, silky dogwood, and azalea dominates. The interior of the wetland is open water, which contains an aquatic bed of floating vegetation and clumps of scrub shrub. The shrubs are silky dogwood and button bush. Large, woody debris and hummocks typify the shrub portions of this wetland. Large northern red oaks are present in the uplands surrounding these wetlands. Wetland #4 is forested and deciduous. The red maple and ash - while dominant - are few in number, leaving the forested wetland with an open character. The open understory is a herbaceous layer of sensitive fern and jewel weed. Bedrock near the surface may limit the potential for growth of vegetation. Wetland #5 is a mix of forested and scrub shrub vegetation. Red maple dominates the tree layer, while sweet pepperbush is the dominant scrub shrub. Wetland #6 is shallow, open water, with numerous woody debris and stumps evident. Duckweed and water lilies and common reed or phragmites are present. The surrounding uplands have high quality saw timber-sized trees with American beech, red maple, sugar maple, and striped maple near the wetland's edge.

Wetland #7 is located immediately east of Nod Hill Road, and oriented north to south. This long, narrow, shallow wetland is located in a depressional forested landscape setting between adjacent north/south trending bedrock ridges. The bedrock is a controlling influence on the hydrology of the wetland. This wetland is located near the watershed divide, draining to the south into Barrett's Brook. Although the watershed is small in response to bedrock conditions, water within the wetland stays ponded for long periods of the year. Topographic relief is approximately 20 feet from the ridge tops down to the wetland creating a significant visual setting. This palustrine wetland exhibits no less than four distinct wetland classes including emergent, open water, scrub shrub, and deciduous forested. The northern-most portion of the wetland is within the field area. It is open, mowed periodically, and vegetated to an emergent, persistent, herbaceous plant community. Soft rush, sensitive fern, jewelweed, and smartweed are common. The soil is saturated with occasional pockets of standing water. An area of palustrine, forested, deciduous wetland is located immediately south of the fields. Trees include American elm and red maple. The soil is very stony, saturated, and mosses are common. Continuing south to the NHS boundary is a mix of open water and scrub shrub. The wetland fringe includes sweet pepperbush, mountain laurel, silky dogwood, high bush blueberry, speckled alder, and arrow-wood. Clumps of button bush are common within the interior of the wetland, where shallow, open water persists.

WETLAND #7

Wetland #8 occurs within the forested setting, east of Nod Hill Road, immediately east and parallel to Wetland #7. Within the landscape, this wetland is depressional and shallow, having ponded conditions in the southerly portions for much of the year. The northerly portions appear saturated, but not ponded.

WETLAND #8

Bedrock exposure and control of the landscape has created a long fingerlike wetland with shallow soils. Similar to Wetland #7, the watershed which feeds this wetland is relatively small, being little more than three times of the size of the wetland itself. However, this wetland is located within a different watershed than Wetland #7. Drainage flows to the north and east. Normal stream flows bypass Weir Pond, traveling off NHS lands, and then joining the Weir Pond outlet stream on NHS lands in the northeastern-most corner. This wetland exhibits three wetland types - forested, scrub shrub, and open water. The northerly one-third of the wetland from the trail crossing, in the area referred to as "the fishing bridge," is forested, deciduous wetland. Drainage flows north, then east, eventually into the Norwalk River. Red maple and green ash dominate the tree layer. High bush blueberry and sweet pepperbush are the shrub layer dominants. South of the trail crossing, the southerly two-thirds of the wetland are classified as scrub shrub. The southern-most third of this wetland is ponded, with buttonbush shrubs growing on hummocks, interspersed with open water. Large red maple trees line the wetland on the north and south sides. The drainage feature located in the southeast corner (noted on Map as D-2) may convey some surface flow to Wetland #10 during times of flooding.

WETLAND #9

Wetland #9 is a continuation of the wetland stream corridor which begins at Wetland #8. It is, however, different in its landscape setting. Wetlands #7 and #8 are depressional and somewhat parallel to the slope. Wetland #9 cuts across the slope and follows the stream as it traverses the landscape. It is not depressional in nature. Soils are deeper, less controlled by bedrock conditions, and are not ponded but saturated. Although it is not easy to determine, portions of the stream

may have been deepened during adjacent lot development. This would probably have been done to reduce the potential for flooding. As the slope steepness decreases, the stream is less entrenched resulting in multiple channels. A drainage modification within this wetland unit is noted in the drainage modification section. This modification occurs at a natural watershed divide, which appears altered to allow flood flows from the stream the opportunity to enter Wetland Unit #10 and be conveyed into Weir Pond. This appears as Drainage Feature D-1 on the Weir Farm NHS Wetlands Map. This wetland and wetland corridor is in a forestland setting. The primary classification is forested, deciduous, wetland. The dominant species in the tree layer are red maple and green ash. In the understory, false nettle is the dominant herb, while the shrub layer includes winterberry, blueberry, spicebush, and sweet pepperbush. This wetland continues northeasterly to the NHS boundary.

WETLAND #10

Wetland #10 is the primary wetland/wetland corridor entering Weir Pond. It occurs in a forested setting, located on till soils which do not exhibit a strong bedrock-controlled land form, as is so common to this area. The wetland contains two major defined stream channels, and at least two intermittent channels which convey surface runoff to the pond. Some of the surface runoff originates off-site within a wooded landscape, with occasional large lot single home development, while other runoff comes from the wooded watershed lands within the NHS. The wetland corridor follows the sloping landscape, and is classified as a forested, deciduous wetland with the primary tree species red maple, ash, and black birch. There is a mixed shrub understory containing sweet pepperbush, winterberry, blueberry, and spicebush. A feature of this wetland is the two somewhat parallel streams which become more of a

braided stream system as runoff nears the pond. It has intermittent or seasonal and ephemeral flows. A number of stone-lined springs have been developed immediately upstream from this wetland/stream/pond interface. They appear to collect seeps from a non-wetland bedrock knoll, which is within the wetland corridor. They are cultural features, but do not appear to have a function in the conveyance of waters to Weir Pond. This wetland joins the pond at its southeasterly extreme. Flows which enter the pond at this point must flow its entire length before exiting.

WETLAND #11

This wetland begins at the Weir Pond Dam and would have been continuous with Wetland #10 prior to construction of the pond. It is a deciduous, forested wetland, and serves as the corridor which contains the outlet stream from the pond. Dominant trees include red maple, green ash, and black birch. This wetland is depressional, having a bowl-like shape. Within this wetland, the stream becomes branching in nature. The stream has a cobble bottom, clear flows, averages less than 15 feet in width, and has no significant pools. It does, however, have a riffle-type flow about six inches in depth. Although the stream is branching in nature, the system appears stable with no streambank erosion. Within this wetland corridor, the stream outletting Wetland #9 reenters NHS lands, joins the pond outlet stream in the northeasterly extreme of the site, and flows north off the NHS land. Near the boundary, in an area known as "the falls," both streams flow as one and abruptly change the grade by approximately 10 feet. The view from the top of the falls is a scenic area where bedrock and large boulders create a cascade into a pool/stream below.

OTHER WETLANDS

There are two areas of wetland associated with Weir Pond proper, along with one small bedrock-controlled wetland which is depressional in nature, and located at the NHS boundary. The first wetland occurs within and adjacent to a cove-like area along the west shore. The second occurs in the vicinity of the island which is located along the easterly shore. Both areas are associated with the wetted perimeter of the pond. When the pond rises, the wetlands become wetter; when the pond lowers, they become drier. Both have a growth of scrub shrubs and nonpersistent herbaceous plants which are described in the Weir Pond evaluation section. Each has an overstory from the adjacent forested uplands. The cove-like area is positioned in a low point where the bedrock is near the surface. Subsurface flows from fractures in the bedrock in the near area appear to travel to this point, increasing wetness. The second area is quite narrow (about 30 feet wide), and follows the pond perimeter to a narrow, intermittent drainage contributing from lands off the NHS. Aerial photo interpretation shows this drainage originating at the pond just south of the intersection of Tall Oaks Drive and Thunder Lake Road. There is some contribution from side hill seeps where the soils appear seasonally wet, but not hydric.

The small (30' x 60') bedrock-controlled wetland is seasonal in nature, and is located at the boundary of the NHS in the northeast corner. In wet years, the wetland may contain water all year, and in normal or dry years it may dry up in June or earlier - in August 1995, it appeared completely dry. This wetland does not pond water deep enough or for a long enough period of time to be an effective vernal pool.
