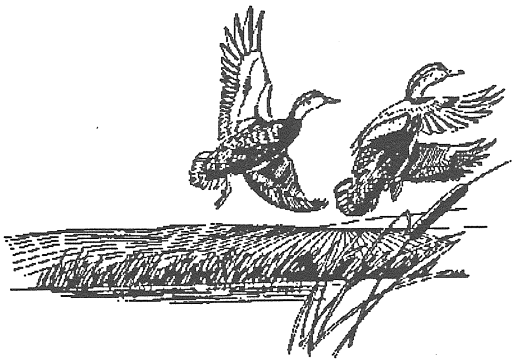
Matthies Park



Beacon Falls, Connecticut

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

King's Mark Resource Conservation and Development Area, Inc.

Matthies Park

Beacon Falls, Connecticut

Environmental Review Team Report

Prepared by the
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of the
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Resource Conservation and Development Area, Inc.

for the
Park and Recreation Commission
Beacon Falls, Connecticut

June 1999

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Acknowledgments

This report is an outgrowth of a request from the Beacon Falls Park and Recreation Commission to the New Haven County Soil and Water Conservation District (SWCD). The King's Mark Conservation and Development Area Council approved the request.

The King's Mark Environmental Review Team Coordinator, Elaine Sych, and Acting Coordinator, Alison C. Guinness, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Tuesday, April 20, 1999.

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We would like to thank First Selectman Susan Cable and Park and Recreation Commission Vice-Chair Dominick Sorrentino for their cooperation and assistance during the environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review, Team members were given additional information. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town and landowners. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in developing a mangement plan for Matthies Park.

If you require additional information please contact:

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Introduction

Introduction

The Town of Beacon Falls through the Park and Recreation Commission requested Environmental Review Team (ERT) assistance in conducting an environmental review and natural resource inventory of Matthies Park. A review of the potential impacts from the construction of a regional high school on the town owned park was also requested.

The 325 acre property was acquired by the town in 1972 with the deed reading that part of the property is to be used for a public school and the remainder to be used for the creation of a park and recreation area.

The park is located on Route 42, Pine Bridges Road, Rimmon Hill Road and Back Rimmon Hill Road in the towns of Beacon Falls and Oxford.

The site contains a large 14 acre pond with an average depth of 5 feet. There is a half acre island in the middle of the pond with a house on it. A biological survey and water quality sample collection was performed in August 1998 and indicates that the overall water quality of the pond is good.

The site also contains woodlands, meadows, wetlands and numerous watercourses. There are a limited number of hiking trails existing on site.

Requests of the former owner include: (1) that the natural surroundings of he lake within a 500 feet area not be disturbed except to provide a beach for public swimming, (2) no motors of any kind are to be used on the pond, (3) camping be allowed, but no trailers or motor campers, (4) no hunting at any time, (5) no motor vehicles, no motorbikes, bikes with motors, go-carts, snow mobiles, ski-doos or other 2 or 3 wheel vehicles with motors shall have access to or be on the property,

(6) no commercial activity shall be allowed except for the school area, (7) water rights from the spring on the property shall be used by the farm on the opposite side of Chestnut Tree Hill Road.

The Park and Recreation Commission intends to use the ERT report to develop a management plan for the preservation and enhancement of the natural features and amenities of the site and to make the park more accessible to the public.

Objectives of the ERT Study

The ERT was asked to focus on a natural resources inventory of Mattheis Park, especially Carrington Pond. Secondarily, the ERT was asked to consider the proposed regional high school slated to be constructed on a 55 acre portion of the park to the southeast directly uphill from the pond on Rimmon Hill Road and Back Rimmon Road. The Park and Recreation Commission wanted to know what design features should be incorporated into the school plan to protect and preserve the pond, and how the town could best balance the conservation, recreation, and educational purposes that the park will serve.

The ERT Process

Through the efforts of the advisory committee this environmental review and report was prepared for the Town of Beacon Falls.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the town.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on Tuesday, April 20, 1999, and some Team members made additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Topography, Geology and Hydrology

The Matthies Park property straddles the sharply incised valley of Hemp Swamp Brook. The topography (Figure 1) on the western side, is rugged; steep rock outcroppings are common. A thick blanket of glacial till mantles the eastern valley wall and the topography is much smoother and slopes gentler. Carrington Pond is an artificial impoundment, which drains an area of only 175 acres. Groundwater springs localized by bedrock fractures parallel to the conspicuous steep linear edge of the valley may supply additional water to the pond during dry periods.

400 million-year-old schists and gneisses underlie the area. Carr (1960) mapped the bedrock geology of the Naugatuck Quadrangle. He considered the quartz-feldspar-biotite-muscovite gneisses to be equivalent to the Waterbury gneiss and the biotite-rich augen geisses to be the Prospect gneiss (now called the Harrison gneiss). Rodgers (1985) reinterpreted the identity (but not the mineralogy) on the State Geologic map. He considered the gneisses in the area to belong to the Collinshill Formation (Oc in Figure 3). Both authors agreed that the silver-colored coarse grained muscovite schist to be the Straits Schist (Dst in Figure 3). However the arguments over the exact identity of the rocks has little environmental significance. The quality of groundwater in both lithologies is likely to be quite similar. Neither unit contains reactive minerals such as sulfides, which can weather to produce acid, iron rich waters.

Except for a small area of ice-contact sand and gravel immediately downstream of Carrington Pond, Mattheis Park is blanketed by a thin veneer of glacial till, material dragged along at the base of the last continental ice sheet to cover Connecticut, 30,000-15,000 years ago (Figure 2). Unlike the Connecticut till, the deposit in the Park is notable for its sandy texture and the

abundance of well rounded boulders. Indeed early farmers must have had a difficult time building their stone walls as the angular flat slabs that are typical of New England's stone fences are very difficult to find. Presumably the last advance of the ice picked up and redeposited the voluminous sands and gravel that must have filled the bottom of Naugatuck Valley during the retreat of each of the preceding ice ages (20 or more glacial episodes during the last few million years).

References

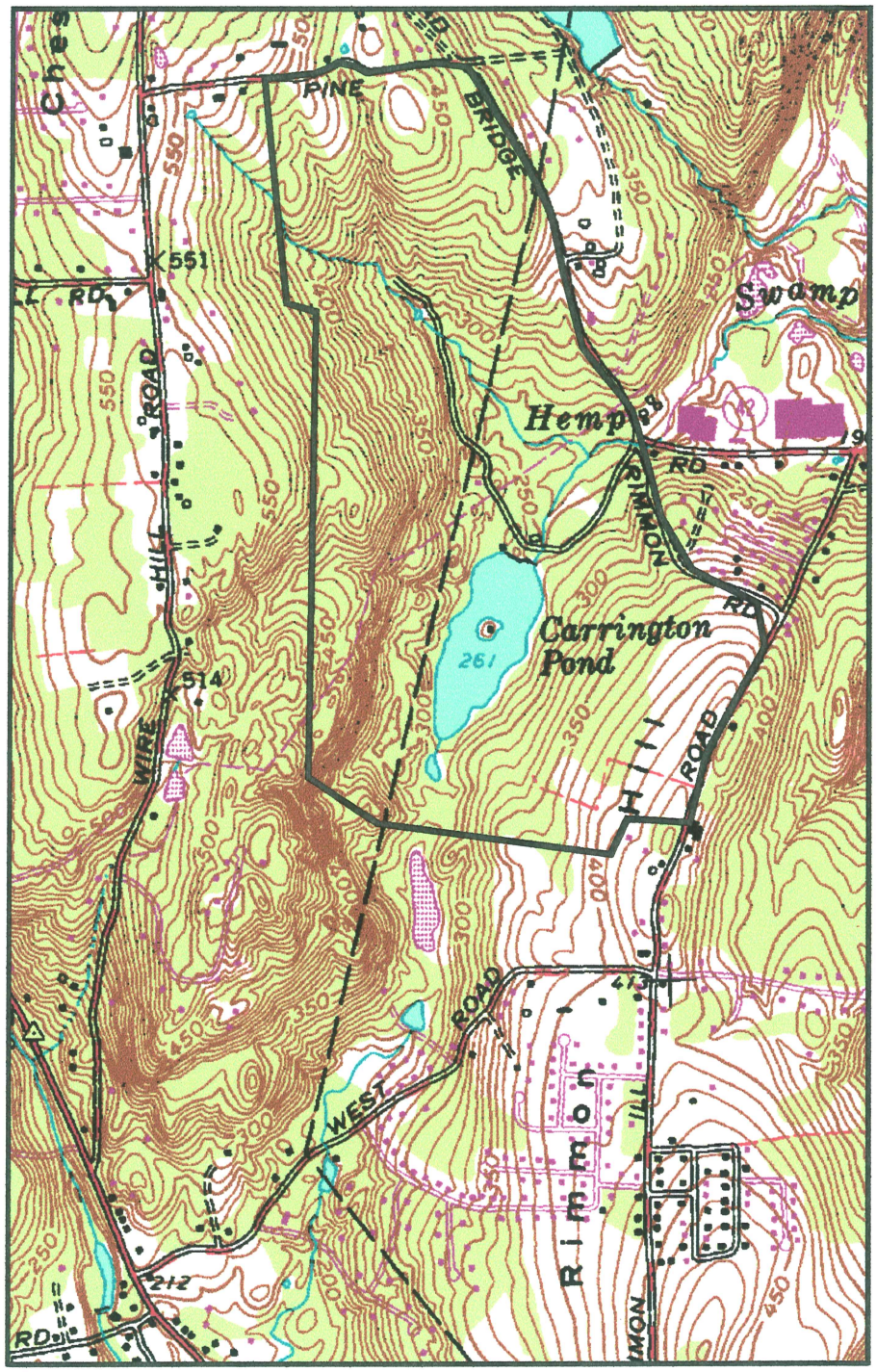
Carr, Michael C. 1960. The Bedrock Geology of the Naugatuck Quadrangle, CT Geologic and Natural History Survey, QR-9.

Flint, Richard F. 1978. The Surficial Geology of the Naugatuck Quadrangle, CT Geologic and Natural History Survey, QR-35.

Rodgers, John. 1985. Bedrock Geologic Map of Connecticut, 1: 125,000, CT Geologic and Natural History Survey.

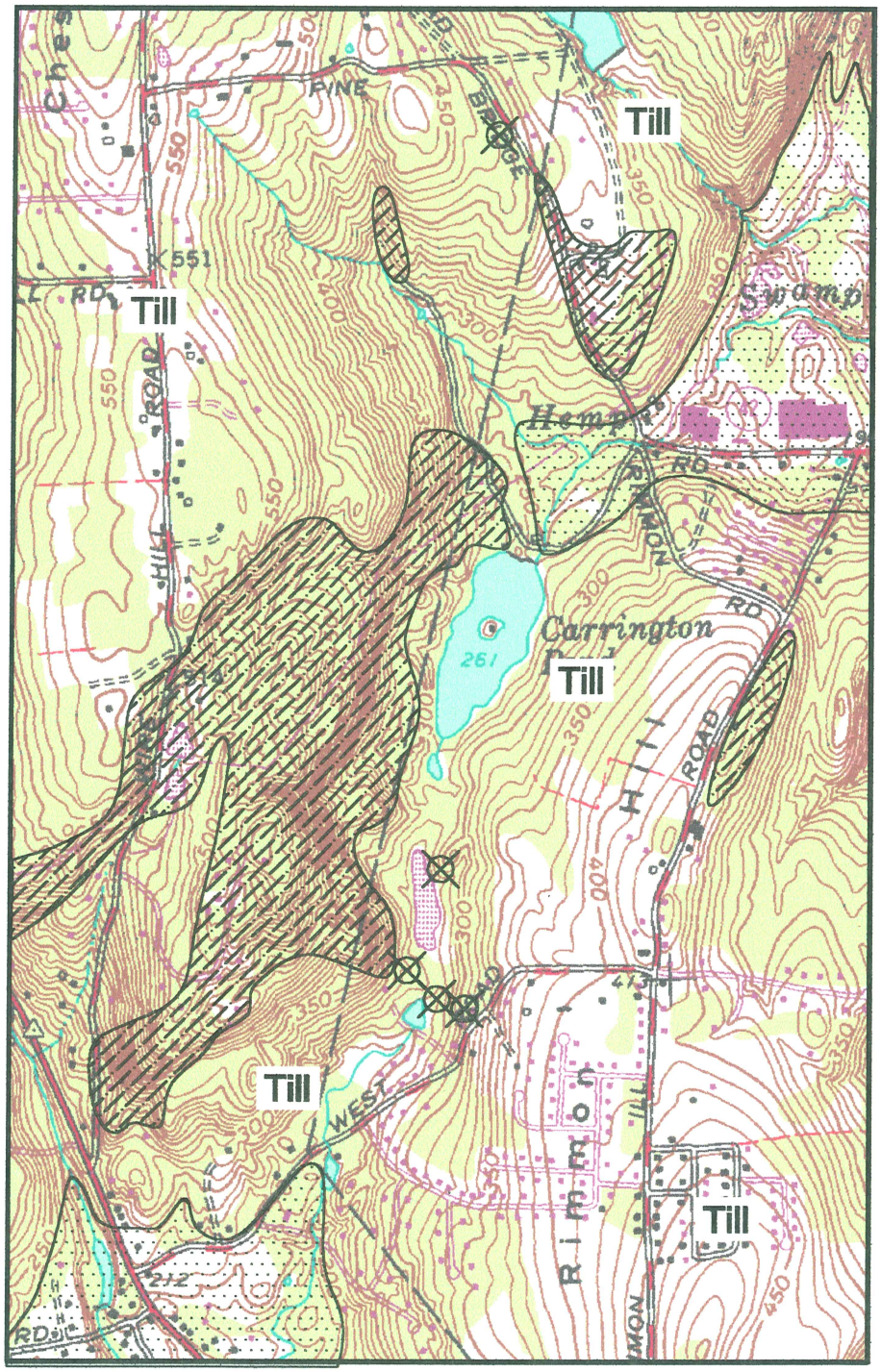
Topography

Matthies Park Area, Beacon Falls, CT



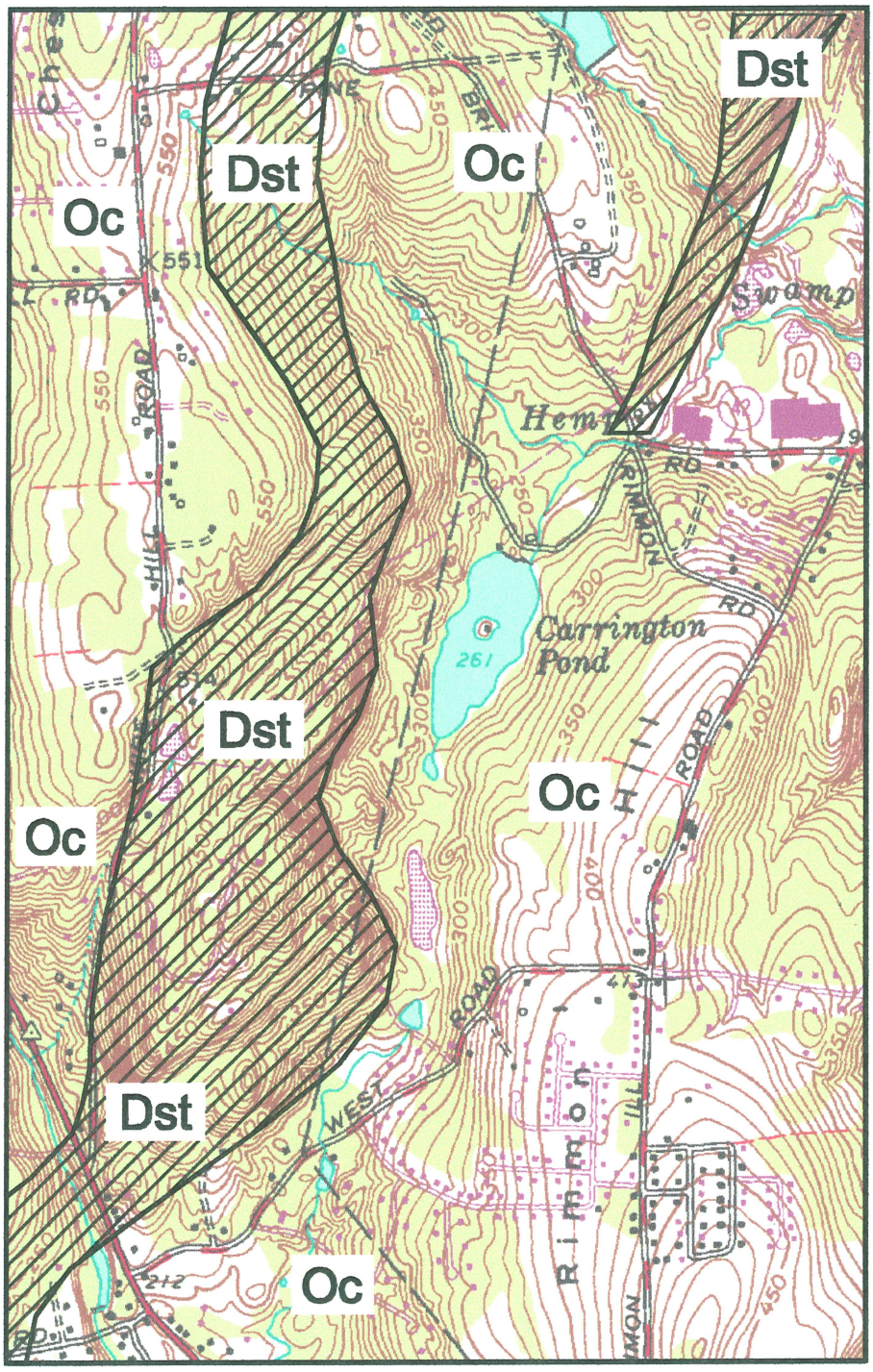
Surficial Geology

Matthies Park Area, Beacon Falls, CT



Bedrock Geology

Matthies Park Area, Beacon Falls, CT



Dst: Straits Schist

Oc: Collinshill Formation

0 1000

Feet

Soil Resources

This soils report applies to the Matthies Park property. The parcel is a 55.0 acre tract that is half wooded hillside and open agricultural land located on the west side of Rimmon Road in the town of Beacon Falls. The information in this report is based on the soil series descriptions and the mapping units descriptions as presented in the 1979 USDA Soil Survey of New Haven County and on field observations.

The site can be found in sheet 34 of the New Haven County Soil Survey.

Non-wetland Soils

Mapping Units

1. Map Unit CfD

Cfd - Charlton fine sandy loam, 8 - 15% slopes. Located on the sides of hills and ridges and at the foot slopes of steep hills that have been influenced by underlying bedrock. This soil has **poor potential** for community development. It is limited mainly by steepness of slopes. The steepness of slopes causes additional expense in building structures, roads and onsite septic systems plus the installation of water and sewer lines. This soil is fairly easy to excavate, but it commonly contains stones and boulders.

Waste disposal systems require very careful design and installation to ensure that effluent does not seep to the surface downslope from the system. Intensive conservation measures are needed to prevent excessive runoff, erosion and siltation during construction projects. The Site Schematic and

Property drawing indicates a 20 ft sewer right of way and playing fields atop this type of soil which would minimize its disturbance.

2. Map Unit PbB

PbB - fine sandy loam, 3 - 8% slopes. Paxton soils are well drained soils that have a substratum that is described as very firm gravelly fine sandy loam. This soil has a **fair potential** for community development. It is easy to excavate, but the substratum is very firm (hardpan) and commonly has stones and boulders. Waste disposal systems and onsite septic systems will generally not function satisfactorily because of the slowly permeable substratum. Very careful design and installation are required to ensure a satisfactory system. During periods of construction, conservation measures are needed to prevent excessive runoff, erosion and siltation.

3. Map Unit PbC

PbC - Paxton fine sandy loam, 8 to 15% slopes. This unit is composed primarily of Paxton soils on 8 to 15 percent slopes. Paxton soils are very deep, well drained soils that formed in compact glacial till derived mainly from gneiss and schist. Typically they have friable fine sandy loam or loam surface layer and subsoil over a firm fine sandy loarn or sandy loam dense till substratum.

Permeability is moderate in the surface layer and subsoil and slow in the substratum. The available water capacity is moderate. Runoff is rapid. The soil tends to dry out and warm up slowly in the spring and possesses a low shrink-swell potential.

This Soil has **fair potential** for community development. It is limited mainly by its slow permeability in the substratum and the steepness of its slopes. Steeper slopes cause additional expense in building roads, installing

stormwater infrastructure and water lines. During construction, fairly intensive conservation measures are needed to prevent excessive runoff, erosion, and siltation.

4. Map Unit WzC

WzC - Woodbridge extremely stoney fine sandy loam, 3 - 15% slopes. Woodbridge soils are very deep, moderately well drained soils that formed in compact glacial till found on the top and sides of ridges and hills of glacial uplands and are derived mainly from gneiss and schist. Typically, they have a friable fine sandy loam or loam surface layer and subsoil over a firrn fine sandy loam or sandy loam dense till substratum.

This soil has a **fair potential** for community development. It is limited by its seasonal high water table of about 20 inches. This soil is fairly easy to excavate, but in many areas it has stones and boulders below the surface as well as on the surface. Because of the seasonal high water table, excavations are frequently inundated. When the soil is saturated, steep slopes of excavations are unstable and tend to slump. Waste disposal systems, such as an onsite septic system, will generally not function with only normal design and installation because of the seasonal high water table and the slowly permeable substratum. During construction periods, conservation measures are needed to control runoff, erosion and sedimentation.

Wetland Soils

Mapping Units

1. Mapping Unit Rd

Rd - Ridgebury fine sandy loam. Ridgebury soils are very deep, poorly drained soils that formed in compact glacial till derived mainly from gneiss and

schist. Typically, they have a friable loam or fine sandy loam surface layer and subsoil over a firm fine sandy loam or sandy loam dense till substratum. Ridgebury soils have a perched water table within 1.5 feet of the surface much of the year. This soil has moderate to moderately rapid permeability in the surface layer and subsoil and slow or very slow permeability in the substratum. It has a low shrink-swell potential.

This soil has poor potential for community development. This soil is difficult to excavate because the high water table inundates the excavations. Steep slopes of excavations tend to slump when saturated. This soil is poorly suited to building foundations because footings are placed below the depth of the water table. Waste disposal systems do not function properly in this type of soil without costly design and installation for reasons cited above. Conservation measures are needed to prevent excessive siltation, runoff and erosion.

This soil located in the most southerly end of the tract is a minor component in the make-up of the entire parcel but is of note because of its designation as an inland wetland soil.

Wetland and Watercourse Inventory

Please refer to the accompanying aerial photograph (Figure 4) for a generalized, graphical representation of the wetlands and watercourses present on this site, as well as the approximate locations of significant watershed divides.

The primary water resource on this site is Carrington Pond. An impounded waterbody, the pond primarily offers an open water habitat. Primary function and value includes fisheries, recreation and aesthetics. Its relatively steep sides provides little opportunity for a littoral (shoreline) vegetative community to establish itself. There are four primary inlets to the pond, all of which most likely contain intermittent flow: one on the southern end, two on the western side and one on the northern end.

The southern end of the pond is fed by a short watercourse that emanates from a small forested wetland that is most likely a vernal pool wetland. Vernal pools are small, shallow, circular depressions in the landscape which fill with water during the wetter periods of the year (spring and late fall), and become drier during the warmer summer months. True vernal pools also support unusually diverse and dynamic assemblages of wildlife. Much of this wildlife is solely dependent on these areas for one or more periods of their life cycle. Because of the absence of permanent water, fish do not live in these ephemeral pools, making these areas very attractive to certain animals which would normally fall prey to these carnivorous fish. Rare and endangered amphibian species are commonly found in these pools.

Between the vernal pool and the pond is a smaller excavated pond. Similar to Carrington Pond, this pond has relatively steep sides and consists primarily of open water habitat.

The two inlets entering the pond from the west are short, high-gradient brooks of little fisheries value with a primary function of conveying water to the pond. The northern most of the two begins near a subdivision cul-de-sac off of Wire Hill Road approximately 4500 feet from the pond. The southernmost inlet begins 800 feet from the pond. These two streams flow through small, forested wetlands prior to their discharge into the pond.

The inlet on the north side of the pond is a formal, manmade diversion trench which brings water from the north that would have normally by-passed the pond and entered directly into Hemp Swamp.

On the east side of the pond there are several "hillside seep" forested wetlands which are perched on the slope leading down to the pond. With no sustained, well-defined, permanent watercourses, these wetlands typically receive most of their hydrologic inputs from groundwater as it flows down the slope and comes into contact with a restrictive soil layer and is forced to emerge onto the surface. While these types of wetlands may have low values in the area of flood control, nutrient retention and fisheries, their value to wildlife is typically significant. This type of wetland provides open foraging grounds and refuge for mammals, game birds and songbirds during the winter and early spring due to the fact that the ground and water may remain thawed while other surrounding areas are snow-covered and inaccessible to wildlife. Included within the southernmost of these hillside seep wetlands is what appears to be a man-made vernal pool where wood frogs have been observed.

The unnamed watercourse that drains the northern portion of this parcel and joins the pond outlet prior to crossing Bridge Road has been altered through historic construction of artificial watercourses, basins, roadways, and well facilities. Despite these alterations, the natural watercourses in this area

possess high values for wildlife habitat, flood control, aesthetics and most likely fisheries. While inspecting the series of artificial basins constructed within the watercourse, scores of salamander egg masses were observed, most of which were contained within the deep, clear water of the lower basin. The role these basins played as vernal pools was an unexpected surprise. It would be interesting to study the methods by which these salamanders enter and exit the high-walled basin to breed as well as exit the basins after hatching.

A large riparian wetland area exists in conjunction with this watercourse at its lower portions. As a riparian wetland, its value is heightened due to its function as a nutrient and sediment trap for the watercourse, as well as the creation of a productive wildlife corridor.

Watershed Analysis

It might be useful to delineate the watershed for Carrington Pond, since there is some noted concern for maintenance of its water quality. As shown on the accompanying photo (Figure 4), the thick solid line is an approximation of this watershed. The thick dotted line is the watershed of the diversion trench which was flowing at the time of my inspection. Whether it receives perennial flow was difficult to determine. The flow lines for both the natural and artificial watercourses leading out of the lower basin appeared to be at the same elevation, thus when overflow into the one ceases the other should theoretically cease also. However, there appeared to be a low flow/ "clean-out" pipe that was sustaining flow from the basin into the natural watercourse. At any rate, when flowing, this "diversion trench" watershed should be considered as a contributing watershed just as much as the pond's primary watershed.

In order of diminishing quantity, land-use/land-cover within the watershed is forested, residential, open water, field and pasture. The primary threat to the water-quality of the pond appears to be polluted runoff from the residential roadways, lawn areas and septic systems. As is evident from the photo, blocking off the flow into the pond from the diversion trench would omit a majority of this water **quality** threat, however, this may have a negative effect on the **quantity** of water entering the pond. A more detailed water balance study could be instituted to look into this possibility.

One final note on the existing conditions found at this location. While inspecting the pond's dam, a localized discharge of water was noticed emanating from the impoundment area. The flow was significant and was eroding soil from the impoundment. The DEP Dam Safety Section was notified of this condition, and they will be investigating.

Potential Regional High School

As indicated on the schematic site plan entitled Regional School District No. 16 / Beacon Falls and Prospect", dated 4/19/99 the potential location for the facility seems to be optimal if your choice is restricted to the parcel in question. Due to the steep slopes found throughout this parcel, the only other remotely possible location seems to be to the north along Bridge Road. While most of this area is located outside of the pond's watershed and would not be a threat to its water quality, it may not offer adequate acreage once its steep slope areas are factored out.

However, a majority of the currently proposed site does exist within the watershed of the pond and construction of a facility such as is proposed would likely not benefit the pond due to polluted runoff from parking lots, playing fields, and roadways. Two primary challenges will present themselves if

construction of the school moves forward at this site. The first is erosion and sedimentation control during the construction period. While the soil types at this location are not considered highly erosive, much of the lower areas appear to have a higher groundwater table than was expected. With the amount of cuts and fills that will be needed to construct on this consistently sloping parcel, the groundwater could be interrupted and the control of this surfacing groundwater could be problematic. As evidence for this potential, many seeps created by the construction of the sewer line were observed in need of control.

The second challenge will be to develop and implement a satisfactory stormwater management system. This system should not only include best management practices for the treatment of stormwater discharges but should, at the same time, maintain the current pattern of hydrologic inputs to the wetlands found on the site.

Finally, two items relating to the conditions transferred as part of the deed to this property. The first, states that there would be very limited disturbance within 500 feet of the pond. The current plan calls for a detention basin within this 500 foot "buffer". This does not seem to comply with the conditions of the deed. Secondly, the entrance for the school appears to utilize the current entrance to the recreational area. This also seems to be in contradiction to the deed restriction. Consider accessing the property from the sewer easement area which is already in place. This would avoid the steep slopes that the access road is currently proposed to traverse (just east of the proposed detention basin) and reduce the potential for erosion and sedimentation problems.

If and when more detailed plans for this facility are produced, the DEP Inland Water Resources Division (860-424-3903) is available for technical assistance if required.

Figure 4 Generalized Wetlands and Watercourse Location Map
N ⇑ 1"=1500' Matthies Park, Beacon Falls

Wetland Area

Watercourse

Diversion ditch watershed

Watershed divide (pond)

Pond Resources

Carrington Pond is approximately 14 acres with a watershed or drainage basin of 177 acres. The recreational uses of Carrington Pond are warm water fishing and passive recreation. Carrington Pond was monitored in 1998 by the consulting firm Aquatic Control Technology (ACT). ACT's monitoring report indicates that Carrington Pond is not in need of intensive management for rooted plant or algae control.

The primary water quality concern for lakes and ponds in Connecticut is accelerated eutrophication from non-point sources of pollution. Eutrophication is a process where nutrients such as phosphorus and nitrogen increase aquatic plant growth. As eutrophication advances, excessive plant growth will reduce the aesthetic appeal and discourage recreational use of the pond. Nutrients are generally delivered to a waterbody from non-point sources of pollution such as road runoff, soil erosion, and stormwater from land in active agriculture or residential use.

Most lakes and ponds are at a somewhat stable place in the eutrophication process with some waterbodies naturally having more rooted plant and algae growth than others. The placee in the eutrophication process is known as the trophic state. The ACT monitoring effort was designed to ascertain the trophic state of Carrington Pond.

Any development within the drainage basin of Carrington Pond could increase nutrient loading to the pond and advance its trophic state. Currently a proposal is being considered to construct a high school that will be partially within the drainage basin of Carrington Pond. At this writing, no plans have been provided for the high school and therefore, a review of the plans is not possible as part of this ERT report. Plans for the high school should consider

that Carrington Pond will receive runoff during and after construction from the site.

In addition to the permit reviews, DEP can review the plans for the high school to assure that the water qua1ity of Carrington Pond is adequately protected. The Bureau of Water Management, Lakes Management Program can be reached at (860) 424-3716 for this assistance.

Aquatic Resources

Site Description

Perennial surface waters located within the bounds of the 325 acre Matthies Park are the headwaters of Hemp Swamp Brook and Carrington Pond - an impoundment of an unnamed tributary to Hemp Swamp Brook.

Approximately 2100 feet of Hemp Swamp Brook is within Matthies Park. A segment of the stream channel near the western park boundary has been modified into concrete lined pools each having a surface area of less than one-quarter acre. From these pools, a portion of Hemp Swamp Brook flow is diverted through a masonry-stone channel to Carrington Pond. The channel is roughly 5 feet in width and 3 feet in depth. Reportedly the ponds and channel were created by the former property owner to provide additional water to Carrington Pond. The concrete lined ponds and other modifications within the artificial channel were apparently designed to prevent sediments and other debris from entering Carrington Pond.

Land adjacent to the artificial channel has been altered to a manicured park like condition. A paved roadway parallels much of the channel length.

Through the unmodified, Hemp Swamp Brook is contained within a channel approximately 10 feet in top of bank width and normal flow depths averaging less than 1 foot. The moderate gradient channel creates surface flow of a nearly equal distribution of pool and riffle. Stream substrate is composed of small boulder, cobble, gravel, and widely distributed deposits of coarse sand and sand-silt fines.

Dense growths of hardwoods and woody shrubs predominate as riparian vegetation along Four Mile Brook and the unnamed tributary streams. This vegetation provides the streams with a nearly complete canopy. Physical in-stream habitat is provided by the water depth in pools, small boulders, gravel deposits, undercut banks, and fallen or overhanging riparian vegetation.

Carrington Pond is a 14± acre impoundment of an unnamed tributary to Hemp Swamp Brook and had originally been developed for recreation. A biological and water quality monitoring survey of Carrington Pond was conducted by Aquatic Control Technology, Inc. and sponsored by the Beacon Falls Park and Recreation Commission in 1998. Survey results indicate the pond as having a maximum depth of 7 feet and average depth of 5 feet. Waters less than 5 feet in depth supported extensive aquatic plant growth with naiad and filamentous algae most prevalent. Aquatic vegetation, fallen or overhanging riparian vegetation, and boulders are the key physical habitat features within the impoundment.

Wetlands have been protected and uplands maintained as forest on the Matthies Park site and nearby adjoining parcels. To date this protection has proven to be an effective means of preserving water quality. The Department of Environmental Protection classifies Hemp Swamp Brook and Carrington Pond as *Class AA* surface waters. Designated uses for surface water of this classification are existing or potential public drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other purposes. Recreational uses may be restricted.

Aquatic Resources

Based upon channel grade, morphology, and substrate composition, the unmodified section of Hemp Swamp Brook can be classified as a coldwater

stream resource. Although the stream reach on the Matthies Park site has never subject to a formal Fisheries Division resource survey, such a survey of Hemp Swamp Brook approximately one-half mile downstream of Matthies Park was conducted by the Fisheries Division in 1991. That survey focused on a 150 foot stream reach parallel to Route 42 near the Beacon Falls Industrial Park. Being in such close proximity, the reach of Hemp Swamp Brook on the Matthies Park site is anticipated to contain a similar fish population as the stream reach surveyed. Survey results (see Appendix) revealed a fishery population composed of brook trout *(Salvelinus fontinalis)* longnose dace *(Rhinichtys cataractae)* and white sucker *(Catostomus commersoni)*. These species are commonly associated with coldwater streams in Connecticut. Several age-size classes of brook trout were collected in Hemp Swamp Brook which is indicative of a naturally developed, self-sustaining, and well balanced population. Largemouth bass *(Micropterus salmoides)* were also present. This species is a common resident of warmwater ponds and transient in coldwater streams.

A formal fishery resource survey of Carrington Pond has never been undertaken by the Division. Based upon water guality monitoring results of the Aquatic Technology, Inc. survey and physical habitat conditions, Carrington Pond would be classified as slightly eutrophic. Ponds so classified are supportive of water fish species. The anticipated fishery population in Carrington Pond would include bluegill sunfish (*Lepomis macrochirus),* pumpkinseed sunfish *(Lcpomis gibbosus),* largemouth bass *(Micropterus salmoides),* golden shiner (*Notemigonus crysoleucas),* and brown bullhead (*Ameiurus nebolosus).*

Reportedly, Carrington Pond is stocked with trout annually during the spring for a children's fishing derby. While the pond water quality during spring months is conducive for trout survival and allows for put-and-take trout

management, the temperature and quality of water found during summer months precludes year-round trout survival.

Impacts

As previously mentioned, the protection of wetlands and maintenance of forested uplands on the Matthies Park site have proven an effective means of preserving physical habitat and water quality. The management of the parcel in it's present condition as open space will best assure the continued habitat and resource preservation within Hemp Swamp Brook and Carrington Pond.

Should Matthies Park become subject to a significant land use change, the potential for adverse impacts to aquatic habitats and resources increases dramatically. Anticipated impacts include:

- Soil erosion and subsequent sediment transport through increased runoff from unvegetated areas. Excessive erosion, sediment transport, and sediment deposition can degrade both water quality and physical habitat, in turn affecting the resident fishery population. Specifically, excessive siltation has the potential to cause a depletion of oxygen within the water column; disrupt fish respiration and gill function; reduce water depth resulting in a reduction of habitats used by fish for feeding, cover, and spawning; reduce fish egg survival; reduce aquatic insect production; and promote aquatic plant growth.

- Development adjacent to ponds or streams often results in the alteration or removal of riparian vegetation. Changes to riparian vegetation can result in eliminating the natural "filtering" effect of vegetation which has the ability to prevent sediments, nutrients, fertilizers, and other non-point source pollutants from upland sources from entry into ponds and streams

(such non-point source pollutants can degrade habitat and water quality); increase stream water temperature during the summer months (thermal loading) while decreasing winter water temperatures to levels causing a complete ice cover; decrease bank stability thereby increasing surface water siltation and habitat degradation; eliminate or drastically reduce the supply of large woody debris (such material provides critical physical habitat features for numerous species of aquatic organisms; reduce a substantial proportion of tood for aquatic insects which in turn constitutes a reduction in a significant proportion of food available for resident fish); stimulate excessive aquatic plant growth; and decrease the riparian corridor's ability to serve as a "reservoir" storing surplus runoff for gradual release back into the streams during summer and early fall low flow periods.

- An influx of stormwater drainage may cause aquatic habitat degradation due to the release of pollutants from developed areas. Such pollutants include gasoline, oil, heavy metals, road salt, fine silts, and coarse sediments.

- Nutrient enrichment from fertilizer runoff from manicured lawns will stimulate aquatic plant growth. Herbicide runoff from manicured areas may result in fish kills and water quality degradation.

Recommendations

The aquatic habitats and resources of Matthies Park are best protected through the current land use management practices. Should there be future land use change, certain measures need be established in effort to mitigate for potential impacts to Hemp Swamp Brook and Carrington Pond and their associated wetlands. To this end, the Division recommends the following measures for

incorporation in future development proposals within or adjacent to Matthies Park:

1. Adhere to the property deed stipulation prohibiting the alteration of land within 500 feet of Carrington Pond. A similar stipulation should be established for land adjacent to Hemp Swamp Brook. The Division recommends that, at a minimum, a 100 foot buffer zone of undisturbed habitat adjacent to the watercourses be maintained. The buffer zone boundaries should be measured from either, (1) the edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of riparian wetlands, the edge of the stream bank based upon bank-full flow conditions. Research has indicated that a buffer zone of this width prevents damage to aquatic ecosystems that are supportive of diverse species assemblages. Buffers absorb surface runoff, and the pollutants they may carry, before they enter wetlands or surface waters. Please refer to the documentation (see Appendix) presenting Fisheries Division policy and position regarding riparian buffers for additional information.

2. Adopt the recommendations of Aguatic Control Technologies, Inc. for the management of aguatic vegetation in Carrington Pond.

3. Wooden footbridges or similar structures should be installed at footpath crossings of drainages entering Carrington Pond. Such structures will prevent bank erosion of the drainages and eliminate a source of sediments from deposition in the pond.

The Town of Beacon Falls may also desire to utilize the concrete lined pools on Hemp Swamp Brook as a resource. One such opportunity is a unique program offered by the Division referred to as the Trout Rearing Program. Through a written agreement with a sportsmen's group or other organization

(see Appendix) the Division will furnish up to 2000 fingerling trout free of charge and trout food at cost for one-half of the trout reared. Trout food will be furnished at cost when one-half of the trout are released into publicly accessible waters and food at no cost when all trout are so released.

Prior to entering into the a greement the Division's Fish Pathologist and a staff Fisheries Biologist will inspect the ponds to confirm their suitability for trout rearing and make recommendations for enhancing conditions to meet fish culture standards. The ponds must be ready for stocking no later than November 1st of the calender year.

Should the Town of Beacon Falls be interested in participating in the Trout Rearing Program, a representative should contact the Fisheries Division Fish Pathologist Laboratory at (860) 566-2760.

Natural Diversity Data Base

According to the files of the Natural Diversity Data Base, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species occurring at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental & Geographic Information Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact the Data Base if there are further questions regarding this information at (424-3585). Thank you for consulting the Natural Diversity Data Base. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

Wildlife

Introduction

This report will focus on potential wildlife habitat impacts for the proposed development and recom mendations for reducing wildlife resource impacts for the Matthies Park Development, Beacon Falls, CT.

Current Conditions

The fields, field edges, forest and wetland areas currently provide a variety of wildlife with their habitat requirements.

Wildlife Observations / Site Inspection

Wildlife observed utilizing the forested areas and along the forest edge during the site visit on April 30, 1999 were: Sharp-shinned hawk *(Accipiter striatus)*, tree swallow (*Tachycineta bicolor*), American crow (*Corvus brachyrinchos)*, yellow warbler *(Dendroica petechia)*, song sparrow *(Melospiza melodia)*, American robin *(Tardus migratorius)*, black-capped chickadee *(Parus atricapillus)* and red-winged blackbird *(Agelaius phoeniceus)*, blue jay *(Cyanocitta cristata)*, wild turkey *(Meleagrus gallapavo)*, woodchuck *(Marmota monax)*, cottontail rabbit *(Sylvilagus* spp.), common grackle *(Quiscalus quiscala)*, and gray squirrel *(Sciurus caroliniana)*. Observed meadow vole *(Microtus pennsylvanicus)* activity in the field habitat. A more detailed review of the property during the four seasons of the year would, undoubtedly, reveal additional wildlife use of the property.

Inspection of Forest Habitat Condition

The following list of trees, shrubs and vines were inventoried on the site: red maple (*Acer rubrum*), pin oak (*Quercus palustrus*), black gum (*Nyssa sylvatica*), red cedar (*Juniperus virginiana*), white oak (*Quercus alba*), Hickory (*Carya* spp.), black oak (*Quercus velutina*), sassafras (*Sassafras albidum*), black cherry (*Prunus serotina*) gray birch (*Betula populifolia*) serviceberry (*Amelanchior canadensis*), Alder (*Alnus* spp.), wild apple (*Malus* spp.), staghorn sumac (*Rhus typhina*), spicebush (*Lindera benzoin*), highbush blueberry (*Vaccinium augustifolium*), *winterberry* (*Ilex verticillata*) sweet pepperbush (*Clethra alnifolia*), arrowwood viburnum (*Viburnum recognitum*), bayberry (*Myrica pennsylvanica*), blackberry (*Rubus allegheniensis*), greenbriar (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), wild grape (*Vitis* spp.), and Virginia creeper (*Parthenocissus quinquefolia*). These plants include a variety of seasonally available soft and hard mast (berries and nuts) eaten by a variety of wildlife including migratory songbirds.

Deer browsing effects are apparent throughout the forest understory. Vegetation inspection showed heavy browsing of many of the understory plants. Many of the red cedars show sign of heavy browsing of lower branches. Heavy deer browsing can be deleterious to forest regeneration and composition which may effect the habitats of other forest-dependent wildlife. The forested area is experiencing an invasion of non-native woody plants which are displacing more valuable native plants. Tree of heaven (*Ailanthus altissima*), autumn olive (*Eleagnus umbellata*), oriental bittersweet (*Celastrus orbiculatus*), privet (*Ligustrum* spp.), Japanese barberry (*Berberis thunbergii*) and multiflora rose (*Rosa multiflora*) are degrading the habitat quality of the forested area. This can be combatted utilizing various vegetation management techniques such as mechanical removal and limiting herbiciding (more information is available upon request).

Grassland / Hayfield

Agricultural lands such as hayfields provide all or a portion of the habitat requirements for a variety of wildlife such as meadow vole, short-tailed shrew, cottontail rabbit, red fox, owls, and hawks. It provides nesting habitat for wildlife such as cottontail rabbit, meadow vole, wild turkey. Although the critical size of grasslands for some of Connecticut's grassland birds requires larger acreage (15-35 acres), seasonal use during migration may occur. Further censusing during migratory period may reveal additional wildlife use. If this field was allowed to go unmowed it would revert to forestland.

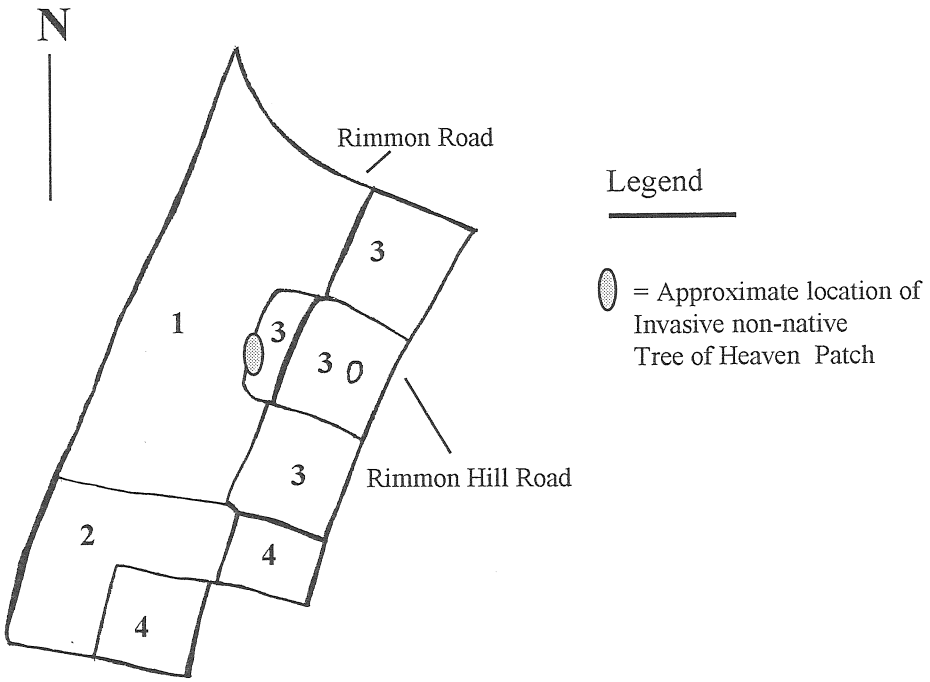


Figure 5 . Beacon Falls property for the proposed Regional School District No. 16, Beacon Falls and Prospect.

Area #3- These hayfields provide valuable grassland habitat. Grasslands are becoming less common with time in Connecticut. Birds such as bobolinks and meadowlarks may use these areas seasonally. The timing of the mowing is critical during the nesting season. First mowing should not take place before July 1st at a minimum to prevent nest destruction during mowing.

Area #2- This young forest contains many pioneer plants such as red cedar, pasture juniper, gray birch and gray dogwood. The evergreen component of this area makes it valuable for winter cover for many of Connecticut's birds and mammals. If this area were to be actively managed for habitat, the deciduous tree cover should be culled to allow the evergreen cover to persist. Evergreen cover comprises only about 12 percent of the forested cover statewide.

Area #4- These two parcels are young enough to still contain openings. These young abandoned fields provide cover for a variety wildlife which utilize early successional habitats. It is rapidly growing and will become similar to area #2 in about 15 - 20 years.

Area #1- This upland forest contains plant species such as red maple and spicebush which thrive in moist conditions. Red cedar now are skeletons in the mid-story of the forest having past the stage in which it thrived. The moist and rocky soils are valuable for a variety of plant life and forest dwelling wildlife. Deer browing of understory plants is substantial and a concern for healthy forest regeneration Wildlife such as gray squirrel, flying squirrel, and wood thrush will thrive in this older forest. Given the steepness and high moisture in the soils, this area should have limited development.

Discussion and Recommendations

The land being reviewed has a mix of older forest, young forest, abandoned field and hayfields. The mix of the various stages of succession makes this property highly valuable for wildlife. Most of the parcel appears to drain towards Carrington Pond. The current configuration of fields places them furthest away from the pond and the forest buffer in between. The forest helps buffer and attenuate any runoff from the fields towards the pond. If the school is to be built on the parcel with lots of lawn and ball field area, then the forest buffer should be maintained as much a possible. The sloping nature of the property and nearness to Carrington Pond makes it necessary to consider keeping the bulk of the school building, lawns and ball fields out of area # 1 as much as possible.

Nature Trail And Outdoor Classroom Potential

The land lends itself very well to designing a nature trail and/or nature observation. It is crucial to have the trails located and placed during the design phase of the project. Trails should strive to travel through the various habitat types and terrain. Learning stations can be placed in each forest succession and several microhabitats.

Managing Invasive Non-native Plants

An effort to manage some of the woody invasive non-native plants should be done while there is heavy eguipment available and tree cutting expertise on the grounds. There is a patch of Ailanthus (Tree of Heaven in area #3) (Figure 5) which can be pulled out using a backhoe or other heavy equipment. Tree cutters can also selectively remove invasives as they come across them. Herbiciding the cut stumps with an approved anti-sprouting agent is

recommended (Call Dr. Todd Mervosh at CT Agricultural Experiment Station at (860)683-4984.

Technical Assistance

The team wildlife biologist is available for further consultation for layout of nature trails and learning stations with the project designers. Please call at (860)675-8130.

Forest Resources

Vegetation

The 325+- acre Matthies Park Property which was acquired by the town of Beacon Falls in 1972 has excellent potential as open space for passive recreation. Development of a more intensive nature such as the proposed Regional High School Complex and athletic fields have potential to impact the quality of Carrington Pond, unless strict sediment and erosion control practices are planned, implemented and maintained. Forest management practices such as thinning would help to improve the over all health and vigor of a major portion of this Park's forest resource. Best Management Practices should be followed at all times when implementing any forest management activities.

The vegetation which is present on the parcel falls into five broad categories. These include Mixed Hardwoods, Old Field, Hardwood Swamp/Wetland, Open Field/Utility ROW and Conifer Plantation. Below are brief descriptions of each of these vegetation categories. The location and acreage of these areas were obtained from 1995 aerial photographs and are only approximate. They are depicted on the Forest Vegetation Map. A more comprehensive inventory of the herbaceous vegetation which is present in each of these categories should be made at different times throughout the year by a botanist.

A. **Mixed Hardwoods:** The Mixed Hardwood type totals approximately 160 acres. Today this forest is made up of a mosaic of reasonably healthy sawtimber size trees (11 " in diameter at breast height (d.b.h.) and larger) and pole size trees (5" to 11" d.b.h.) which range from 50 to 110 years of age. Larger and older trees are present but they are few in number and are generally located along old boundary lines. The overstory is dominated by red oak, black oak, white oak, scarlet oak, American beech, black birch, red maple,

sugar maple, tuliptree, white ash, black cherry, shagbark hickory, mockernut hickory, and pignut hickory. Occasional white pine, eastern hemlock, sassafras, and yellow birch are scattered throughout this vegetation type. The understory vegetation which is present includes hardwood tree seedlings, maple leaved viburnum flowering dogwood, witch-hazel, eastern hophornbeam, American hornbeam, azalea, beaked hazelnut, nanny berry, American chestnut sprouts, highbush blueberry, lowbush blueberry, barberry*, and scattered patches of mountain laurel. Ground cover vegetation includes Canada mayflower, aster spp., wild sarsaparilla, poison ivy, Virginia creeper, grape, green briar, raspberry, wood aster, pink lady,-slipper, bluets, dewberry, cinquefoil spp., club moss spp., evergreen wood fern, hayscented fern, Christmas fern and many other species of grasses, sedges and wild flowers.

Some areas have recently evolved from the old field type and are now dominated by young mixed hardwoods. These areas have remnant eastern red cedar, gray birch, aspen, and apple trees present. They also have low bush blueberry which is conspicuous in the understory.

Sugar maple, tuliptree, white ash, yellow birch, red oak and American elm dominate the steep rocky slopes found in the south western portion of this property. These tree species are also found in greater numbers where there is a transition between the mixed hardwood vegetation type and the hardwood swamp/wetland type. The rich moist soils which are present at the bottom of the steep slopes support a great variety of ground cover species. The dominant species include poison ivy, aster spp., Virginia creeper, wild geranium, wild sarsaparilla, Solomon's-seal, false Solomon's-seal, doll's eyes, trout lilly, trillium spp., cinnamon fern, Christmas fern, evergreen wood fern, maidenhair fern and club moss. Japanese barberry* a non-native invasive species is just beginning to invade this section of the property.

B. Old Field. The old field vegetation type occupies about 60 acres of this site and may be found in several locations. The vegetation which is present is variable, some areas are densely vegetated while others are somewhat open. This is primarily due to the timing of pasture abandonment and the establishment and spread of hardwood and softwood shrubs and trees. Soil moisture differences will also have an effect. Eastern red cedar are dominant with red maple, black birch, gray birch, old field juniper, white pine, flowering dogwood, gray-stemmed dogwood, black cherry, choke cherry, apple, crab apple, quaking aspen, speckled alder, spice bush, highbush blueberry, lowbush blueberry, multiflora rose*, autumn olive*, barberry*, bittersweet*, arrowwood, bayberry, Tatarian honeysuckle*, Japanese honeysuckle*, and staghorn sumac which are scattered throughout. Ground cover vegetation is comprised of grasses, sedges, poison ivy, Virginia creeper, goldenrod, ragweed, hayscented fern, raspberry, cinquefoil, Queen Anne's lace, milkweed, thistle, daisy fleabane, spirea, maleberry, meadowsweet and other wildflower and weed species.

C. Hardwood Swamp/Wetland. There are approximately 39 acres of hardwood swamp/wetland present within this park. These wetland areas follow the drainages and are somewhat variable with all size classes and age classes of trees represented. Each wetland is dominated by red maple with occasional sugar maple, black gum, white ash, American elm, yellow birch, black birch, and tuliptree. Some areas have red oak and hemlock intermixed. Black willow is found along the shore of Carrington Pond. Many of the larger trees in these wetland areas have cavities which make excellent den sites for many species of wildlife. Understory vegetation includes spice bush, sweet pepperbush, highbush blueberry, eastern hophornbeam, American hornbeam, arrowwood, witherod, nanny berry, swamp azalea, winterberry, witch-hazel, multiflora rose*, swamp rose and barberry*. Skunk cabbage, false hellebore, tussock sedge, club moss, sphagnum moss, poison ivy, grape,

Virginia creeper, green briar, bittersweet*, Canada mayflower, cinquefoil spp., aster spp., jewelweed, goldenrod, steeplebush, meadowsweet, cinnamon fern, Christmas fern, sensitive fern, evergreen wood fern, royal fern, club moss, sedges and other wild flower species are present as ground cover.

D. **Mixed Hardwoods.** Approximately 28 acres of this tract is made up of a mixed hardwood vegetation type that is significantly different from the one described above. This area is dominated by pole size red maple with occasional sugar maple intermixed. Eastern red cedar and gray birch are present which suggests that this area was pasture not too long ago. Spicebush has become very dense in the understory and is accompanied by highbush blueberry and barberry*. Canada mayflower, poison ivy, cinnamon fern, evergreen wood fern and club moss make up the sparse ground cover which is present.

E. **Open Field/Utility** ROW. This vegetation type makes up about 19 acres of this parcel. The vegetation which is present in these areas is dominated by grasses, sedges, wild flower and weed species with multiflora rose*, bittersweet*, Tree-of-Heaven*, autumn olive*, raspberry and poison ivy encroaching into some areas. Some of the wild flower and weed species which were observed include daisy fleabane, ox-eye daisy, black-eyed Susan, milkweed, Queen Anne's lace, goldenrod spp., ragweed spp., clevers, wild onion, boneset, dandelion, nettle spp., and white clover.

F. **Conifer Plantation.** Several conifer plantations have been established along the entrance to the Park and around Carrington Pond. These total approximately 5 acres. They are predominantly made up of pole to small sawtimber size Norway spruce with occasional white spruce, white pine and hemlock intermixed. Some hardwoods have become established in the understory, these include black birch, red maple, sugar maple, white ash and black cherry. Ground cover consists of Canada mayflower, poison ivy,

Virginia creeper, Indian cucumber root, wild sarsaparilla, hayscented fern, grasses, sedges, Japanese knotweed* and bittersweet*.

*Invasive exotic vegetation has become established on some of the review site. Of special concern are several invasive plant species which have the potential to become major components of the ecosystem by out competing with native species. These include autumn olive, Japanese knotweed, bittersweet, barberry, Japanese honeysuckle, Tatarian honeysuckle, tree-of-heaven and multiflora rose. Although many of these species provide wildlife with food and cover, they are aggressive competitors with native plant species. Mechanical removal of these plants may be difficult, but it is effective. In some areas the presence of one or more of these species has precluded the establishment of other more desirable native species.

Management Considerations

The maintenance of a healthy forest environment is feasible for this property in the long run. The removal of risk and hazard trees and the maintenance of healthy vigorous trees which are less likely to be adversely affected by insect and disease infestation should be of major concern in the management of this property considering its primary use as open space for passive recreation. In the future, if not restricted by the deed, improvement thinnings focused on the removal of unhealthy and damaged trees which are competing with trees of high potential could be implemented within the mixed hardwood and conifer plantation vegetation types. These areas are crowded and many of the trees are showing signs of decline and loss of vigor. Periodic harvests aimed at releasing crop trees, by removing poor quality competitors, will result in a healthier, more stable forest condition. To reach a healthy and productive

state, individual forest stands should be periodically evaluated to determine present and future management needs.

A Public Service Forester from the Department of Environmental Protection may be contacted at (860) 295-9523 to provide basic advice and technical assistance in woodland management. These services are provided free of charge. Services of a more intensive nature are available at a fee from Certified Professional Foresters. A directory of Certified Forest Practitioners is available from the State of Connecticut Division of Forestry (860) 424-3630.

Trees and forests have value in reducing climatic extremes, controlling runoff, filtering out pollutants from the air and water, reducing noise, providing aesthetic enjoyment, creating wildlife habitat, recharging aquifers, supplying wood fiber and functioning as a carbon sink. Healthy forests provide these long term amenities. Therefore a good relationship between development and the retention of forested open space is essential if generations to come are to enjoy a high quality of life.

FOREST VEGETATION MAP

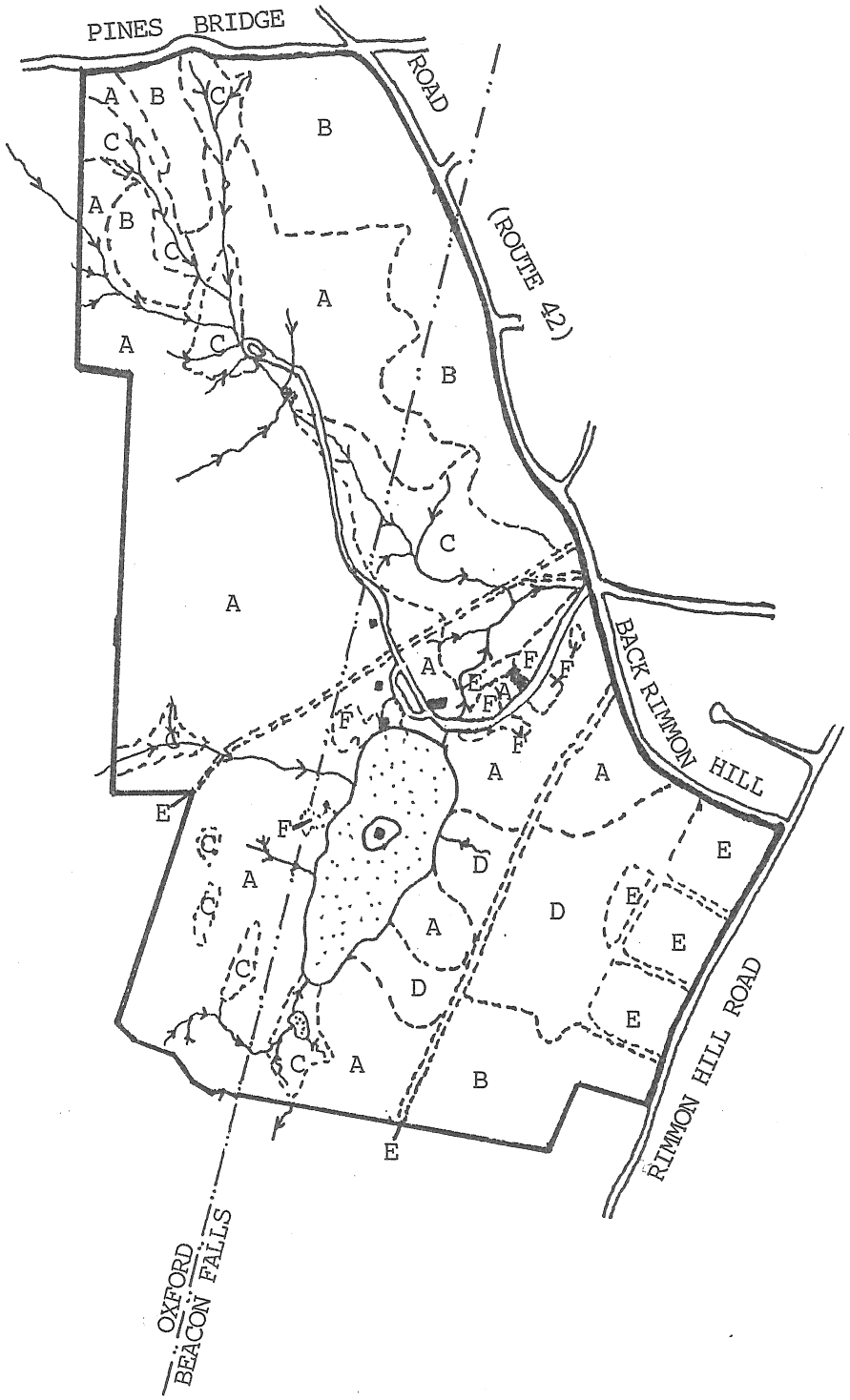
Matthies Park, Beacon Falls, CT

April 20, 1999

NORTH

▲

SCALE 1"=1000'



VEGETATION TYPES

A. Mixed Hardwoods.....160+- ACRES

B. Old Field.....60+- ACRES

C. Hardwood Swamp/Wetland...39+- ACRES

D. Mixed Hardwoods.....28+- ACRES

E. Open Field/Utility ROW.....19+- ACRES

F. Conifer/Plantation.....5+- ACRES

LEGEND

PROPERTY BOUNDARY

VEGETATION BOUNDARY

PAVED ROAD

POND (14+-ACRES)

STRUCTURES/PARKING

STREAM

TOWN LINE

Archaeology

The following comments are offered regarding the archaeological sensitivity of Matthies Park. A review of the State of Connecticut Archaeological Site Files and Maps shows no known archaeological resource within the review area. However, our files indicate a known prehistoric Native American archaeological site in close proximity to the project area. This site represents a hunting and gathering camp of unknown age associated with Hemp Swamp Brook to the east.

While no sites have been previously located, the one site adjacent to the project area suggests that similar cultural resources may remain undiscovered. As a result, the Office of State Archaeology suggests that any proposed development, including plans for a regional high school should be reviewed by our office or the Connecticut Historical Commission to determine if an archaeological survey is warranted. This survey would locate and identify any cultural resources and the impact to those resources by the proposed undertaking. The survey would provide for recommendations to mitigate any archaeological sites which might exist on the property.

The Office of State Archaeology is prepared to offer the Beacon Falls Park and Recreation Commission any technica1 assistance in conducting the recommended survey.

Park Planning

From the perspective of a state park supervisor, the following recommendations and observations are made concerning future plans in Matthies Park:

1. Other than the obvious loss of prime meadow habitat, it is not believed the new school will physically impact the rest of Matthies Park to any great degree. However, the potential for increased human impact may be a different story. To that end, a link trail between school property and Matthies Park is not recommended (an unofficial trail may form despite this). This would discourage casual use of the park as a hangout, and it is accompanying vandalism.

Since the school property will be a separate entity, and the gas line right-of-way already serves as a habitat barrier, keeping the two properties separate is easily accomplished.

2. As for other recreational considerations, it is apparent that the original owner wished for the public "to share the enjoyment of this natural beauty and surroundings." From conversations with park staff, and from personal observation, it is apparent that the public also comes to Matthies Park for low key types of recreation such as fishing, hiking, dog walking and bird watching.

The original letter from Mr. Matthies mentions swimming and camping as possible, permitted activities. According to park staff, due to shallow water conditions, swimming is not being considered at this time. For a swim area, not only would lake dredging be necessary, but increased costs such as water testing, lifeguards, changing rooms, etc. would be created.

As for camping, Mr. Matthies writes of camping with "adequate supervision." This is the key to any future camping policy. In keeping with an environmental theme, a small (15 person) group camping area might be created. This could be limited to carry-in/carry-out camping restricted to sanctioned scout and school groups. On site adult supervision and a two-day maximum stay would be mandatory.

3. Another topic for discussion is trail development. After walking most of the trails and roadways, adequate trails already exist. Enhancement of existing trails is preferable to creating new ones. Unfortunately, many parks install trails to the point of overkill, leaving no corner of the park to nature or the naturalist. This in effect fragments the same wildlife habitat we seek to protect.

Certainly, present trails could use upgrading in terms of signage, drainage, brushing-out, etc. In addition, if an outdoor classroom type of trail is created, extensive research and set-up work are required. Technical assistance for this type of trail could be obtained from the DEP Wildlife Division at Sessions Woods Wildlife Management Area in Burlington (Tel: 860-675-8130). Jenny Dickson, Nonharvested Wildlife Biologist, and Peter Picone, Urban Wildlife Biologist are likely resources. Diane Joy, from the Office of Communications and Education, Director of the Kellogg Environmental Center in Derby, coordinates environmental education statewide. She is nationally known and is an excellent contact person (Tel: 203-734-2513).

For labor, many volunteer groups could be utilized. Boy Scouts, particularly those seeking Eagle projects, can do many different tasks. Equestrians and mountain bikers also contribute their time and effort, provided their activities are permitted. Even a Volunteer Day can produce good results.

It may be useful, at some point, to formalize a trail use policy. Motorized use is already prohibited, but other activities may co-exist or conflict with each other. Some trails may be inappropriate for horses or mountain biking, while others may need seasonal closures to some or all activities. Horses require more vertical clearance than pedestrians and mountain bikes and horses may damage sensitive areas. Mountain bikes in large numbers may create dangerous conditions on crowded trails. All of these considerations contribute to making a trail use policy in balance with the mission of Matthies Park.

One last thought on trails. Since this is a public park, the needs of handicapped citizens must, by law, be addressed. Any new trails, boardwalks, facilities, or programs must, if feasible, accommodate their needs to participate. Design standards that meet the American with Disabilities Act (ADA) requirements are available to municipalities.

4. Finally, the unique history and structures of Matthies Park are attractions in themselves. With the onset of computers and intrusive technology, there is almost a nostalgic interest in the history of our public places. The impressive stone work stands as a monument to human ingenuity and hard work. Does a written history of the park exist? Could a brochure be produced? Would there be any interest in a couple of guided historical tours per year?

To conclude, Matthies Park is a valuable resource to the town, offering a striking alternative to the traditional ball field/playground style park. Many opportunities exist to expand on the basic theme of passive recreation in natural areas. But to do this, proactive thought must be given to future trends, constituencies, and the land itself.

Planning Considerations

Beacon Falls is a predominately rural town situated within the Central Naugatuck Valley Region. It shares municipal boundaries with Seymour, Oxford, Naugatuck, and Bethany. The town's 5,150 residents are concentrated mostly east of the Naugatuck River within the vicinity of the town center along and east of old Route 8 and along Route 42—the main east-west corridor. Route 8, a modern four-lane limited access highway runs north-south through the town and connects Beacon Falls with the Bridgeport and Waterbury metropolitan areas. Based on a 1990 land use survey conducted by the Council of Governments of the Central Naugatuck Valley (COGCNV), a majority of the town's total land area (55%) is undeveloped. The next largest land use classification is open space (17%), which is represented mainly by the Naugatuck State Forest, located in the northern portions of the town.

Matthies Park is located near the southwest corner of Beacon Falls off Route 42 in the vicinity of Back Rimmon and Rimmon Hill Roads. Approximately 1/2 of the park's total area lies within the Town of Oxford. Surrounding land uses are primarily low-density residential or undeveloped, with some industrial uses along Route 42 between Back Rimmon and Rimmon Hill Roads (Figure 7). The site is zoned R-1 residential, which allows for schools and playgrounds as a permitted use. The 325-acre park was deeded over to the Town by Bernard H. Matthies in 1972 with stipulations that the site be specifically limited to park and recreation uses. However, an exception was provided in the deed that allows for the development of a school facility on a portion of the property.

The Town is considering a proposal to construct a high school within Matthies Park that will serve up to 800 students residing within Regional School District No. 16 (Beacon Falls and Prospect). The proposed construction

site is situated on 55-acres located along the eastern side of the park adjacent to Back Rimmon and Rimmon Hill Roads, both of which feed onto Route 42. The campus will comprise the following:

- High school facility (160,000 square feet)
- One regulation size baseball field, plus two smaller softball fields
- One soccer field
- One football field and track
- Six tennis courts
- Parking for 415 vehicles

An existing sewer line easement forms the western boundary of the proposed school property. Located within the confines of the park is a 14-acre pond with a house situated on a 1/2-acre island. An elaborate series of drainage and retention ponds designed and built by Mr. Matthies himself, exist throughout the park and are still fully functional. Both the natural and man-made structures within the park are interconnected by a series of hiking trails and narrow paved roadways that are closed off to all motorized traffic.

Existing Plans

A detailed study has never been conducted for the park. Furthermore, the Town of Beacon Falls does not have a current and comprehensive Town Plan of Conservation and Development for use as a policy guide for directing the future use of the site. The two primary published documents that can serve as a land use guide for the site are Regional and State Plans.

Regional Plan of Conservation and Development for the Central Naugatuck Valley

Adopted in December 1998, the overall goal of the Regional Plan is to promote the orderly conservation and development of the Region and to encourage and foster community identity and character. The future land use map recommends that all of Matthies Park be designated as open space (Figure 8). The Plan's official definition of *Open Space* is as follows:

> Areas intended to be preserved as open space or recreational uses (such as local, state, or federal parks, land trust preserves, or recreation facilities). May also include some areas perceived as open space that are in private ownership or use (such as water companies, golf courses).

Land surrounding the park and proposed school grounds is categorized as a growth area, meaning that the Plan considers it capable of accommodating a large portion of future regional growth. Such areas are also considered to have ready access to public water and sewer service.

The vicinity of the proposed high school is considered to have moderate natural development constraints (Figure 9). Under this classification, the Regional Plan considers the area to have moderate or localized severe restrictions on development which may be overcome through careful site planning that mitigates runoff and disturbance to the natural environment. Characteristics of a moderately constrained area include well drained soils with 15-25% slopes or high seasonal water table, hardpan soils with 15% slopes or lower, and shallow or rocky soils with less than 15% slopes.

Conservation and Development Policies Plan for Connecticut 1998-2003

Like the Regional Plan, the State Plan categorizes Matthies Park and the proposed site of the high school as Existing Preserved Open Space, the State's highest conservation priority. Under the priority 1 classification, the strategy is to support the permanent continuation as public or quasi-public open space and to discourage the sale and structural development of such areas except as may be consistent with the open space function served.

Properties surrounding the site of the proposed high school, meanwhile, are designated as *Growth Areas,* which the State ranks as a development priority 3. The State defines *Growth Areas* as lands in proximity to *Regional Centers* or *Neighborhood Conservation Areas,* such as the town center of Beacon Falls, that provide the opportunity for staged expansion in conformance with municipal and regional development plans. The stated strategy here is to place high priority and affirmative support toward concentrating new growth that occurs outside traditional development centers into specified areas capable of supporting large-scale, mixed uses and densities.

Recommendations

Although schools are not specifically mentioned as a desirable open space use in either the Regional or State Plan, the proposed high school would be in keeping with the long term mission and goals outlined in both plans. Some of the benefits to Matthies Park, Beacon Falls, and the surrounding region that a high school could provide are as follows:

1. The facility would provide active recreational opportunities, such as baseball, softball, football, soccer, track, and tennis, coupled with passive recreational activities such as hiking and fishing.

2. Provided construction adheres to sensitive design considerations that mitigate disturbance to the pond and other natural resources within the park, the school grounds and its surroundings could provide an invaluable outdoor laboratory for students both to learn and to gain a greater appreciation of our natural environment.

3. The demographics of the region is shifting as more and more young couples with children continue to move from Fairfield County into more affordable communities such as Beacon Falls. Therefore, currently underutilized Matthies Park will likely experience increased usage. The addition of a high school on the grounds would increase public awareness of this invaluable resource and would likely multiply the number of visitors to the park.

In his July 20, 1972 letter to the Beacon Falls Board of Selectman transferring ownership of the site to the Town, Bernard Matthies suggested the park as an ideal site for a new school. The introduction of a school facility on the park grounds will expand the various functions of the park. The challenge to the Town and its residents will be to find ways to best balance the conservation, recreation, and educational demands that the new school will entail upon Matthies Park.

Park Maintenance

Although it is among the most pristine open space areas in Beacon Falls and the surrounding region, Matthies Park reveals signs of neglect and under-investment. The concrete surrounding the drainage and detention ponds is

crumbling and some of the trails have been reclaimed by undergrowth. The park, currently underutilized, will likely experience a dramatic increase in usage with the addition of the high school. It is conceivable that the increased number of park visitors will lead to increased demands and pressure upon Town officials to provide more upkeep. If the Town, due to limited financial resources is unable to provide increased maintenance, other options are available. For example, the property (minus the high school grounds) could be transferred over to a land trust. Another possibility is to enlist a civic group, such as the Rotary Club or Lions Club for assistance in upkeep. A third option to consider might be to pool resources with the Town of Oxford in a bi-municipal agreement to jointly shares in maintenance and upkeep cost in return for equal access of the park to residents of both towns.

Municipal Land Use Liability

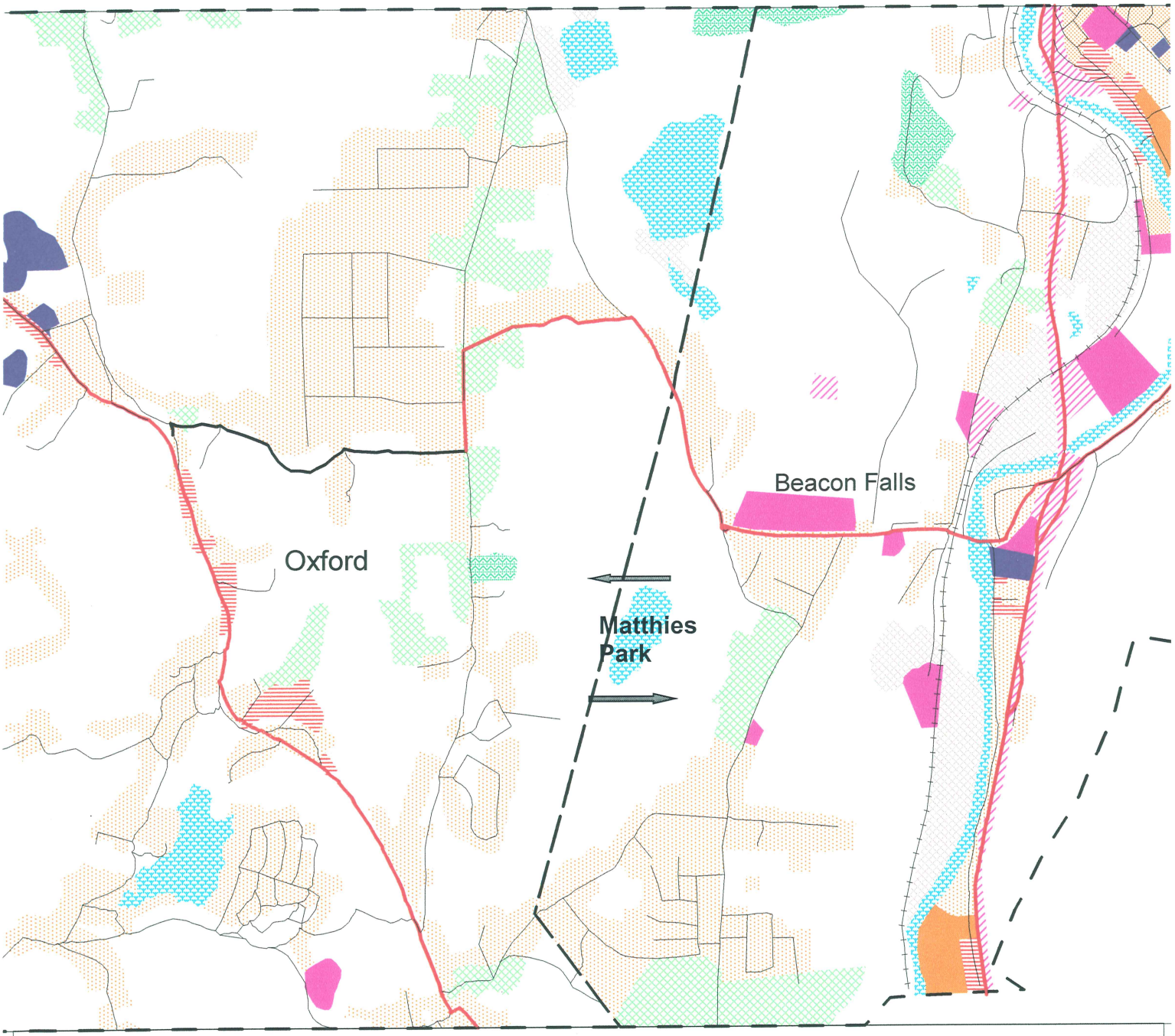
Given that Matthies Park is a Town-owned facility, Beacon Falls could potentially be exposed to lawsuits should an injury occur on the property (i.e., a hiker sprains an ankle). Increased usage of the park could lead to increased risk of injury, and subsequently to increased cost for liability insurance. However, costs can be kept lower by limiting the park (with the exception of the high school) to passive recreational uses.

Driveway Access to School Grounds

Careful consideration should be given toward ensuring safe and efficient access to and from school property. Without careful design and consideration of sight lines, severe congestion could result during the early morning and afternoon hours as school buses struggle to enter and exit the property.

Route 42 is currently undergoing realignment in the vicinity of Back Rimmon Road (State Project No. 0006-0111). When completed, Route 42 will have a smoother turning radius, Back Rimmon Road will connect with Route 42 at a right angle instead of the current diagonal approach, and Matthies Park Drive will feed directly onto Back Rimmon Road, in place of feeding onto Route 42 simultaneously with Back Rimmon Road. The developers propose to position the driveway entrance onto school grounds off of realigned Matthies Park Drive, approximately 100 feet back from Back Rimmon Road.

Although not necessarily the most desirable access design, the surrounding topography severely limits where access to school property can be positioned. Given existing low traffic volumes along Route 42 and Back Rimmon Road, the Connecticut Department of Transportation (ConnDOT) considers the proposed site plan as the best possible design. However, undeveloped land along the northern edge of Route 42 opposite the proposed school site is zoned for industrial uses that, if developed, could lead to increased truck traffic in addition to school buses in the vicinity.



Land Use Type

- Agriculture
- Community Facilities/Institutional
- Commercial
- Industrial
- Open Space and Recreation
- Residential High Density
- Residential Low Density
- Residential Medium Density
- Resource Extraction
- Transportation & Utilities
- Water

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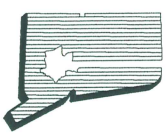
S

Scale: 1 inch = 2000 feet



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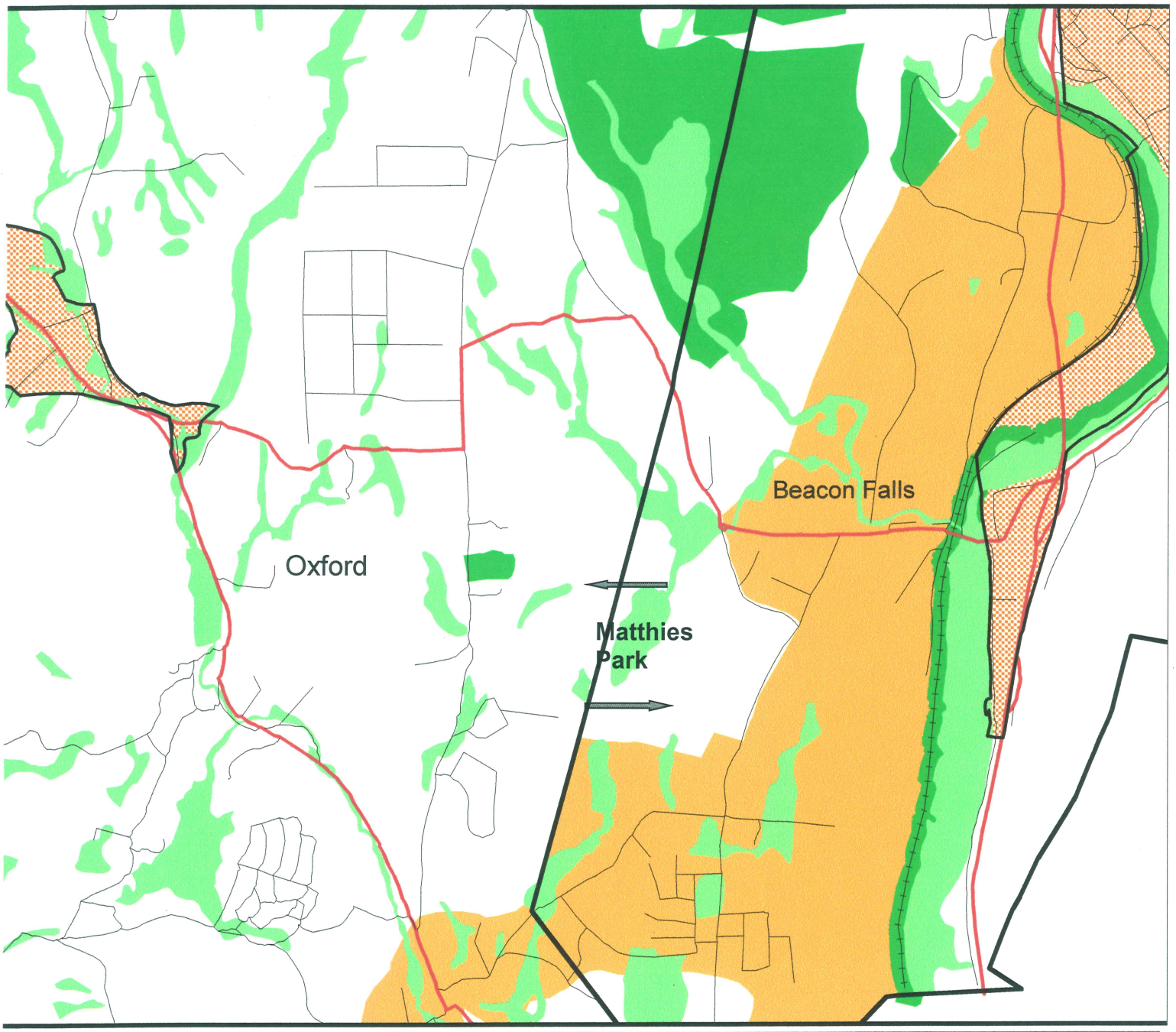


Future Land Use

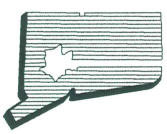
Development Areas
- Regional Core
- Major Economic Areas
- Community Centers
- Growth Areas

Conservation Areas
- Rural Areas
- Severe Environmental Constraints
- Public & Proposed Open Space

Transportation
- Airport
- Regional Arterial
- Local Road

N W E S

Scale: 1 inch = 2000 feet



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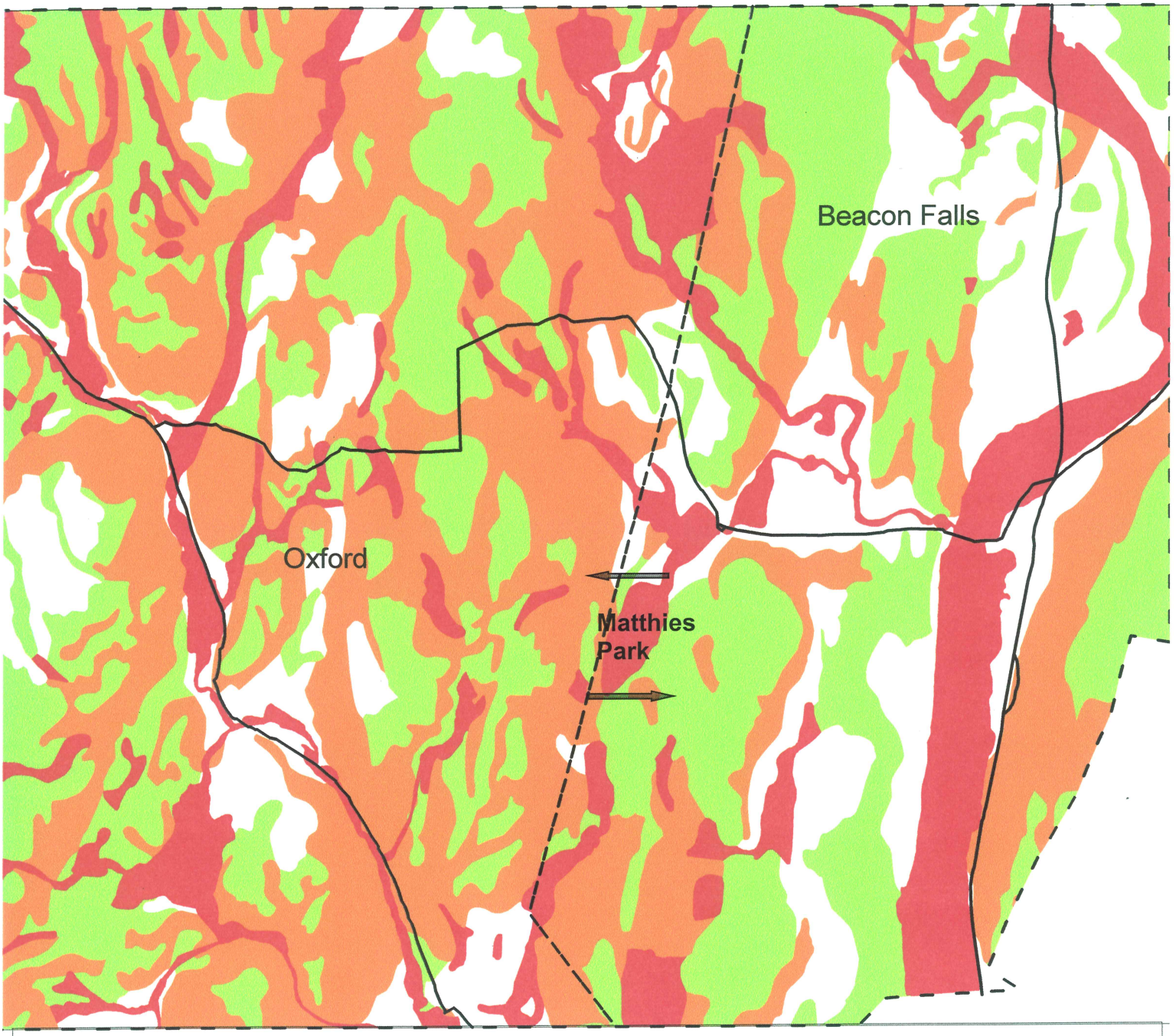

Natural Resource Constraints

- Minimal
- Moderate
- Severe
- Prohibitive

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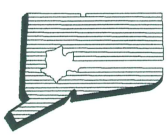
Scale: 1 inch = 2000 feet



Prepared by the Council of Governments of the Central Naugatuck Valley

Appendix

STREAM NAME : HEMP SWAMP BROOK SITE #: 3076
SITE DESCRIPTION: PARALLEL TO RTE 42, DOWNSTREAM OF NEW INDUSTRIAL PARK ACCESS ROAD, BEACON FALLS.
SAMPLE LENGTH : 50. SAMPLE DATE: 09/17/1991

PHYSICAL			CHEMICAL		MEAN	STD
AIR TEMP. . . . :	26.00	(C)	DISSOLVED OXYGEN (mg/l). . :			
WATER TEMP. . . :	19.00	(C)	pH . . . . . :			
VELOCITY. . . . :	0.117	(m/s)	COND . . . . . (uS/cm3). . :		98.67	9.24
DISCHARGE . . . :	0.029	(m3/s)	ALKALINITY .(mg CaCO3 eq/l):			

	MEAN	STD	
WIDTH. . . . . :	2.75	0.68	(m)
DEPTH. . . . . :	9.20	6.03	(cm)

DOMINANT SUBSTRATE TYPE. . :	4		POOL/RIFFLE RATIO . .:	3.31
TYPE THREE SUBSTRATE . . . :	18.2	(%)	AIR/WATER TEMP. RATIO:	1.37
EMBEDDEDNESS OF TYPE THREE :	62.50	(%)		
OVERHEAD CANOPY. . . . . :	0.44	(%)		
INSTREAM SHELTER . . . . . :	1.290	(m2)		

BIOLOGICAL

SPECIES	POPULATION SIZE (Number/ha)	STANDARD ERROR (Number/ha)
Salvelinus fontinalis	2690.	0.0
Rhinichthys cataractae	3781.	132.4
Micropterus salmoides	1018.	0.0
Catostomus commersoni	1672.	91.6

DEPARTMENT OF ENVIRONMENTAL PROTECTION
INLAND FISHERIES DIVISION

POLICY STATEMENT
RIPARIAN CORRIDOR PROTECTION

I. INTRODUCTION, GOALS, AND OBJECTIVE

Alteration and exploitation of riparian corridors in Connecticut is a common event that significantly degrades stream water quality and quantity. Inasmuch as riparian ecosystems play a critical role in maintaining aquatic resource productivity and diversity, the Inland Fisheries Division (Division) recognizes that rigorous efforts are required to preserve, protect, and restore these valuable resources. Consequently, a riparian corridor protection policy has been developed to achieve the following goals and objective:

Goals

Maintain Biologically Diverse Stream and Riparian Ecosystems, and

Maintain and Improve Stream Water Quality and Water Quantity.

Objective

Establish Uniform Riparian Corridor Buffer Zone Guidelines.

II. DEFINITIONS

For the purpose of implementing a statewide riparian corridor protection policy, the following definitions are established:

Riparian Corridor: A land area contiguous with and parallel to an intermittent or perennial stream.

Buffer Zone: An undisturbed, naturally vegetated area adjacent to or contained within a riparian corridor that serves to attenuate the effects of development.

Perennial Stream: A stream that maintains a constant perceptible flow of water within its channel throughout the year.

Intermittent Stream: A stream that flows only in direct response to precipitation or which is seasonally dry.

III. RIPARIAN FUNCTION

Naturally vegetated riparian ecosystems perform a variety of unique functions essential to a healthy instream aquatic environment. The delineation and importance of riparian functions are herein described. Vegetated riparian ecosystems:

* Naturally filter sediments, nutrients, fertilizers, and other nonpoint source pollutants from overland runoff.

* Maintain stream water temperatures suitable for spawning, egg and fry incubation, and rearing of resident finfish.

* Stabilize stream banks and stream channels thereby reducing instream erosion and aquatic habitat degradation.

* Supply large woody debris to streams providing critical instream habitat features for aquatic organisms.

* Provide a substantial food source for aquatic insects which represent a significant proportion of food for resident finfish.

* Serve as a reservoir, storing surplus runoff for gradual release into streams during summer and early fall base flow periods.

IV. RIPARIAN CORRIDOR BUFFER ZONE GUIDELINES

Recognizing the critical roles of riparian corridors, the Division provides buffer zone guidelines that are designed to bring uniformity and consistency to environmental review. The guidelines are simple, effective, and easy to administer. The following standard setting procedure should be used to calculate buffer zone widths.

Perennial Stream: A buffer zone 100 feet in width should be maintained along each side.

Intermittent Stream: A buffer zone 50 feet in width should be maintained along each side.

Buffer zone boundaries should be measured from either, (1) edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of a riparian wetland, the edge of the stream bank based on bank-full flow conditions.

The riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition. All activities that pose a significant pollution threat to the stream ecosystem should be prohibited.

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths and allowable development uses within these areas, local authorities should be encouraged to adopt the more restrictive regulations and policies.

12/13/91
Date

James C. Moulton
Acting Director

POSITION STATEMENT
UTILIZATION OF 100 FOOT BUFFER ZONES TO PROTECT RIPARIAN AREAS IN CONNECTICUT

BY
BRIAN D. MURPHY
TECHNICAL ASSISTANCE BIOLOGIST
INLAND FISHERIES DIVISION

I. INTRODUCTION

One tenet of the Inland Fisheries Division Policy on Riparian Corridor Protection is the utilization of a 100 foot buffer zone as a minimum setback along perennial streams. The adoption of such a policy is sure to be controversial. Laymen, developers and natural resource professionals alike will ask questions such as: Why was a standard setting method adopted? What's magical about 100 feet? Will 100 feet be sufficiently protective, or will it be overly protective? In response, this paper outlines the ramifications of adopting a riparian corridor policy including the use of a 100 foot buffer zone.

II. STANDARD SETTING VERSUS SITE SPECIFIC BUFFER ZONES

There are two approaches for determining buffer zone width; standard setting and site specific. Standard setting methods define an area extending from the streambank edge or highwater mark to some landward fixed point boundary. Site specific methods utilize formulas that incorporate and consider special site specific land characteristics, hence, the calculation of a variable width buffer zone. In both case, buffers are employed to define an area in which development is prohibited or limited.

A major advantage of standard setting methods is that they are easy to delineate and administer, thereby improving the consistency and quality of environmental assessments. Furthermore, valuable staff time would not be required to determine site specific buffer zones along each and every watercourse of concern.

The exact width of a buffer zone required for riparian corridor protection is widely disputed (Bottom et al. 1985 and Brinson et al. 1981). Buffer width recommendations found in the literature vary from as little as 25 feet to as great as 300 feet (Palfrey et al. 1982). The 100 foot buffer is widely accepted in Connecticut having been adopted by numerous inland wetland and conservation commissions as an appropriate minimum setback regulation for streambelts. In addition, Division staff have been recommending the utilization of the 100 foot buffer zone to protect streambelts since the early 1980's. Scientific research has not been generated to dispute the adequacy of utilizing 100 foot buffer zones to protect Connecticut's riparian corridors. In fact, to ensure that riparian functions are not significantly altered, recent scientific information points towards maintaining buffer zones that would be at a minimum, 100 feet in width (see section III).

Site specific methods define buffer widths according to the character and sensitivity of adjacent streamside lands. These buffer widths, also referred to as "floating buffers," consider physical site characteristics such as slope, soil type, and vegetative cover. The advantage of site specific methods is that buffer widths are designed using site characteristics and not an arbitrary predetermined width. Unfortunately, there is no "one" universally accepted formula or model and none have been developed for use in Connecticut. Most formulas are based on the degree to which sediment can be removed or filtered by natural vegetation, thus, the primary useage is sediment control. Other weaknesses of site specific techniques are (1) all areas must be evaluated on a case-by case basis and, (2) the subjectivity of different techniques (i.e. if the evaluation technique is inadequate, the buffer width will also be inadequate).

Additionally, these formulas only concentrate on one specific riparian function at a time and do not take into account multiple riparian functions, especially those of inland fisheries values as discussed in Section III. Consequently, site specific formulas approach riparian function on a single dimension rather than taking a more realistic, holistic approach.

In the absence of a scientific model to determine buffer widths suitable to protect Connecticut's riparian corridors, the utilization of a standard setting method is environmentally and politically prudent.

III. RIPARIAN FUNCTION

To assess the efficacy of a 100 foot buffer zone, the literature was searched to identify studies which have applied a quantitative approach to buffer width determination. Literature was searched for studies which both support and dispute the 100 foot zone. The following is a summary "by riparian function" of quantitative studies which assess buffer widths.

Sediment Control

Width, slope and vegetation have been cited as important factors in determining effectiveness of buffer zones as sediment filters (Karr and Schlosser 1977). Wong and McCuen (1981), who developed and applied a mathematical model to a 47 acre watershed, found that a 150 foot zone along a 3% slope reduced sediment transport to streams by 90%. Mannering and Johnson (1974) passed sediment laden water through a 49.2 foot strip of bluegrass and found that 54% of sediment was removed from the water. Trimble and Sartz (1957) developed recommendations as to width of buffer areas between logging roads and streams to reduce sediment load. They determined a minimum strip of 50 feet was required on level land with the width increasing 4 feet for each 1% slope increase. Buffer widths as determined by Trimble and Sartz (1957) have been characterized as evaluated guesses rather than empirically defined widths (Karr and Schlosser 1977). Rodgers et al. (1976) state that slopes greater than 10% are too steep to allow any significant detention of runoff and sediment regardless of buffer width. After a critical review of the literature, Karr and Schlosser (1977) determined that the size and type of vegetative buffer strip needed to remove a given fraction of the overland sediment load cannot be universally quantified. Existing literature does suggest that 100 foot riparian buffers will assist with sediment entrapment, although efficacy will vary according to site conditions.

Temperature Control

Brown and Brazier (1973) evaluated the efficacy of buffer widths required to ameliorate stream water temperature change. They concluded that angular canopy density (ACD), a measure of the ability of vegetation to provide shading, is the only buffer area parameter correlated with temperature control. Results show that maximum angular canopy density or maximum shading ability is reached within a width of 80 feet. Study sites were 9 small mountain streams in Oregon that contained a conifer riparian vegetative complex. Whether or not maximum angular canopy density is reached within 80 feet in a typical Connecticut deciduous forest riparian zone is doubtful. Tree height in Connecticut riparian zones is smaller than in Oregon (Scarpino, personal communication), therefore buffers greater than 80 feet in width would be required for temperature maintenance in Connecticut.

Nutrient Removal

Nutrient enrichment is caused by phosphorous and nitrogen transport from, among other things, fertilized lands and underground septic systems. Most research on nutrient enrichment has focused on overland surface flow. Karr and Schlosser (1977) report that 88% of all nitrogen and 96% of all phosphorous reaching watercourses in "agricultural watersheds" were found to be attached to sediment particles; thus, successful nutrient removal can be accomplished through successful sediment removal. There are conflicting reports on the ability of buffer widths to remove nutrients with most research being tested on grass plots. Butler et al. (1974) as cited by Karr and Schlosser (1977) found that a 150 foot buffer width of reed canary grass with a 6% slope caused reductions in phosphate and nitrate concentrations of between 0–20%. Wilson and Lehman (1966) as cited by Karr and Schlosser (1977) in a

study of effluent applied to 300 m grass plots found that nitrogen and phosphorous concentrations were reduced 4 and 6%, respectively. Studies on subsurface runoff as cited in Clark (1977) found high concentrations of nitrates at 100 feet from septic systems with unacceptable levels at 150 feet. Clark (1977) recommended that a 300 foot setback be used whenever possible, with a 150 setback considered adequate to avoid nitrate pollution. Environmental Perspective Newsletter (1991) states that experts who commonly work with the 100 foot buffer zone set by the Massachusetts Wetlands Protection Act are increasingly finding that it is insufficient since many pollutants routinely travel distances far greater than 100 feet with nitrate-nitrogen derived from septic systems moving distances of greater than 1000 feet. Research indicates that the adoption of 100 foot buffer widths for Connecticut riparian zones will assist with the nutrient assimilation; albeit, complete removal of all nutrients may not be achieved.

Large Woody Debris

The input of large woody debris (LWD) to streams from riparian zones, defined as fallen trees greater than 3 m in length and 10 cm in diameter has been recently heralded as extremely critical to stream habitat diversity as well as stream channel maintenance. Research on large woody debris input has mainly been accomplished in the Pacific Northwest in relation to timber harvests. Murphy and Koski (1989) in a study of seven Alaskan watersheds determined that almost all (99%) identified sources of LWD were within 100 feet of the streambank. Bottom et al. 1983 as cited by Budd et al. (1987) confirm that in Oregon most woody structure in streams is derived from within 100 feet of the bank. Based on research done within old-growth forests, the Alaska region of the National Marine Fisheries Service, recognizing the importance of LWD to salmonid habitat, issued a policy statement in 1988 advocating the protection of riparian habitat through the retention of buffer strips not less than 100 feet in width (Murphy and Koski 1989). All research findings support the use of a 100 foot buffer zone in Connecticut for large woody debris input.

Food Supply

Erman et al. (1977) conducted an evaluation of logging impacts and subsequent sediment input to 62 streams in California. Benthic invertebrate populations (the primary food source of stream fishes) in streams with no riparian buffer strips were compared to populations in streams with buffer widths of up to 100 feet. Results showed that buffer strips less than 100 feet in width were ineffective as protective measures for invertebrate populations since sediment input reduced overall diversity of benthic invertebrates. Buffer strips greater than 100 feet in width afforded protection equivalent to conditions observed in unlogged streams. The ultimate significance of these findings is that fish growth and survival may be directly impacted along streams with inadequate sized riparian buffer zones. All research supports the feasibility of implementing a 100 foot buffer zone in Connecticut to maintain aquatic food supplies.

Streamflow Maintenance

The importance of riparian ecosystems in terms of streamflow maintenance has been widely recognized (Bottom et al. 1985). In Connecticut, riparian zones comprised of wetlands are of major importance in the hydrologic regime. Riparian wetlands store surplus flood waters thus dampening stream discharge fluctuations. Peak flood flows are then gradually released reducing the severity of downstream flooding. Some riparian wetlands also act as important groundwater discharge or recharge areas. Groundwater discharge to streams during drier seasonal conditions is termed low flow augmentation. The survival of fish communities, especially coldwater salmonid populations is highly dependent upon low flow augmentation (Bottom et al. 1985). Research, although documenting the importance of riparian zones as areas critical to streamflow maintenance, has not investigated specific riparian buffer widths required to provide the most effective storage and release of stream flows.

IV. OTHER POLICY CONSIDERATIONS

Measurement Determination

The proposed policy states that buffer zone boundaries should be measured from either the edge of the riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or in the absence of a riparian wetland, the edge of the streambank based on bank-full flow conditions. This boundary demarcation is absolutely necessary to ensure that all riparian wetlands are protected. For example, if all measurements were to start from the perennial stream edge and extend landward for a distance of 100 feet, many riparian zones that contain expansive wetlands greater than 100 feet in width would be left unprotected.

Also, since boundary demarcation includes wetland delineation, the ultimate width of the buffer will vary according to site specific features. Consequently, buffer width determination as stated by Division policy is a "hybridization" of both standard setting and site specific methods. This hybridization of methods is advantageous since it acknowledges the sensitivity of streamside wetlands.

Home Rule

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths, local authorities would be encouraged to adopt the more restrictive regulations and policies. This feature incorporates flexibility to acknowledge the importance of local "home rule" regulations or policies already in accepted practice. Conversely, towns and cities without accepted policies and regulations could choose to enact the Division policy.

Allowable Uses in Buffer Zones

The Division policy states that "the riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition and that all activities that pose a significant pollution threat to the stream ecosystem should be prohibited." In essence, the buffer zone becomes an area where no development should be allowed. For this policy to be effective, there should be no exceptions, a blanket restriction of all uses would be recommended. Further clarification and more precise definitions of allowable uses will, however, be required in the future if the policy evolves into a departmental regulation.

Recently, the Connecticut Supreme Court has ruled that local agencies can prohibit specific development within buffer zones. The *Lizotte v. Conservation Commission of the Town of Somers, 216 Conn.320 (1990)* decision ruled that the construction or maintenance of any septic system, tank, leach field, dry well, chemical waste disposal system, manure storage area or other pollution source within 150 feet of the nearest edge of a watercourse or inland wetland's seasonal high water level can be prohibited (Wetlands Watch 1990). If this decision is a precursor of the future, Connecticut courts will continue to the support the use of buffers, especially those which restrict or prohibit detrimental activities.

V. CONCLUSIONS

The following actions are required to preserve, protect, and restore Connecticut's riparian corridors:

1. The Inland Fisheries Division needs to adopt and implement the proposed policy so that staff can use it as a guideline to assist cities, towns, developers and private landowners with making sound land use decisions. This policy will act to solidify a collective position concerning riparian corridor protection.

2. While the proposed policy in its "current form," represents a recommendation from the CTDEP Inland Fisheries Division, the ultimate goal of the Division should be to progressively implement this policy as either a CTDEP regulation or State of Connecticut statute.

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DEPARTMENT of ENVIRONMENTAL PROTECTION
TROUT REARING PROGRAM

An agreement between the Department of Environmental Prtoection and Sportsmen's clubs or other organizations.

The Department of Environmental Protection agrees to:

1. Furnish up to 2000 fingerling trout free of charge and trout food at cost, for one half of all trout reared.

2. Furnish trout food at cost when one half of trout are released in open waters.

3. Furnish trout food at no cost when all trout are released to open waters.

4. Make monthly inspections of the facilities, measure growth of fish and deliver trout feed needed. (No trout feed will be released from the hatcheries without prior approval of the Supervisor of Fish Culture.)

5. Provide all equipment and one man to aid in stocking the clubs and State's fish. The State's share of the fish will be released in predetermined areas selected by the biologist in that area.

The _____ club agrees to:

1. Provide facilities that meet with fish culture standards and have the facilities ready for stocking no later than November 1st.

2. Provide facilities reasonably secure from predators, vandals and natural disasters.

3. Provide adequate manpower to help with the capture and release of the Club's and State's fish. No stocking will be done on weekends, holidays or after 1 p.m. and must be finished by June 1st.

4. Contact the Supervisor of Fish Culture as soon as possible if there are any problems with fish or the holding facilities.

THE CLUB HAVING AN UNSUCCESSFUL REARING PROGRAM FOR TWO CONSECUTIVE YEARS SHALL BE REVIEWED BY THE SUPERVISOR OF FISH CULTURE AND MAY BE DROPPED FROM THE PROGRAM UNTIL CORRECTIVE MEASURES HAVE BEEN TAKEN. (A minimum of 65% survival will be required.)

I am in receipt of _____ (number) _____ (species) trout fingerlings in the name of _____ (organization).

_____
Department Agent

_____
Name and title

_____
Address

_____
Telephone number

_____
Date

_____
Date

cc: Area biologist
Fisheries Unit
Hatchery

ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - ***free of charge***.

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision making. This is done through identifying the natural resource base of the site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Soil and Water Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.