Bertini Park
Summer Day Camp and Outdoor Center

Wallingford, Connecticut

King's Mark
Environmental Review Team Report

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

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Prepared by the
King's Mark Environmental Review Team

Of the

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

For the
Parks and Recreation Department
Wallingford, Connecticut

April 2008

Report #347

Acknowledgments

This report is an outgrowth of a request from the Wallingford Parks and Recreation Department to the Southwest Conservation District (SWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Council and ERT Subcommittee for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark Environmental Review Team Coordinator, Elaine Sych, 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 Thursday, January 17, 2008.

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I would also like to thank John Galwak, director, and Michelle Bjorkman, superintendent of programs, Wallingford Parks and Recreation Department, Erin O'Hare, environmental planner, John Thompson, town engineer, George Yasinsky, town sanitarian, members of the Wallingford Conservation Commission, Town Council, and Parks and Recreation Commission, Sean Doherty, executive director, Wallingford Family YMCA, and others attending for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location maps. During the field review Team members were given additional information and some Team members received additional environmental studies after the field review. 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. This report identifies the existing resource base and evaluates its significance to the proposed use, 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 the review and development of an outdoor education center and camp at Bertini Park.

If you require additional information please contact:

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Introduction

Introduction

The Wallingford Parks and Recreation Department have requested Environmental Review Team (ERT) assistance in conducting a review of Bertini Park.

The 76.5 acre Bertini Park is located on West Dayton Hill Road in the southeastern portion of town and is considered part of the +1000 acre Muddy River/Tyler Mill Preserve. The park, now owned by the town, was used as a YMCA camp over 30 years ago. The Boy Scouts did some trail work some time ago with a kiosk that has since been destroyed by vandals. The town Parks and Recreation Department along with the Wallingford Family YMCA have formed a partnership (see Appendix) to provide day camping and outdoor educational experiences to the youth of the greater Wallingford Community including scout groups, Boy's and Girl's Clubs, the Recreation Department, YMCA and the general public. The Town of Wallingford will provide the land and the recreational space on a permitted basis through the Recreation Department. The YMCA will be responsible for obtaining/operating within the State Department of Health License and the American Camping Association. Other possible uses include an environmental classroom, low ropes course, orienteering, trail creation, hiking, fishing, camp overnights, natural amphitheater and accessible trails. They would like to construct a permanent pavilion that would have water and toilets and place platform tents for various activities throughout the area.

Objectives of the ERT Study

The Department of Parks and Recreation has requested the ERT to assist them in the planning and development of the camp. The information will guide the town and YMCA in developing a quality public resource while protecting environmentally sensitive areas.

The ERT Process

Through the efforts of the Wallingford Parks and Recreation Department this environmental review and report was prepared for the Town of Wallingford.

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.

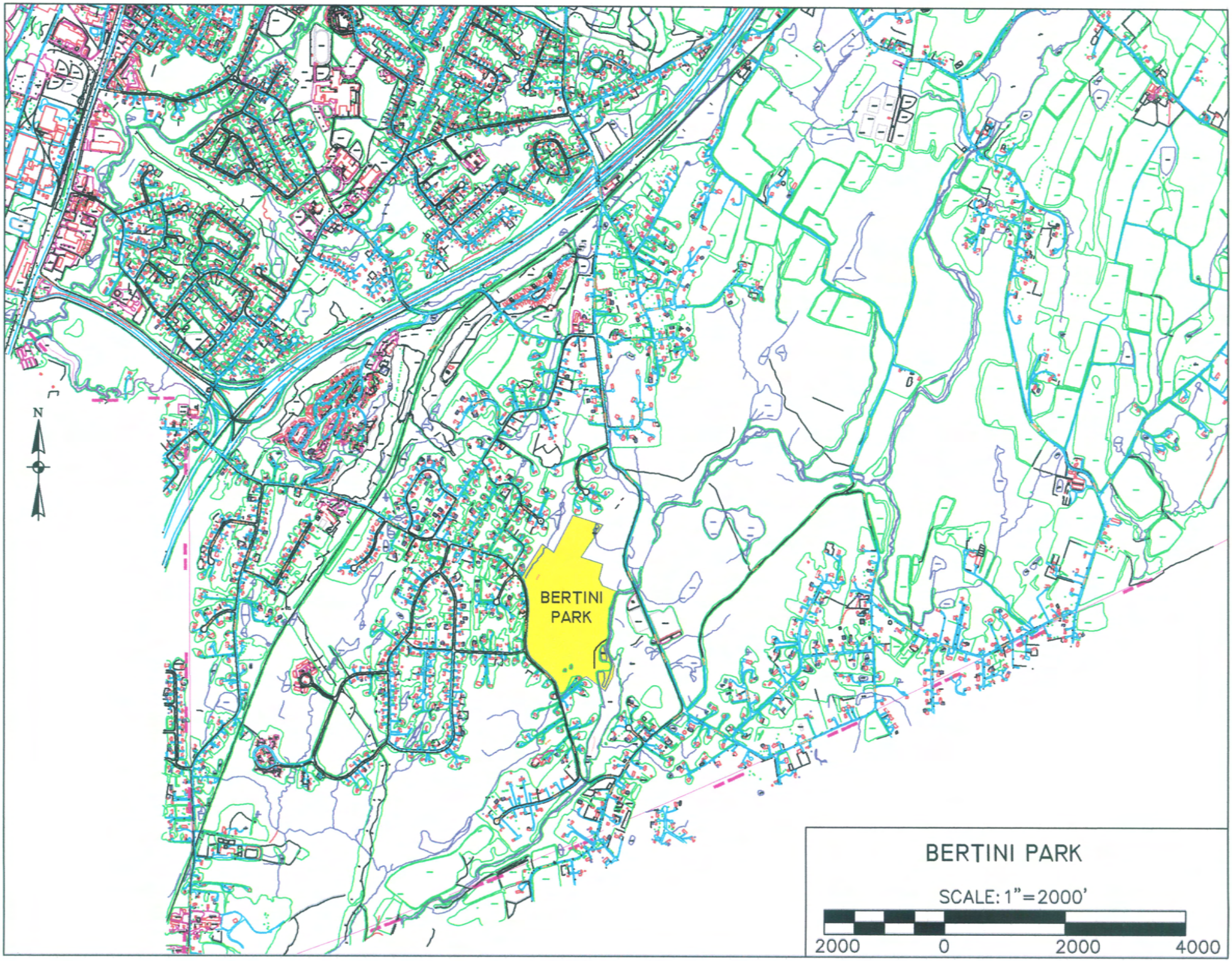
The review process consisted of four phases:

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 Thursday, January 17, 2008. 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.

Location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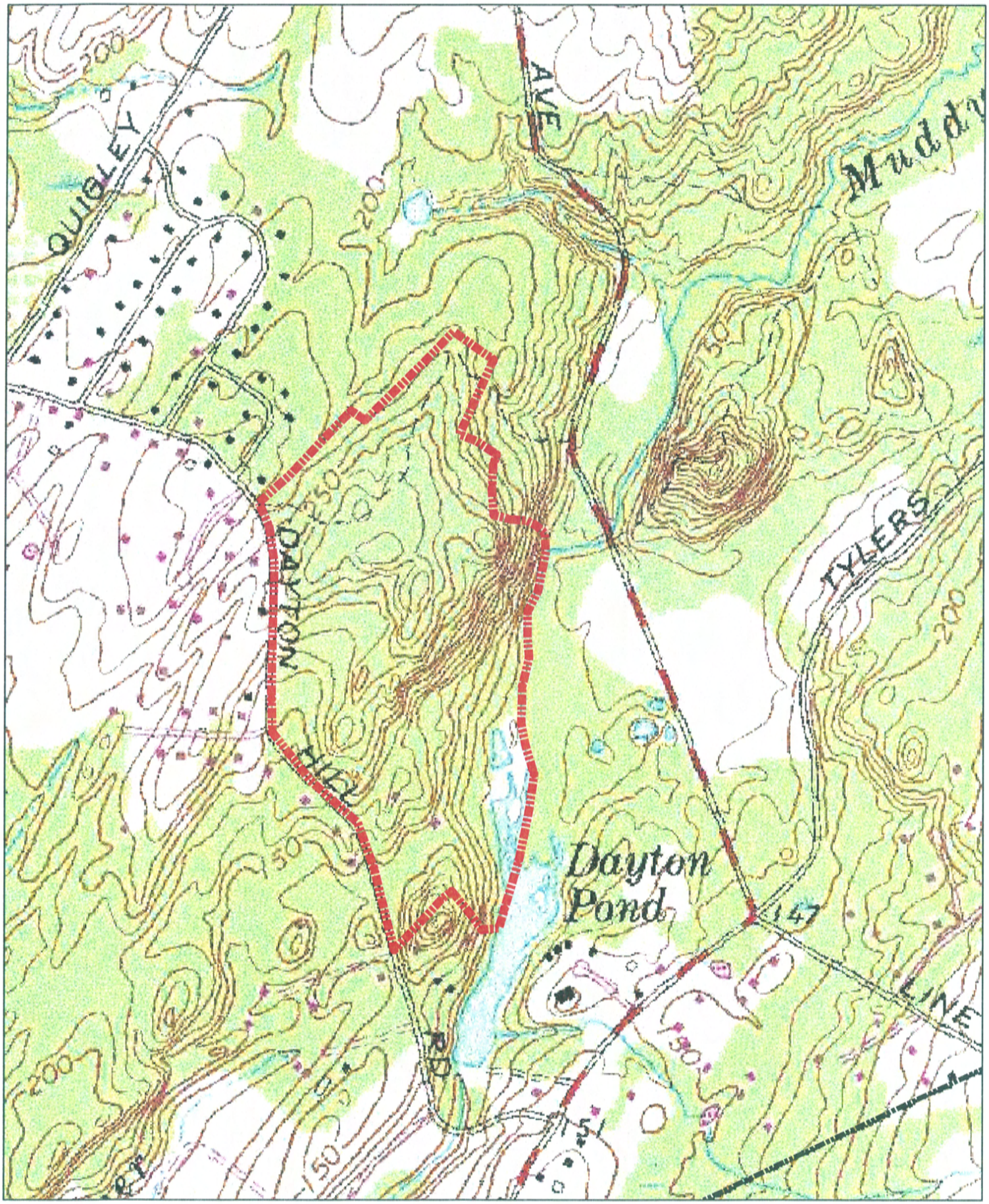
Bertini Park Outdoor Educational Center and Camp Site Map



The Connecticut Environmental Review Team

This map was prepared by Amanda Fargo-Johnson for the Connecticut Environmental Review Team. This map is for educational use only. It contains no authoritative data. December 2007.

Wallingford, CT

Approx. Site Location

N

0 0.05 0.1 0.2 0.3 Miles

Bertini Park Outdoor Educational Center and Camp Aerial Map

The Connecticut Environmental Review Team

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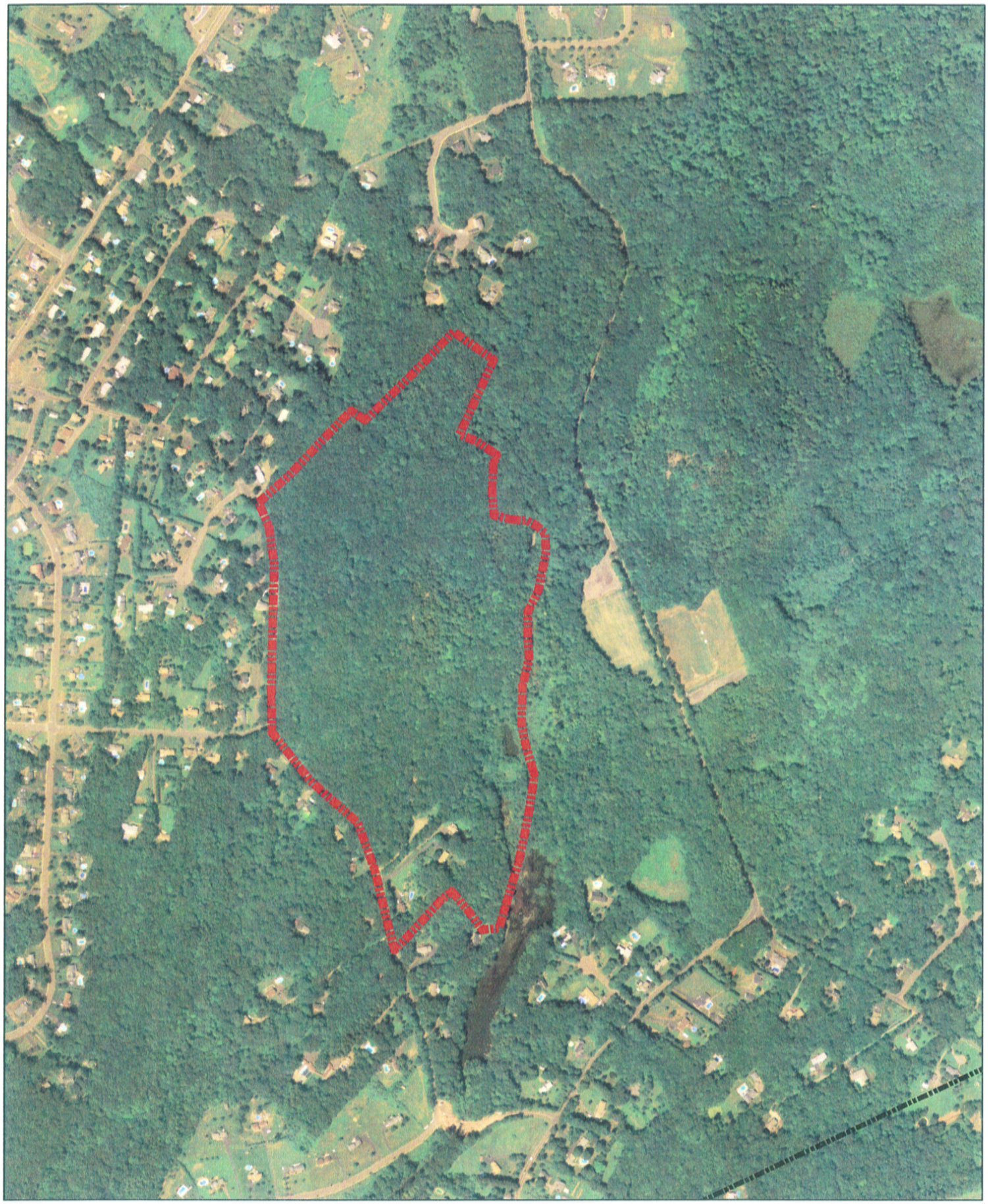
Wallingford, CT

Approx. Site Location

N

0 0.05 0.1 0.2 0.3 Miles

Bertini Park Outdoor Educational Center and Camp Color Aerial



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Wallingford, CT

Approx. Site Location

N

0 0.05 0.1 0.2 0.3 Miles

Topography and Geology

Wallingford lies within the central lowlands of Connecticut. The lowlands are underlain by Mesozoic aged rocks sedimentary rocks and intrusive and extrusive (volcanic) igneous rocks along with their intrusive feeder dikes. Sandstone, siltstone, and conglomerate comprise the sedimentary rocks. They were relatively easily eroded by the glaciers of the last Ice Age and are basically responsible for the lowness of the area. The igneous rocks are composed of diabase which is more resistant to glacial erosion and hence stand up in relief. Most of Bertini Park is underlain by the sedimentary rocks. The highest areas are underlain by the diabase.

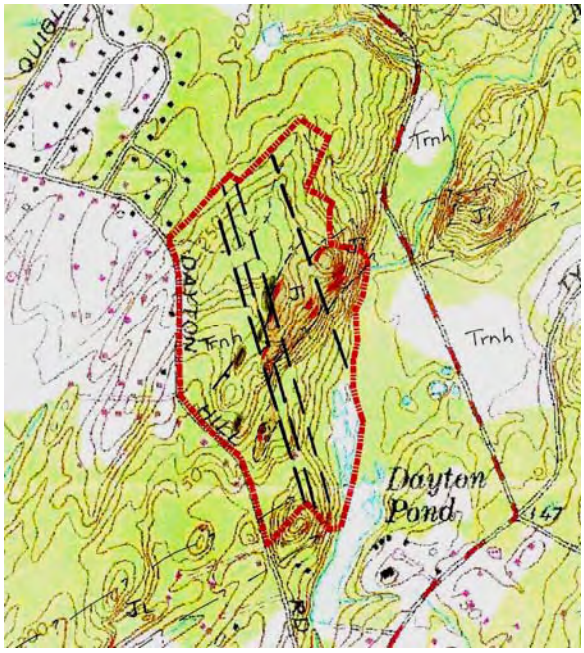


Figure 1. Geologic map of Bertini Park made on field review (with surrounding areas from Rodgers, 1985, see fig.5). **Trnh** = Triassic age New Haven Arkose (brown areas on map – location of visited outcrops); **Ji** = Jurassic age intrusive basalt (red on map – darker color at visited outcrops). Thin dashed black lines = approximate contact between rock units. Thick dashed black line = trace of fault.

Topography

Bertini Park is characterized by several northeasterly trending ridges with steep southeasterly facing slopes (see Fig.1). The Muddy River and its flood-plain, along with an impoundment (pond) form the eastern boundary of the park and are its lowest elevation. The pond elevation in maintained by a dam at about 104 feet (above mean sea level). The highest ridge has an elevation just greater than 288 feet. Total relief is about 185 feet. The ridges are interrupted and to some extent offset by several northwest trending lineaments. The topography is very much a product of the bedrock geology and glacial erosion.

Bedrock Geology

The *sedimentary rocks* belong to the Triassic age New Haven Arkose, the oldest rock unit in the Mesozoic basin. They were deposited in the channels of ancient streams and rivers that meandered across the landscape between 200-225 million years ago, during the age of dinosaurs. The formation here consists of interbeds of coarse-grained arkosic sandstone and conglomerate which form several areas of outcrop (Fig. 2). They are probably interbedded with layers of siltstone which do not crop out in the area. Generally conglomerate and sandstone are more resistant to erosion than siltstone. The more subdued ridges in Bertini Park are underlain these more resistant of the sedimentary rocks (Figure 1).

The sandstone and conglomerate are reddish brown and reddish gray in color. They are composed of medium to coarse grains of quartz, feldspar, and rock fragments. The rock fragments are metamorphic in origin and are similar to metamorphic rocks exposed in the eastern highlands of Connecticut, their presumed source. The sand grains are held together (cemented) by hematite (Fe_2O_3) cement which is the pigmenting agent.

A. **B.**

Figure 2. A. New Haven Arkose. Outcrop near southwest boundary of park showing south-easterly dip (tilt) of rock layer. Glove is ~10" in length. **B.** Conglomeratic sandstone. Light colored grains are feldspar. Pen is 5.5" in length.

Sedimentary rocks are originally deposited in layers stacked on top of each other and with a near horizontal orientation. Now the layers are tilted toward the east-southeast at about 10-15^{o}. Although no rocks crop out along the long ridge near the northwestern border of the park, the ridge morphology suggests that it is likely underlain by a layer of sandstone or conglomerate tilted toward the east-southeast.

The *igneous rock* forms discontinuous outcrops along the highest ridges in the park (Fig. 3). Outcrops are more abundant on the northwest facing slopes near the top of the ridge summits. The rock is tea-brown on a surface exposed to weathering, but dark gray on a freshly broken surface. It is composed of dark minerals: pyroxene and calcic plagioclase feldspar.

A. **B.**

Figure 3. Basalt/Diabase outcrops. Notice the fractures that tilt into the hill in **A** and that tilt toward the observer in **B**. These are interpreted to be cooling joints that formed perpendicular to the intrusive contact.

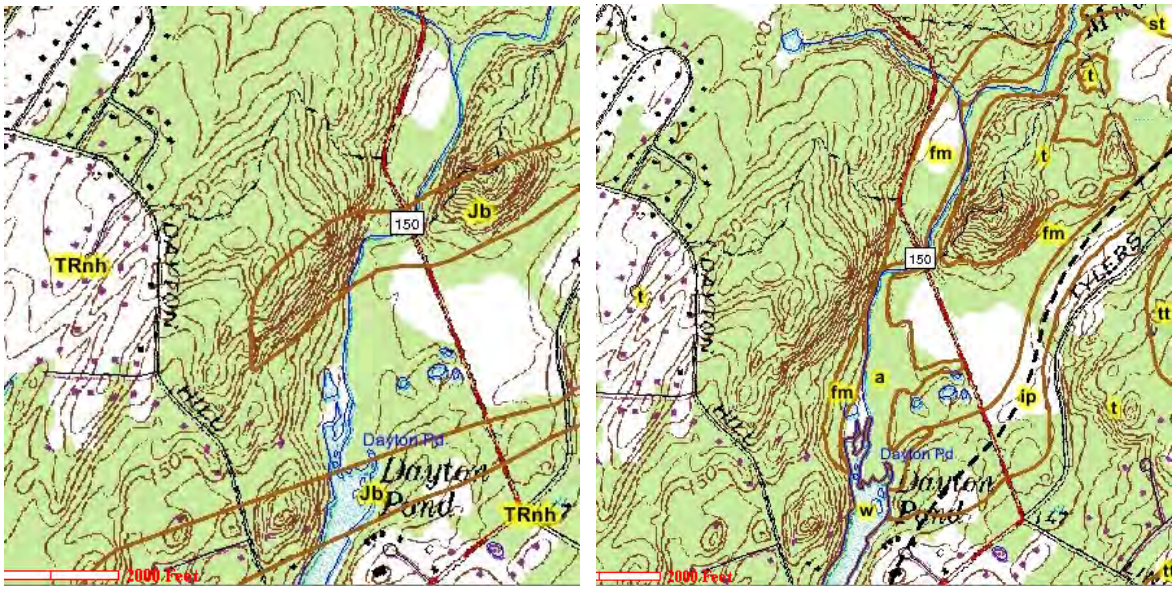
Although the Team did not find olivine, small amounts of olivine are found elsewhere in this rock. The rock is fine to medium grained and is classified as diabase. Near the highest summit in the park the diabase may be seen to cross-cut the trend of sandstone bedding. This suggests that the diabase is younger than the sandstone. Low-angle joint columns in the diabase on the southeast side of the ridges suggest a high-angle contact between igneous body and the surrounding sedimentary rock. Thus the diabase is judged to be intrusive in nature. It must be noted, however, that the contact of the diabase with the surrounding sedimentary rocks was only seen at one location on a northwesterly facing slope. The contact on the southeast facing ridge slopes was not seen in the field and thus the location of the contact on the map is an estimate of its true location.

The shape of the intrusive body appears to become narrower and pinch out near the southwestern boundary of the park: it apparently does not cross Dayton Hill Road. This makes it somewhat larger than shown on the state map (Fig. 4A, Rodgers, 1985). Rodgers does show, however, that the intrusive rock reappears both north and south of the park, somewhat en echelon in fashion. This is typical of the outcrop pattern of the Higganum Dike, to which this body is correlated by these authors (see discussion below).

The ridges are cut by northwest-southeast trending fault/fracture sets (Fig. 1). The rock body is noticeably displaced along the fracture sets suggesting that they are faults. The displacement along the fractures seems to be down to the north on the northern fractures but down to the south for the southern fractures. This interpretation is based on the interpretation that the diabase contacts dip steeply to the northwest and the assumption that movement on the faults is vertical. None is well exposed but all have a pronounced affect on the erodability of the rock. Breaking the rock along the fractures made the rock more susceptible to glacial erosion. Hence, the greater erosion along the fractures has created small ravines and northwest trending slopes.

Most of the intrusive bodies in the southeastern part of Wallingford have been considered part of the Buttress Dike system by Rodgers (1985, see Fig. 4A). Just south in North Haven,

however, a similar dike connects to the Talcott Basalt and hence is interpreted to be a feeder for that lava flow (Philpotts and Martello, 1986: Philpotts and Asher, 1992). That dike is part of the West Rock Dike system (which correlates to the Higganum Dike east of the central valley). The dikes in the southeastern part of the Mesozoic Basin are considered the down-dropped equivalents of the Higganum Dike by Philpotts and Martello. The Team geologists think the dike system in Bertini Park is likewise part of the West Rock-Higganum system.



A. B.

Figure 4. A. Bedrock map of Rodgers, 1985. **TRnh** = New Haven Arkose, **Jb** = Buttress Dike)intrusive basalt/diabase. Compare with Figure 1. Scale has been cut and shows only 1000'. **B.** Quaternary Geologic Map of Stone and others, 2005.**t** = till, **tt** = thick till, **fm** and **ip** = glacial meltwater stream deposits, **a** = modern alluvium, **w** = water. Scale has been cropped and shows only 500 feet. Both maps from DEP.

Surficial Geology

Most of the rock in Bertini Park is covered by glacial soils formed at the end of the last Ice Age: only a few outcrops poke through the soil. Glaciers are powerful agents of erosion. They remove the original soil from rock over which they flow. They melt and refreeze in and around fractures in the underlying rock and are able to wedge and pull chunks of the underlying rock up into the glacial flow. They then use those chunks of rock as gouges to scrape and abrade the underlying bedrock. They grind the rocks together and break them into finer and finer fragments. The ice carries all this debris along with it as it flows. When the ice melts, all the debris is left behind, covering the underlying rock and forming glacial soil. The glacial soil is referred to as till (**t** and **tt** on Fig. 4B). Till is the debris left behind by the glacial ice after it melted. As such, it is a mixture of mud, sand, and gravel. The till is fairly thin over most of the park area and in a few places it is so thin that bedrock crops out.

Melting ice creates large volumes of water that collect into streams that rapidly flow downhill. Water is also a mover of material. The melt-water streams transported large amounts of sand, gravel and mud. Some of the sand and gravel was deposited as terraces along the sides of the valleys through which the streams flowed. In many places, left over blocks of ice remained in the valleys. The leftover ice was covered or partially covered by the stream-deposited sand and gravel. When the ice melted it created depressions, called kettles, and allowed streams, both meltwater and modern, deeper valleys in which to flow. A terrace stands 6+ ft the pond elevation at Bertini Park (Fig. 5). It is likely a kame terrace deposited by meltwater streams at the end of the ice age. The ball-fields across the river are built on a similar deposit. Several kettles are indicated on the map in the ball-field deposit. The deposits are mapped as ice-contact deposits (**fm** and **ip**) by Stone and others (2005, see Fig. 5B).

A. **B.**

Figure 5. Two views of kame terrace. Notice in 5A that terrace is about 6 feet above the pond level, which itself is several feet higher that the original river bed. Terrace is inferred to predate modern stream processes: it was deposited by a glacial meltwater stream.

Hydrology

If it becomes necessary during development of the park to drill water-wells, several areas offer the chance for obtaining better yielding wells. The kame terrace is underlain by high permeability sand and gravel deposits. However, heavy pumping may induce infiltration from the Muddy River with potential pollutants. Bedrock wells drilled in line with the fault/fracture traces likely will yield higher volumes of water than wells drilled into the less fractured rock.

References

Philpotts, A.R., and Asher, P.M., 1992, The first Mesozoic magma of the Hartford Basin: Examination of the feeder dike, a laccolith, and the Talcott lave flow. in New England Intercolleidiate Geological Conference, 84th Ann. Mtg. Trip A-6, p. 67-85.

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Rodgers, John, 1985, Bedrock Geological Map of Connecticut. State Geological and Natural History Survey of Connecticut, Nat'l. Resource Atlas Series, 1:125,000, 2 sheets.

Stone, J.R., Schafer, J.P., London, E.H., DiGiacomo-Cohen, M.L., Lewis, R.S., and Thompson, W.B., 2005, Quaternary Geologic Map of Connecticut and Long Island Sound Basin (1:125,000). U.S. Geol. Surv. Sci. Invest. Map # 2784.

Soils Resources

This soils resources report applies to the 76+-acre parcel referred to as Bertini Park, which is located on 114 West Dayton Hill Road in the southeast corner of town. The information in this report is based on the USDA's historical soils series descriptions and the new digital mapping unit descriptions as presented in the Soil Survey of Connecticut, remote survey interpretations plus field observations.

The historical reference for soils regarding this region can be found on sheets number 38 & 46 of the 1979 New Haven County Survey. See Exhibit #1.

Soils Resources

Wetland Soils

1) USDA Soil #6 - WT - Wilbraham and Menlo extremely stony silt loams. These soils are so intermingled that they could not be separated on the map. Both soils formed in dense basal till in drainageways and depressions. There are two locations where these soils are found on this parcel. The largest portion of this soil type is found along the northwest border of the property west of King Road and Dayton Hill, which is approximately 1.5-acres in size. The other location is at the entrance of Bertini Park off of West Dayton Hill Road and is equal to less than a quarter acre in size.

The Wilbraham soils are very deep and poorly drained. Typically, they have loam or very fine sandy loam textures to a depth of 60 inches or more. These soils have low chroma mottles throughout the subsoil layers. Mottled means "marked with spots of contrasting color." Soils that have brightlv colored mottles and a low matrix chroma are indicative of a fluctuating water table.

The Menlo soils are very deep and poorly drained. Typically, they have an organic surface layer overlying fine sandy loam, loam, or silt loam materials to a depth of 60 inches or more.

2) USDA Soil # 104 - BAS - Bash silt loam. This map unit consists of Bash Soils on 0 to 3 percent slopes. These very deep, somewhat poorly and poorly drained soils are on low-lying floodplains. They formed in loamy alluvial deposits. Bash soils typically have mottled reddish silt loam to fine sandy loam materials, to a depth of 40 inches. They have a seasonally high watertable within 1.5 feet of the surface in wet periods of the year. The Bash soils are subject to frequent flooding and commonly flood annually, usually in the spring.

Concerns

- **River Corridor** - Snags from trees in the river and corridor have concentrated flows towards highly erodable banks that accelerate the aggradation[1] of the riverbed and ultimately affect Dayton Ponds capacity and water quality. Possible clearing of snags and stream bank stabilization should be considered along this section of the river to the pond.

Non-wetland Soils

3) USDA Soil #55B - WcB - Watchaug fine sandy loam, 3 to 8 percent slopes. Watchaug soils are very deep and moderately well drained soils formed in glacial till, derived mainly from red Triassic rocks. There are approximately 4-acres of this soils type, which are located in the southeast portion of the site and abut the Muddy River and the upper reaches of Dayton Pond.

These soils have a seasonally high watertable at 1.5 to 2.5 feet in the late fall to early spring. Typically, they have a fine sandy loam, loam or silt loam surface layer and subsoil, over a friable fine sandy loam, sandy loam or loam substratum that extends to a depth of 60 inches or more. Watchaug soils have low chroma mottles within a 24-inch depth. Mottled means "marked with spots of contrasting color." Soils that have brightlv colored mottles and a low matrix chroma are indicative of a fluctuating water table.

This soil has a **fair potential for community development.** Due to the seasonal high watertable, particular attention needs to be given to building structures that are below grade, because they would generally be below the depth of the water table. On-site septic systems, will generally not function satisfactorily with normal design and installation because of the high water table.

Concerns

- **Flood Plain** - The 100 Year Flood Plain extends westward to the 115' to 116' contour elevation. No camping structures should be sited within the flood zone.

- **Erosion Control** - Pond / River Access Points - Potential access points such as canoe / boat ramps should be properly armored to reduce the threat of erosion and siltation of the pond and the Muddy River.

- **Buffers** - Riparian buffers should be maintained and enhanced in several points along the river and the pond.

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[1] **Aggradation** refers to the build up of the land surface due to deposition of solid materials. Often applied to the deposition of sediment in a river.

4) USDA Soil #63D - CsD - Cheshire fine sandy loam, 15 to 25 percent slopes. Cheshire soils are very deep, well-drained soils formed in glacial till, derived from red Triassic materials. Typically, they have fine sandy loam, loam or silt loam surface layer and subsoil over a friable sandy loam, fine sandy loam or loam substratum that extends to a depth of 60 inches or more. These soils are found in the northwest corner of this parcel, where the slopes are steep and eroding from all terrain vehicle (ATV) use.

This soil has moderate permeability. Runoff is rapid. Available water capacity is high. Unless limed, this soil is very strongly acid through medium acid.

It is limited mainly by the steepness of slopes. There is a severe erosion hazard associated with this soil. Waste disposal systems such as onsite septic systems require very careful design and installation to prevent the effluent from seeping to the surface down slope from the leaching field. Controlling runoff and erosion is the major concern of management. Temporary vegetation, diversions and silt basins are needed to control excessive runoff, erosion and siltation.

Concerns

- **ATV's** - Erosion and siltation has been greatly accelerated along the steep trail section from ATV use. Recommend reclaiming the trail for foot traffic by narrowing the trail, limit access points, posting prohibited uses and implementing runoff diversions at the top of slope and at appropriate intervals along the trail itself.

- **Habitat Disturbance** - This area is a migration area for amphibians and upland habitat for the Eastern Box Turtle. (Eastern Box Turtle documented on the southwest slopes of Morris Rock per R. Mrozinski, field notes.)

5) USDA Soil #64B - CtB - Cheshire very stony fine sandy loam, 3 to 8 percent slopes.
This gently sloping, well-drained soil is on broad hilltops where it formed in glacial till derived mainly from red Triassic rocks. Typically they have a fine sandy loam, loam or silt loam surface layer and subsoil over a friable sandy loam, fine sandy loam or loam substratum that extends to a depth of 60 inches or more. This soil comprises approximately 26% of the total site and is equal to 22-acres in size.

6) USDA Soil #64C - CtC - Cheshire very stony fine sandy loam, 8 to 15 percent slopes.
This soil is similar to the CtB soil but the slopes are steeper. This steepness causes runoff to be rapid. This soil poses a severe erosion hazard when disturbed. This soils type is approximately 5-acres in size.

Concerns

- **Erosion** - Off-road motorized vehicles have gained access to these portions of this parcel and greatly increased disturbances along the trails, which have given rise to increased erosion and siltation on moderate to steep slopes.

- **Trails** - Erosion along trail points throughout this area needs to be addressed and minimize trail width. Trail sides should also be re-vegetated.

7) USDA Soil #69C - YaC - Yalesville fine sandy loam, 8 to 15 percent slopes. Yalesville soils are moderately deep, well drained and formed in loose till, derived from red Triassic materials. This soil occupies approximately 8% of total site and is located on the western portion of the site along West Dayton Hill Road. They have fine sandy loam textures overlying sandstone bedrock. The bedrock occurs within a depth range of 20 to 40 inches.

This soil has moderate or moderately rapid permeability above the bedrock. Runoff is medium. The **hazard of erosion is moderate** and controlling runoff and erosion is a concern in managing this soil for farming. Windthrow is a hazard with large trees because of the limited rooting zone above the bedrock.

Concerns

- **Trails** - Existing and potential trails sited on these soils and slopes require adequate erosion and sedimentation controls to be installed at the top of slope and mid-slope to reduce rill and gully development. Trail widths should be limited to gentler slopes and minimal widths to reduce land disturbance.

8) USDA Soil # 77D - HuD - Holyoke-Cheshire complex, 15 to 35 percent slopes.
The HuD map unit consists of moderately steep and steep well-drained and somewhat well drained soils on uplands where the relief is affected by the underlying bedrock. This soil constitutes 35% of the total soils types on site. This complex has permeability and runoff is rapid. It is limited mainly by steep slopes, shallowness to bedrock and outcrops. Disturbance of these soils would require intensive measures such as diversions, vegetative cover and mulching to prevent excessive runoff, erosion and siltation.

The dominant soil is Holyoke, which is shallow and well drained. They have sandy loam textures overlying consolidated bedrock at a depth of 10 to 20 inches. The underlying bedrock is hard unweathered basalt. These soils do not have a high watertable within their 20-inch depth.

The second soil component is Cheshire. Cheshire soils are very deep and well drained. Typically, they have fine sandy loam textures to a depth of 60 inches or more. Depth to the seasonally high watertable is greater than 6.0 feet.

Concerns

- **Recreation Area** - Proposed Rope Courses and Trail systems through these soils require careful layout and design due to influences of bedrock and steep slopes. Citing the potential hazard of wind throw of trees, remove *hazard* trees along trails and implement adequate erosion and sedimentation controls on disturbed soils and trails.

- **Camping** - Camping should **not** be considered in this section due to the increased risk of wind thrown trees.

9) USDA Soil # 89D - WnD - Wethersfield loam, 15 to 35 percent slopes.
This moderately steep and steep sloping, well-drained soil is on the side slopes of drumlins, ridges and hills on glacial uplands. These soils constitute approximately 5.5% of the total acreage, which is somewhere around 5-acres in size. They formed in compact glacial till, derived mainly from red Triassic rocks. Typically they have a friable loam or silt loam surface layer and subsoil over firm loam, silt loam, or fine sandy loam, dense basal till substratum.

Permeability is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is rapid. This soil has **poor potential** for development. The hazard of erosion is moderate to severe. The slow permeability in the substratum affects the function of any waste disposal system. Waste disposal systems, such as onsite septic systems will generally not function satisfactorily with only normal design and installation. Very careful and generally costly design and installation are required to insure that the system functions properly and effluent does not seep to the surface down slope. **Breakouts are a severe problem on this soil.**

During construction, intensive conservation measures are necessary to prevent runoff, erosion and siltation. These measures may include temporary vegetation, diversions and siltation basins.

Concerns

- **Structures / Septic:** Previously a pavilion and bathrooms were sited in this area had been servicing a smaller camping population. The proposed use for the summer camping and daily recreational use could possibly exceed the capabilities of these soils to perform and contain generated effluents.

Recommendation

- **Septic / Bathrooms** - Recommend relocating the bathrooms and septic system to the area previously occupied by the caretakers dwelling in an effort to redirect discharge treatment away from the camping platforms and take advantage of existing town water infrastructure if possible.

- **Camping Platforms / Pavilions** - Re-establish pavilions and camping platforms on the gentler inclines that terrace these steep slopes.

- **Wind thrown Tree Hazard** - Establish and adequate safety zone around platforms and pavilions through selective removal of tree canopy and possibly creating an early - succesional forest cutting that reduces the taller trees and enhances the shrub growth in closer proximity to the campers. This will increase the protection of the campers from wind thrown trees and downed branches.

Land Use Planning Opportunities

The property needs to have a long-term natural resource conservation plan, which encompasses goals and objectives for increasing and maintaining biodiversity, integrates year round passive recreational uses that can provide a platform for education that showcases its natural resources, provides public access, serves the citizenry of the town while advocating for all environs on and abutting this site.

- **Environmental Education** - The creation of a diverse habitat and sanctuary on this site could be used as an outdoor living classroom / laboratory. This would expand and enhance all grade level science based curriculums in the Wallingford school system. This could involve local schools, colleges and interested non-profits.

- **Trail Layout** - Establish a trail system guided by the protection and preservation of critical habitats, promotes the minimization land disturbance, which ultimately reduces potential impacts from erosion and siltation of sensitive habitats from silviculture operations and recreational activities.

Wildlife Considerations

Wildlife habitat on the site includes mixed hardwood forest, open / reverting fields and wetlands. The wildlife can be managed through management of habitat. Optimum habitat diversity will maximize wildlife production. Suggestions include managing the wooded portions of the property, maintaining open fields, providing small conifer patches, encouraging certain tree species and placing bluebird boxes at the edges of the fields. Controlling unwanted pioneer and invasive species of plants such as autumn olive and multiflora rose would allow for easier management of these properties and provide more opportunity to enhance the area with beneficial native species.

Mixed Hardwood Forest: This habitat type consists of a variety of hardwood species, including red maple, beech, red oak, elm, hickory, white oak and scattered white pine and cedar. Understory vegetation includes witch hazel, elderberry, multiflora rose, grape, blackberry and hardwood regeneration. Wildlife frequenting this habitat type includes deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), barred owls, broad-winged hawks and various non-game species such as shrews, voles and snakes.

Wetland / Riparian Habitat: This habitat type consists of various combinations of streams/ brooks, swamps and small marsh areas. Associated vegetation includes red maple, birch, alder, cattails, dogwood, jewel-weed, spicebush, sweet pepper bush, skunk cabbage, duckweed and various grasses and sedges. Signs of wildlife using these areas include deer, fox, raccoon and muskrat. Other creatures utilizing these areas are skunks, swallows, red-winged blackbirds, cardinals, grackles cedar waxwings, titmice, woodpeckers, wood ducks and numerous amphibians and reptiles, including water and garter snakes, salamanders, newts, spotted and painted turtles.

Management Techniques: The manipulation of vegetation is a key element of wildlife management. Sustaining wildlife populations means regulating on a continual basis the kind, amount and spatial arrangement of food and cover plants to provide for the needs of wildlife. The optimum wildlife habitat will be comprised of well-mixed upland/forest stands, edge habitats with successional vegetation and open fields. Creating a variety of areas with successional stage vegetation, maintaining openings along field borders will sustain your biodiversity and the health of your natural resources as a whole.

Federal Administered Programs
Natural Resource /History / Education/ Trails

Trails are the key to bringing people and wildlife together. Trail systems should be located to take advantage of terrain and existing habitat and conform to existing landscape textures. Effective trail planning and layout can enhance the learning and aesthetic aspects of passive outdoor recreation by providing easy access to varied habitats. A nature trail, including informational signs, provides insight into the ecology of an area. The information provided increases awareness, allows the general public to appreciate a particular animal, plant or habitat and its ecological value and fosters a stewardship of our natural resources that will serve our communities for generations to come.

- Guidance on developing a trail system can be obtained by contacting the CT Forest and Parks Association located on RT 66 in Middlefield, CT (860) 341-2372.

Several federal and state programs offered by the USDA / NRCS are available with cost share options to many Town to facilitate and enhance long-term land management plans for silviculture management, open space preservation and wildlife habitat improvement. For more information regarding these programs please contact Richard Ksyztyniak, District Conservationist for the US Department of Agricultures, Natural Resources Conservation Service at 900 Northrop Rd., Suite A, Wallingford, CT 06492.

- **USDA/NRCS - Programs**
  EQIP = Environmental Quality Incentives Program: Farming Entities (Commercial or Private) under lease agreements with the Town would be eligible to participate in the program for the implementation of BMP's and development of sound conservation plans designed to assist in erosion and sedimentation control, nutrient loading, reducing water consumption and the selection of appropriate crops suited to site specific soils and topographic characteristics.

- **WHIP = Wildlife Habitat Incentive Program:** Municipalities and Private Landowners are eligible to participate in a cost-share program for landowners implement practices to maintain or establish wildlife habitats. These practices include invasive plant control, early successional woodlands, riparian areas; state identified imperiled habitats plus streams and rivers.

Exhibit #1


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HALSEY DR
HITCHING POST DR
KING RD
REGENT CT
W DAYTON HILL RD
FOX RUN DR
WOODHOUSE AVE
64C
64B
69D
6
69C
77D
104
55B
89D
W
N
Meters
0
50
100
200
300
Feet
0
300
600
1,200
1,800

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 6, Mar 22, 2007

Date(s) aerial images were photographed: 3/31/1991; 3/16/1992

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

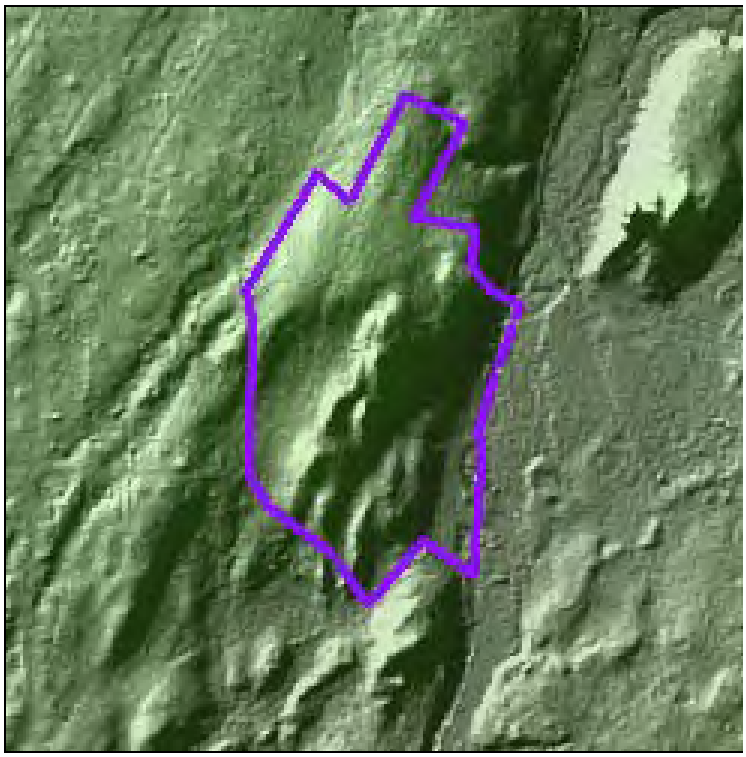
Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
6	Wilbraham and Menlo soils, extremely stony	1.7	2.0%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	4.1	4.7%
63D	Cheshire fine sandy loam, 15 to 25 percent slopes	2.2	2.5%
64B	Cheshire fine sandy loam, 3 to 8 percent slopes, very stony	22.5	26.2%
64C	Cheshire fine sandy loam, 8 to 15 percent slopes, very stony	4.8	5.6%
69C	Yalesville fine sandy loam, 8 to 15 percent slopes	7.2	8.4%
77D	Cheshire-Holyoke complex, 15 to 35 percent slopes, very rocky	30.2	35.2%
89D	Wethersfield loam, 15 to 35 percent slopes, extremely stony	4.8	5.6%
104	Bash silt loam	7.6	8.8%
W	Water	0.8	1.0%
Totals for Area of Interest (AOI)		85.9	100.0%

Wetland Resources

Bertini Park is located in south central Wallingford about one half mile north of the Wallingford-North Branford municipal boundary. It encompasses about sixty nine acres. The park abuts, and is considered part of, the 1,116 acre Tyler Mill town-owned open space parcel.

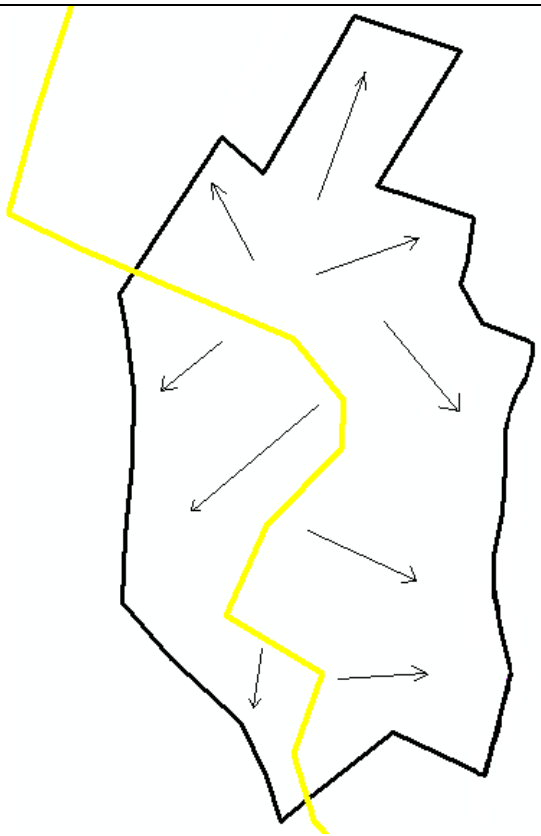
The highest point in the park is 285 feet above Mean Sea Level (MSL). The lowest point is along the shore of Dayton Pond at an elevation of about 105 above MSL. This leads to a wide variety of slopes, from very gradual to very steep. The steepest slope occurs at the east-central part of the parcel and measures about 40 per cent gradient.



This shaded landscape graphic shows the nature of the topography in a "RADAR" type of three dimensional overview. Topographical highlights along with level areas are readily apparent. The darkest locations represent the steepest slopes. Close inspection reveals the level surfaces of roadways.

Base graphic from: http://clear.uconn.edu/clearims/depstands

Bertini Park is split by a drainage divide. Approximately thirty per cent of the water that is shed by the park's hills runs southwesterly into the Pine Brook drainage. The other seventy percent drains in a generally easterly direction, as the topography dictates, into the Muddy Brook/Dayton Pond drainage.



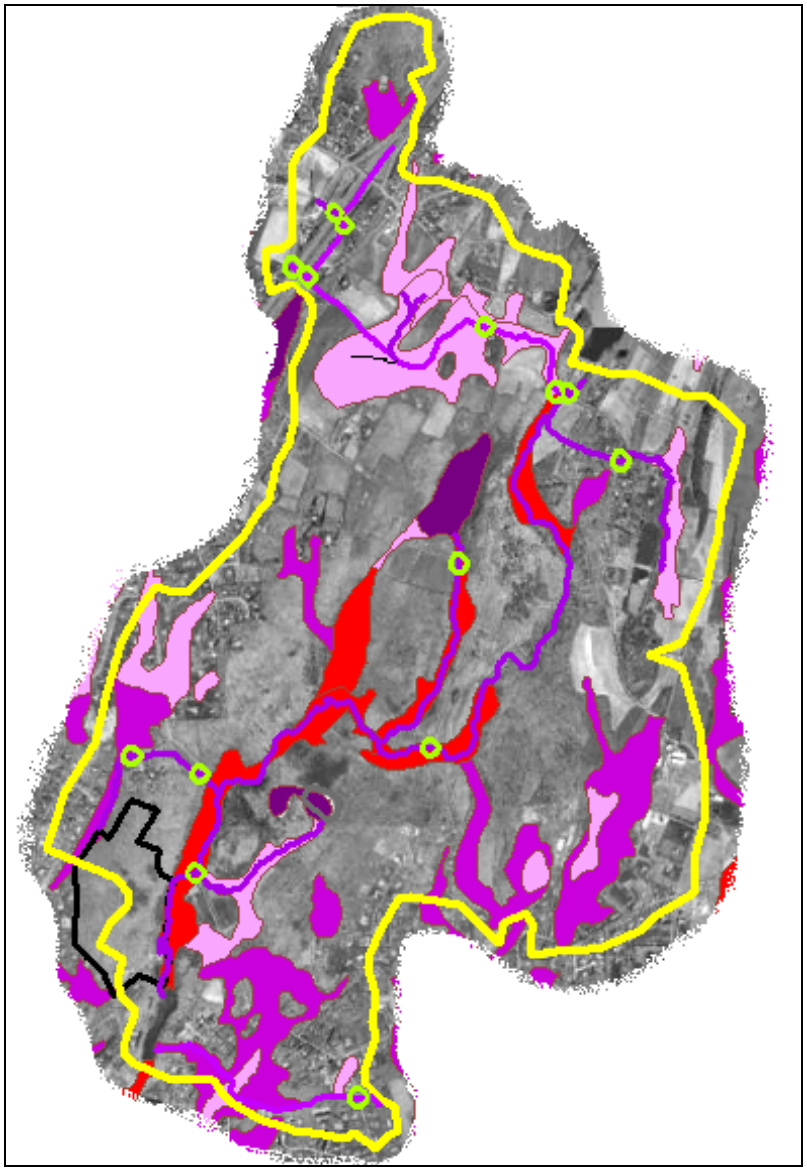
At left is the graphic depicting the approximate park boundaries and the drainage pattern of the park property. The drainage divide is seen in yellow dividing the property into a 30 per cent - 70 per cent split. The divide follows the high points across the landscape. From these points water flows in the direction dictated by the localized topography and indicated here by the black arrows.

The parcel is almost entirely wooded and, as a result, yields excellent water quality for both open water and classic wetland environments. The first-rate work of the woodland forest floor is a critical component in both the surface and the groundwater recharge, filtering, and buffering of water within the watershed.

As of this writing the DEP has classified the Water Quality of the Muddy Brook from its headwaters to Dayton Pond as "AA". This is on a rating scale of "AA" being the best, "A" being next, then "B", "C", and finally "D". The further into the alphabet the letter, the more degraded the water quality. (The full text of DEP's *Water Quality Standards and Criteria* can be found on the web at: http://www.ct.gov/dep/lib/dep/water/water_quality_standardsl/wqs.pdf)

Local water quality is, as it is frequently, the result of upstream impacts from land use. The graphic below depicts all of the land that sheds water into the Muddy Brook drainage from below the Mackenzie Reservoir dam to above the Dayton Pond dam. The yellow indicates the bounds of the drainage area. The green circles show the locations of the road crossings over streams, the most vulnerable locations for sediments to enter the wetland/watercourse system. Bertini Park, outlined in

black in the south west corner, makes up just a very small part (~3%) of this 3.39 square mile (2,170 acre) drainage.



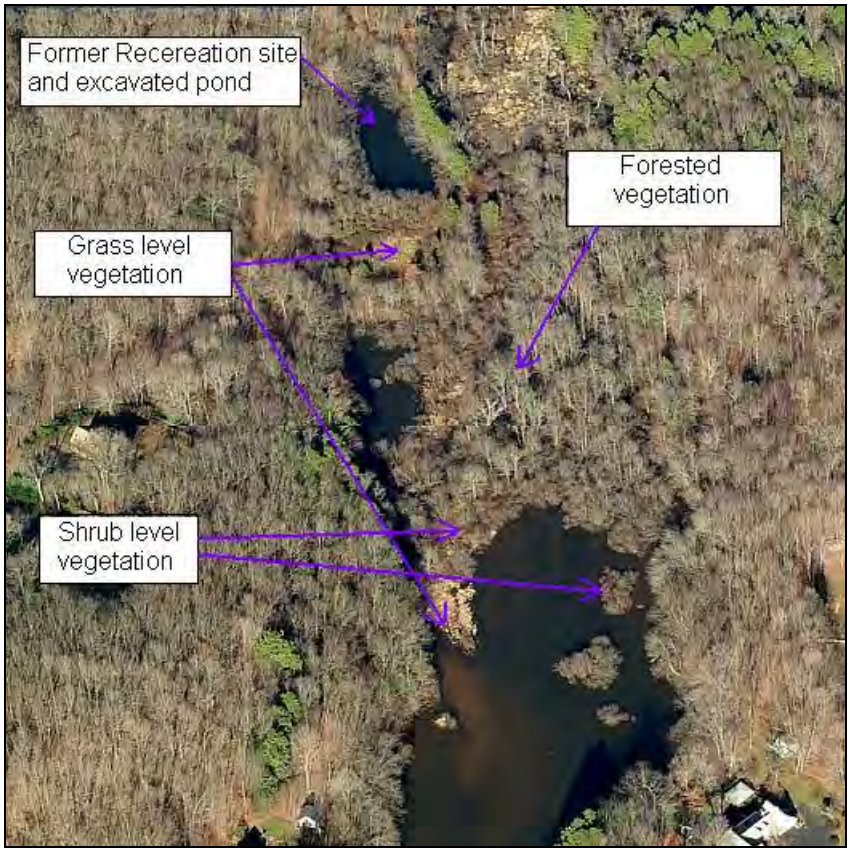
In the graphic at left a variety of colors is present. The base is the 2004 aerial photography upon which the sinuous purple lines represent the watercourses. Other colors represent differing types of wetland soils as mapped by the Natural Resources Conservation Service. Light purple is poorly drained soils, medium purple is very poorly drained, and red is alluvial. It should be noted that the smallest soil unit mapped is three acres in size. Thus, small wetland soil and surface water wetlands may not be included.

This size/acreage “loophole” would be the case for the vernal pool in the northeast portion of the panhandle of the property where a vernal pool exists but is not seen on the map above. Only along the eastern boundary of Bertini Park do we find the red that is indicative of the wetland alluvial deposits of Muddy Brook.

The Wetlands

The Team inspected the existing wetland from various points of view. Primarily the wetlands on site are broad, shallow and riverine with emergent shrub level vegetation tapering to a

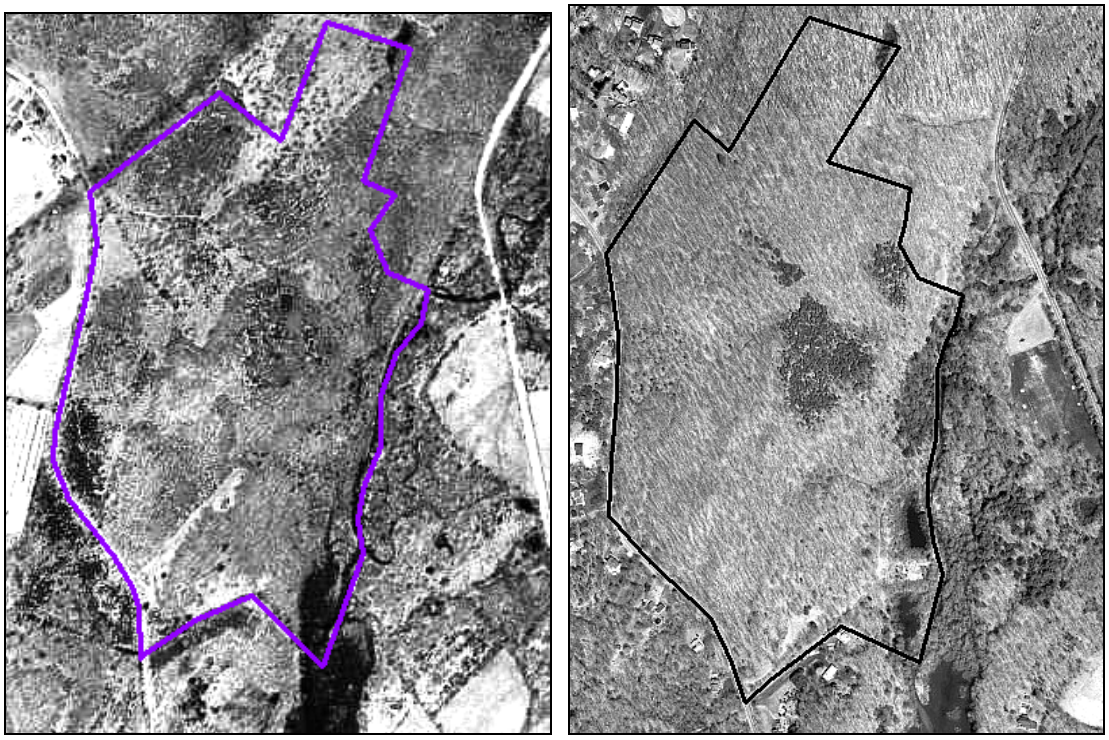
slightly deeper water regime with vegetated (“grass”) sediment islands. Elevation makes all the difference here and subtle vertical changes can be just enough to allow tree growth instead of shrubs, and shrubs instead of grasses. In the views of the vegetated wetlands immediately below, shrubs dominate the across-the-water wetland while to the right grasses dominate this sediment “upland”.



This view of the site is taken from Microsoft’s “Live Search Maps” website with photography from mid 2007±. Here the various types of wetland vegetation can be seen, along with the now overgrown former recreational lake site which is described below.

Historic Land Use

Below is a photographic comparison of the Bertini property (boundaries approximate) from 1934 on the left and 2004 on the right. Clearly the land use today is far more homogenous (totally forested) than it was 70 years ago. On the right, the general gray pallor of the trunks, branches and shadows are the deciduous trees before leaf out, with a few interspersions of the darker conifers. Seventy years earlier (left photo) the nearly white to light gray color range shows the agricultural fields. The variety of coloration seems to address a sort of "recovery" from an assortment of earlier land uses. The lighter colors and hedge rows of former fields are in evidence as well as white roadways and paths. Noticeable also is the much greater extent onto the property of Dayton Pond in 1934 as compared to 2004.



The dark random 'dots' on the 1934 photo to the left, together with lines and clumps of 'dots', are coniferous trees. These were/are frequently located at the edges of fields and as markers of former field boundaries. The same area in 2004 appears at right. (All boundaries approximate.)

Dayton Pond is an integral part of the lower Muddy River riverine/wetland system. As we have seen the greater portion of the park drains into this wetland and watercourse system which forms the southeast park boundary. As such, development (trails, ropes courses, etc.)

on the slopes of the drainage and abutting the wetlands will have to be sensitive to the issues of sediment and erosion control. Hopefully the proposed increased activity in the park will discourage illegal use of erosion causing all terrain vehicles (ATVs).

Sediment loading - Nothing can impact the depth of an impounded lake as quickly as sediment loading. Looking at the two photographs below it is readily apparent that seven decades of sediment loading have not been kind to Dayton Pond. Somewhat less than one third of the lake's open water has disappeared.

1934 2004

It is pretty clear to see that the ponds that now exist north of the impounded lake are vestiges of what was once the lake's upper marsh as seen on the 1934 photograph. (*State Library aerial photograph number 05663, dated April 1934)*

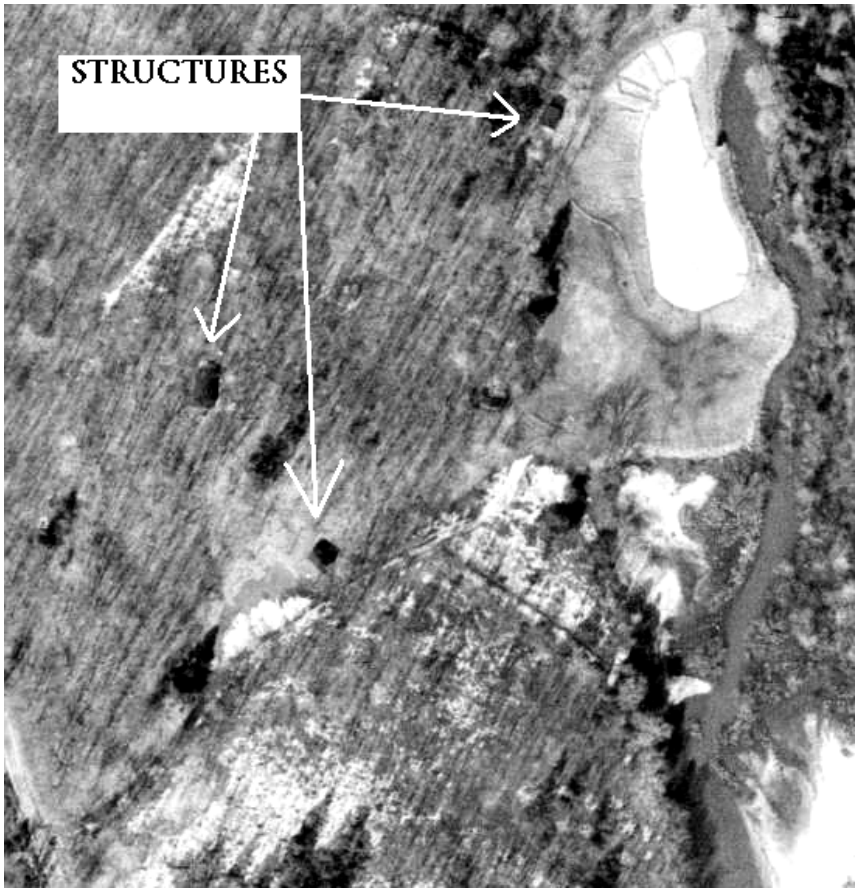
Issue: Road Sand - As the number and width of road surface miles within the watershed increases so does the amount of road sand applied during the winter months. Some things to keep in mind -

Connecticut has a no tolerance level for snow and ice on its roads. As a result, large quantities of road sand have historically been applied every winter to keep the travel ways

safe. The DEP estimates that on average in urban settings more than 40,000 pounds (20 1/4 tons) of sand is applied per road mile every year. Of that total, approximately 30-50 per cent is collected in the spring through street sweeping. Thus, for every year that sand has been applied to roads roughly 12 tons of sand has been left on every mile.

Because of the nature of the Connecticut's hill and valley topography, roads are often in close proximity to wetlands and watercourses. This aspect of the landscape makes it highly likely that over time most of the uncollected sand will move downslope into the wetlands and watercourses. These sediments can destroy aquatic habitat and fill in water bodies. The impact of sand deposition (typically in combination with elevated salt levels) on spawning streams and wetlands with close proximity to roads is well documented. Road sand can be a major pollutant source by carrying nutrients, oil, and metals with it to the rivers, streams, and lakes. In the springtime, after the danger of icing, if the road sands are swept/collected later than sooner, the impacts are worse. This is because the constant grinding of automobile tires reduces sand particle size. These finer particles are held in suspension longer and thus carried further downstream. As a result of these impacts, towns are urged to sweep the roads as soon as possible in the spring and maintain their catch-basin clean-out schedule. (DEP road sand documentation is on the Web at: http://www.ct.gov/dep/lib/dep/waste_management_and_disposal/solid_waste/street_sweepings.pdf)

Not all the alteration of Dayton Pond was due to sediment loading however. In the March 2, 1965 aerial photograph seen at left, Dayton Pond dam is at the bottom center (white with ice) and a "new" pond (also ice covered), along with significant fill has been added to the flood plain at the north end of the impoundment. (*State Library photograph number 00689*.**)**



This close-up of the March 2, 1965 aerial photograph clearly shows the "new" pond and the fill area created for open space immediately abutting the pond edge. In those days before wetland regulations the protection of riverine marsh, floodplain and riparian areas was not regarded.

Finally: the proposed recreational use and impacts for the Bertini park waterfront should be restricted to a defined area(s). There is ample opportunity for teaching both riverine and wetland ecology, the importance of riparian buffers, the impacts of impervious surfaces, and wetland functions and values. Major wetland impacts, such as the recreation pond seen in the 1965 photograph (above), are clearly a vestige of past practices. Indeed the educational component / environmental classroom within the camp will open young minds to the area's diverse wildlife habitat, fish habitat, water quality and what vision it takes to preserve these functions and values. Other activities such as the ropes course, orienteering, trail creation, hiking, overnight camp, natural amphitheater and accessible trails should all avoid or minimize their impacts to the wetlands and floodplain, their riparian areas, and steep slopes.

However, the bigger picture - that of the watershed - also needs a plan; and in this case a plan of preservation. At some point sediment loading from roads, from construction, and from yard and farm sediments will have to be controlled in all of Wallingford's watersheds to preserve the riverine and open water environments. The future of neglecting this issue can be seen today in the northern end of Dayton Pond in the form of sediment accretion.

At left an ERT member displays a handfull of sediments from the bottom of the upper pond. Though an analysis would have to confirm it, these bottom materials are remarkably similar in size to road sand and *not* similar to mud from which the river draws its name.

All plans for trail building and/or rerouting should ensure that trails are constructed to take the traffic they are likely to bear. Any plans short of that standard will end up as these current trails have - needing to be shored up near steep slopes or worn to the point of erosion and held in place only by local root masses.

Aquatic Resources

Waterbody and Watershed Characteristics

Bertini Park encompasses a 76.5-acre tract of land in the south-east section of Wallingford. The Muddy River, Dayton Pond and an unnamed pond are found within the bounds of Bertini Park.

The Muddy River is contained in a channel that is roughly 50 feet in top of bank width and has normal flow depths that average approximately 1 foot. The channel is of low to moderate in gradient with surface flow predominated by pool interspersed by shallow riffle. The riverbed is composed of small boulder, cobble, gravel, coarse sand, and sand. Instream habitat is provided by the water depth in pools, boulders, undercut banks, and fallen or overhanging riparian vegetation. Based on its' physical characteristics, the Muddy River is considered a coldwater stream.

The Muddy River within Bertini Park.

Dayton Pond is an artificial waterbody that was created in the early 1900's by impounding the Muddy River with an earthen embankment dam. DEP Inland Water Resources – Dam Safety staff report that the dam is approximately 220 feet in length and has a 50-foot wide concrete and masonry spillway. The height of the dam is 15 feet and the spillway height is 11 feet. Dayton Pond has a water surface area of 6.6 acres. The Connecticut Agricultural Experiment Station reports that during a July 8, 2005 aquatic plant and water quality survey,

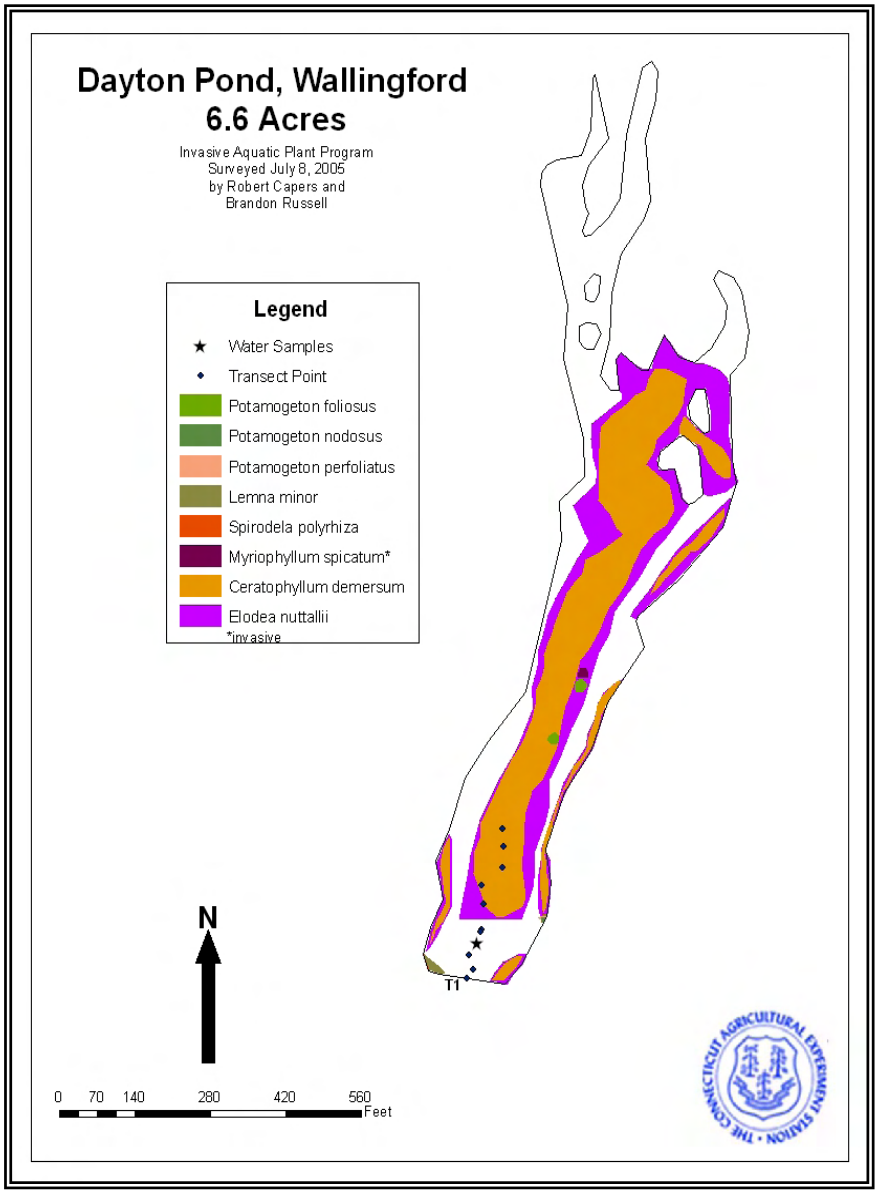
the pond had a maximum water depth of 6.5 feet and that there were extensive areas of shallow water with depths of around 1 foot.

Dayton Pond Dam.

Dayton Pond

Although not apparent on the date of the field review, Dayton Pond supports an abundant growth of floating and submergent aquatic vegetation. The Connecticut Agricultural Experiment Station reported a nearly complete coverage of aquatic plants in Dayton Pond during their 2005 survey.

The plant species identified in the survey included: common duckweed *(Lemna minor)*, giant duckweed *(Spirodela polyrhiza)*, coontail *(Ceratophyllum demersum)*, western waterweed *(Elodea nuttallii)*, claspingleaf pondweed *(Potamogeton perfoliatus)*, leafy pondweed *(Potamogeton foliosus)*, longleaf pondweed *(Potamogeton nodosus)*, and Eurasian water milfoil *(Myriophyllum spicatum)* an invasive, non-native species. A variety of emergent wetland plants (both soft and hard stem species) have colonized on sediment deposits in northern areas of the pond at the inlet of the Muddy River.



Connecticut Agricultural Experiment Station aquatic plant survey of Dayton Pond

In-water habitat in Dayton Pond is comprised of the aquatic plants and fallen or overhanging shoreline vegetation. Based on the habitat characteristics and shallow water depths, Dayton Pond is considered a warmwater impoundment.

A second pond is located westerly along the Muddy River and north of Dayton Pond. The unnamed pond is roughly 1 acre in surface area and had been created by excavation. A heavily vegetated berm separates the pond from the Muddy River. Ice cover prevented an evaluation of the pond's physical characteristics however; it is presumed that the pond would likely feature warmwater characteristics.

Although there has been prior development within Bertini Park, nearly the entire property is vegetated with dense growths of hardwoods and woody shrubs. Similar vegetation is found along the Muddy River and along the shoreline of Dayton Pond and the unnamed pond. A well-vegetated riparian area is critical to the ecosystem health of theses waterbodies. Roots of the trees and shrubs bind the shoreline bank soils and provide a resistance to the erosive forces of flowing water. Stems and leaves of bank vegetation provide shade that prevents high water temperatures. Leaves, stems, and other plant parts that fall into the water provide food for aquatic insects. Large woody debris that fall into the waterbodies enhance physical habitat. Abundant riparian vegetation softens rainfall and enables the riparian area to serve as a reservoir storing surplus runoff for a gradual release to the waterbodies during low flow periods of summer and early fall. The riparian area is a natural filter that removes nutrients, sediments, and other non-point source pollutants from overland runoff.

The conservation of forest land both within Bertini Park and north within the watersheds of the Tyler Mill Preserve and MacKenzie Reservoir have to date provided a means of maintaining Muddy Rivers' water quality. The Department of Environmental Protection classifies the Muddy River through Bertini Park 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.

Fisheries Resources

The Inland Fisheries Division ("Division") has conducted fish surveys of the Muddy River through the Tyler Mill Preserve periodically since the late 1970's. The primary purpose of the surveys was, and continues to be, an evaluation of the river's fish population response to water withdrawals from MacKenzie Reservoir. Division surveys of the Muddy River through the Tyler Mill Preserve revealed a fish population comprised of brook trout, brown trout, rainbow trout, blacknose dace, longnose dace, common shiner, fallfish, redfin pickerel, tessellated darter, white sucker, and American eel. These fish species are common to coldwater stream systems in Connecticut. The reach of the Muddy River within Bertini Park is anticipated to contain a similar fish population.

Several sections of the Muddy River through Wallingford and North Haven are open to recreational fishing. To satisfy angler demand, the Division annually liberates approximately

3,000 adult-sized brook, brown and rainbow trout. A number of trout are allotted to the Muddy River reach within Bertini Park.

Fish surveys have not been conducted in Dayton Pond and the unnamed pond. Based on their warmwater characteristics, both ponds are likely to provide habitat for the following fish species: largemouth bass, bluegill, pumpkinseed, yellow perch, golden shiner, chain pickerel and brown bullhead.

Recommendations

The reported goal of the Wallingford Park and Recreation Department and the Wallingford YMCA is to develop areas of Bertini Park to provide for day and overnight camping, outdoor education, and outdoor recreation that includes fishing and hiking. The following are recommended for incorporation into a long-term management plan for Bertini Park that will provide for stewardship-based conservation of the park's natural resources that are compatible with the recreational goals:

Establishment of Riparian Buffers

The creation of protective buffers would be an extremely effective mechanism to assure the long-term viability of the aquatic habitats and resources found within the Muddy River, Dayton Pond and the unnamed pond. The functions of riparian buffers were previously explained. It is recommended that the Wallingford Park and Recreation Department and the Wallingford YMCA adopt the Division riparian buffer policy of maintaining a 100 foot wide buffer along the Muddy River, Dayton Pond, and the unnamed pond. A 50 foot wide buffer should be maintained along intermittent drainages. Research has indicated that protected riparian buffers along watercourses prevent damage to aquatic ecosystems that are supportive of diverse species assemblages. 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. There should be no development of permanent structures within the riparian buffers. Activities to enhance the vigor of vegetation within the riparian buffers (e.g. timber harvesting) should be allowed.

Please refer to the attached documentation presenting Division policy and position regarding riparian buffers for additional information. (See Appendix)

Trail Maintenance

There are a several trails within Bertini Park that are used for hiking and unfortunately are being used by unauthorized off road vehicles. One trail runs parallel to the Muddy River and Dayton Pond. Trail usage has caused significant erosion. Left unchecked, sediments from the erosion on trails sloping toward the Muddy River and/or Dayton Pond degrade physical habitat once deposited. Ultimately, such deposition can adversely affect fish population. It is recommended that:

1. Pedestrian traffic should be limited to authorized trails only. The development of

unauthorized trails should not be allowed and be eliminated if they are noted.

2. Develop a trail maintenance plan to conduct routine trail inspections and make corrective repairs to those situations potentially causing erosion and sediment events.

Fishing Access

The trail parallel to the Muddy River offers excellent access for fishing and should be maintained to prevent erosion and sediment transport. Access to Dayton Pond and the unnamed pond is difficult at best. The most appropriate means to provide access would be the installation of fishing piers. One pier at each pond would be sufficient. The Inland and Marine Fisheries Divisions collaborated on design standards for fishing piers that were published in the document *Fishing Piers: Design Guidelines to Enhance Recreational Fishing*. The designs provided in the document should prove of value in developing functional angler access including access for anglers with physical disabilities. A copy of the document is attached. (See Appendix)

Recreation Planner Review

Site Description

The 76.5 acre Bertini Park is part of a roughly 1,000 acre Wallingford town property along the Muddy River (Muddy River/Tyler Mill Recreation and Conservation Area) . The project site was used some 30 years ago as a YMCA camp, a similar YMCA/town partnership use is now being proposed. Bertini Park would serve as a day use camp and perhaps overnight camping facility. The site consists largely of rolling to hilly upland covered with deciduous forest, although also containing limited access to the upper end of Dayton Pond and to the Muddy River. The bulk of the soils in the proposed activity core of the facility are moderately steep – steep (15-35% slope) Cheshire-Holyoke soils or Wethersfield very stony and steep (15-35%) soils, both of which are subject to serious erosion. In addition, much of the northwestern half of the tract consists of Cheshire very stony 3-8% slope soil and a narrow strip of alluvial soil is seen along the river corridor.

Existing site facilities include a gated parking lot and the site of a former caretaker house. No site plans or records are available concerning the reported water and septic systems serving the earlier YMCA camp.

Use Potential and Management Recommendations

Despite the steepness and erodible soils of the southern, proposed core portion of the facility, a central pavilion/day use activity site seems feasible cresting the knoll behind the parking lot/assembly area and could be serviced by a rough road (please refer to Soils Resources section for concerns with septic in this area). Similarly, an amphitheater could be located in the hollow immediately west/northwest of the pavilion.

In the absence of on-site water and sewer facilities, the property has use constraints which may rule out consideration of overnight camping other than some limited backpack type/primitive campsites. This could perhaps take place in the more remote northern part of the property. Porto-potties or outhouses (if soil conditions permit) may suffice for the day use area, but lack of potable water is a serious limitation unless the former well can be located and restored or a new well drilled that meets current health standards.

Similarly, existing slope conditions may also impact needed handicapped access to the major use areas of Bertini Park.

Trail activity is a natural for Bertini Park, with a possible trail network leading from the central use area and extending throughout the entire tract and linking to trails elsewhere in the Muddy River/Tyler Mill area. (However, see cautionary note under security below.) To avoid potential erosion on steep slopes or damage to wet soils near the Muddy River, trail locations should be carefully sited.

Potential for aquatic activities is severely limited on site, with swimming to be provided at the YMCA or at the Community Pool. The adjoining Dayton Pond is a rather shallow and heavily silted-in waterbody especially at its upper end, which is the only portion within Bertini Park. However, some fishing potential may exist upstream of the deltaic deposits at the northern of this pond, along the Muddy River. Although Wallingford may eventually gain title to (and responsibility for) the dam and thus some additional public access for fishing, such access may not physically link to Bertini Park, posing potential problems either of trespass on private property or of public safety concerns from children utilizing Dayton Hill Road to get from Bertini Park to the dam.

Site security also must be considered to avoid vandalism and inappropriate activity (partying, illegal camping, dumping (as seen adjacent to the proposed pavilion area). Therefore the existing gate should be locked at all times of non-camp use. Furthermore the inadvisability of mixing possible public use and children's camp use should limit seasonal use of Bertini Park to the proposed camp use. It may be desirable to have only one trail connector linking the Bertini Park trail network with a main Muddy River/Tyler Mill trail system along the lines which this reviewer suggested in the 2002 ERT *Tyler Mill/Muddy River Conservation and Recreation Area* (see pages 120, 121 and Figure 12 on page 124) or to the soccer fields along Woodhouse Avenue.

Another issue involves forest management or silvaculture. Clearly the main issue in the core public use areas within the camp is public safety, involving the removal of potentially hazardous trees and major branches as needed. Some similar arborist activity may also be needed periodically along trails. Regarding the remainder of Bertini Park development of a silvicultural management policy is recommended, a review of the 2005 Forest Inventory prepared by Ferrucci &Walicki may be needed with regard to site management for a camp and outdoor education.

Outdoor Education Resources

CT DEP -Educator Workshop Curricula

Project Food, Land and People is designed to provide supplementary educational material emphasizing the environment and our agricultural impact. It promotes an educational approach that allows students to understand the interrelationships among agriculture and the environment and the people of the world. Its goal is to create critical thinking skills that will provide for sustainable practices that benefit our environment while meeting our needs for food, clothing, and shelter. This project was designed to complement Project Learning Tree, WILD, Agriculture in the Classroom materials, and national youth programs. To learn more about this program, email Susan Quincy or call (203) 734-2513. National Food, Land, and People website

Project Learning Tree uses the forest as a "window on the world" to increase students' understanding of our complex environment; to stimulate critical and creative thinking; to develop the ability to make informed decisions on environmental issues; and to instill the confidence and commitment to take responsible action on behalf of the environment. PLT is a comprehensive environmental education curriculum. It is not just about trees; it is about the total environment: land, air and water. PLT is local, national and global in scope. To learn more about this program, email Diane Joy or call (203) 734-2513. National PLT website

Project WILD emphasizes wildlife and habitat. **Aquatic WILD** focuses on aquatic wildlife and aquatic ecosystems. WILD materials are used indoors or outdoors and include a mix of activities for independent exploration, cooperative learning, and full group instruction. Materials are appropriate for use by formal classroom teachers as well

as by people who work with and teach youth outside the formal classroom setting. To learn more about this program, email Diane Joy or call (203) 734-2513. National WILD website

Project WET (Water Education for Teachers) explores people's relationships to water. The 516-page curriculum guide is full of activities that are hands-on, easy to use and fun! Activities incorporate a variety of learning formats, such as large and small group learning, whole body activities and laboratory investigations. The WET curriculum itself covers the full spectrum of water-related topics and concepts, from water's role in the social and cultural contexts of our lives to its existence as a managed resource and an essential ingredient of life throughout all Earth systems. These activities promote critical thinking and problem solving skills. To learn more about this program, email Susan Quincy or call (203) 734-2513. National Project WET website

Classroom FeederWatch has students across the country watching and counting winter feeder birds such as Northern Cardinals, Black-capped Chickadees and Downy Woodpeckers and reporting their results to the Cornell Lab. of Ornithology. Some classes even write their own scientific article about their own results and get published in Cornell's newsletter "Classroom Birdscope". The Kellogg Environmental Center provides teacher training for this integrated science project and curriculum. To learn more about this program, call (203) 734-2513. National Classroom FeederWatch website

Schoolyard Habitat Network is a Connecticut-based collaborative effort dedicated to promoting hands-on environmental education on school property. Using schoolyard property to create 'outdoor classrooms' gets children excited about learning in a way that few other approaches can, while cutting costs for field trips. Math, science, art, history and all disciplines come alive for the children as they experience them by measuring a tree, writing a poem, experimenting with gravity, or understanding that stone walls are part of the history of agriculture in Connecticut. To learn more about this program, email Diane Joy or call (203) 734-2513. Connecticut Schoolyard Habitat Network website

Project SEARCH began in1994 when the National Science Foundation awarded a teacher enhancement grant to the CT DEP and the Science Center of Connecticut. Since then, public and private high schools throughout Connecticut have been trained and equipped to conduct stream water quality monitoring and data analysis. The data that SEARCH students collect from local rivers and streams are submitted to the CT DEP and municipal officials. While generating useful information, students learn important lessons in earth and environmental science, biology, chemistry, geography and mathematics. They also gain an opportunity to use state of the art field techniques in the collection and interpretation of scientific data. We are pleased to invite you to participate in the SEARCH program and help Connecticut students increase their proficiency in science, mathematics and technology. For further information, please email Alberto Mimo or call (203) 734-2513. Project Search website

Summer Search is an environmental research program for high school students. For a week, high school students participate in hands-on research activities while learning about and helping our environment. Participants use state parks and forests as their camp and research base. Some research projects have included monitoring rare wood turtles and meadow birds. For more information, email Alberto Mimo or call (203) 734-2513.

The Connecticut Department of Environmental Protection is the official state sponsor of **Project Learning Tree; Food, Land and People; Project WILD; Aquatic WILD; and Project WET.** The DEP partners with other organizations to support Schoolyard Habitat Network, Classroom FeederWatch, and Project Search.

Connecticut Forest & Park Association

Contact CFPA at (860) 346-2372 or info@ctwoodlands.org.

All student Programs are correlated to the Connecticut Framework K-12 Curricular Goals & Standards.

Professional Development Workshops

WINTER PROGRAMS 2008

Professional Development Workshops for Teachers and Educators
CFPA teaches students how to think, not what to think, about the environment as a sponsor of the award-winning environmental education curriculum Project Learning Tree. For a registration form, contact CFPA 860-346-2372 or email info@ctwoodlands.org; CEU's available. Workshop fees are $35.00/participant and are held at CFPA headquarters unless otherwise noted.

Children's Literature and Nature
Friday, February 29, 9:00 a.m.–3:00 p.m.
PreK-5th grade educators
Children's natural affinity for animals and nature provides a wonderful way to enhance their reading, comprehension, communication and other language arts proficiencies. This Project Learning Tree (PLT) workshop uses the forest as a window into the world to explore seasons, habitats, animal groups, trees, life cycles and other environmental topics. PLT teaches students how to think, not what to think, with ready-made lesson plans that can be used within existing curriculum or as thematic units. Literary works from Jean Craighead George, Eric Carle, Leo Lionni, Eve Bunting, Robert Frost and others will be highlighted as exiting ways to engage students in books and natural history that will set them on the path of lifelong reading. Workshop participants actively participate in activities that address literature, science and social studies standards. Participants receive the Project Learning Tree PreK-8 Activity Guide. CT Language Arts Frameworks: Standard 1: Reading and Responding; Standard 3: Communicating with Others. CT Science Framework Content Standards: Structure and Function for 1.2, 1.3, 2.1 – VI and Heredity & Evolution for K.2 – VII.

Service Learning with Project Learning Tree
Friday, March 14, 9:00 a.m.–3:00 p.m.
Grade 3– 8 educators
Get into action and learn activities that introduce your program participants to many important concepts essential to the conservation of natural resources - our forests, water, soil and biodiversity. Project Learning Tree encourages creativity, originality, and flexibility to

resolve environmental problems and issues. Inspire and empower youth to become responsible, productive, and participatory members of society. Participants receive the Project Learning Tree PreK-8 Activity Guide and are eligible for PLT GreenWorks! grants. CT Framework Content Standards: Science - Science & Technology in Society (3.4, 6.4), Matter & Energy in Ecosystems (6.2, 4.2) Social Studies - Rights & Responsibilities of Citizens, Human & Environmental Interaction, Limited Resources; Language Arts - Communicating with Others.

Your Environmental Workout: COEEA Environmental Education Conference
Friday, April 4, 2008
Quinnipiac University, Hamden
Annual Connecticut Outdoor & Environmental Education Association (COEEA) Conference filled with workshops, roundtables, networking, and wine tasting. Learn best practices in the environmental education field. Please visit www.coeea.org for updates and conference details.

Squish – Train to be a FrogWatcher
Wednesday, April 9, 9:30a.m.-12 Noon
For all youth group leaders and educators
Help scientists conserve frogs and toads. Learn observation skills, "frogging" protocol, data collection, internet monitoring and natural history of Connecticut's frogs and toads and how to bring this program to your youth and students. Frogwatch USATM is a frog and toad monitoring program managed by National Wildlife Federation in partnership with the U.S. Geological Survey. Rubber boots and outdoor clothing recommended. $20/nonmembers; $15 members.

Gardening with Native Plants for Wildlife
Saturday, April 19, 9 a.m. – 1 p.m.
CFPA, Middlefield
It's National Wildlife Week! Learn how to create and enhance wildlife habitat within your own living space, no matter how large or small, to attract wildlife. This engaging program will present information about why yards are important for wildlife, the key components of habitat, basic habitat assessment techniques for your yard and the use of native plants in creating habitats for wildlife. We'll be inspired to create our own natural space after our visit to a local National Wildlife Federation certified Backyard Wildlife HabitatTM yard. Fee is $20/nonmembers; $15 members. Light refreshments provided.

Forest Forensics
Arbor Day, Friday, April 25, 9:00 a.m. – 3:00 p.m.
Grade 6-8 educators
CFPA Headquarters, Middlefield
Discover evidence-based activities that connect student's natural affinity for the outdoors with scientific exploration, literacy and problem-solving. This engaging workshop will prepare teachers for the student Forest Forensics program offered in late spring, or will help them create a Forest Forensics program at their own site. During the student-based Forest Forensics program, the forest plots will be treated as a crime scene. Students will investigate

a forestry-related crime as they search for clues and evidence in the role of entomologists, wildlife biologists or foresters. Participants receive the Project Learning Tree (PLT) Activity Guide; CEU's provided. PLT meets state and national education standards.

Friday, May 2, 9:00 a.m. – 3:00 p.m.
Every Student Learns Outside
Grade K-5 educators
CFPA Headquarters, Middlefield
Unleash the naturalist in your students. Discover ways to challenge them to explore grade-appropriate environmental issues – from the inside to the outside. Project Learning Tree (PLT) activities suit different learning styles, meet education standards and teach through experiences in nature. All activities feature science as well as reading and technology connections, clear objectives and assessments strategies. This completely hands-on workshop will teach how to use inquiry skills to examine and measure components of different habitats. We'll investigate a variety of factors of an environment, such as sunlight, temperature, wind, soil, plants, and animal life. Participants receive the Project Learning Tree PreK-8 Activity Guide. CT Language Arts Frameworks: Reading and Responding, Communicating with Others. CT Science Framework Content Standards: Scientific Inquiry, Scientific Literacy, Scientific Numeracy**.**

Get Out! Outdoor Learning for Youth Leaders & Camp Counselors
Thursday, May 22, 9:00 a.m. – 3:00 p.m.
CFPA Headquarters, Middlefield
In this fun and lively hands-on workshop, youth group leaders can:
Receive help in planning nature programs relevant to group's own site;
Learn age-appropriate, environmental activities geared towards forests, nature, energy and more and their connection to our everyday lives;
Become part of a network that offers follow-up resources and opportunities;
Acquire background information and materials about environmental education; and
Involve young people in the natural world them.
Participants will receive the Project Learning Tree PreK-8 Environmental Education Activity Guide.

CT Aquatic Resources Education (CARE)

CARE Center – 860-663-1656

The Connecticut Department of Environmental Protection, Fisheries Division, sponsors FREE fishing classes. Families and individuals age nine and up are encouraged to attend classes held throughout the year across Connecticut. Classes are taught by state certified volunteer instructors through the Connecticut Aquatic Resources Education (CARE) Program. The classes vary in length from half-day events to four-day courses. All locations provide access for the disabled and all fishing tackle and course materials are provided free of charge! Students will receive official diplomas upon successful completion of the course.

To learn more about the CARE Program, visit the CARE webpage or call the CARE Center at (860) 663-1656.

Standard Courses Multiple meeting classes held in the Spring and Fall. Each class finishes with a fishing trip.

In School Programs Classes presented in elementary and middle schools.

Ice Fishing Events Designed to introduce you to the wintertime sport of ice fishing.

City Fishing Classes Classes that are presented to municipal and youth organizations. They take place during the summer at urban saltwater and freshwater sites.

Hooked on Fishing Classes Classes that include special lessons on life skills. We try to accommodate special conditions or needs of students. These classes are held year-round

The Natural Diversity Data Base

The Natural Diversity Data Base (NDDB) maps and files have been reviewed regarding the project area. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species at the site in question. *(Documentation for the Eastern Box Turtle has not yet been submitted the NDDB.)*

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 and 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.

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.

Appendix

Bertini Park Summer Day Camp and Outdoor Center – A Community Partnership

DEP Inland Fisheries Division Policy Statement – Riparian Corridor Protection

DEP Inland Fisheries Division Position Statement – Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut

Fishing Piers – Design Guidelines to Enhance Recreational Fishing

Bertini Park Summer Day Camp and Outdoor Center

A community partnership between the Town of Wallingford Parks and Recreation/
Youth Service Bureau along with
The Wallingford Family YMCA

Bertini Park has never been fully developed nor public use of it encouraged especially in its current state. This park has great potential as a wonderful nature and recreational resource for the entire community. Over the last ten years the Recreation Department with the support of the Conservation Commission and bordering neighbors of the park has worked with many scout groups unsuccessfully to develop a nature educational center and outdoor camp at the park. Many states including Connecticut have started a challenge to parents and care givers of NO CHILD LEFT INSIDE. People believe that our children are experiencing nature deficit disorder. The National Wildlife Federation recommends that to combat this issue children should receive one "green hour" per day outdoors and in unstructured play. This worthwhile project can bring hours of outdoor learning, fun and enjoyment for all ages.

The Wallingford Family YMCA is most interested in pursuing a management agreement with the Town of Wallingford to operate a Summer Day Camp for June 2008. The day camp will operate on the grounds of Bertini Park for the duration of eight weeks. In addition to the summer program, the YMCA would also provide off-season programs including outdoor education/exploration and teambuilding.

For over a half century, the Wallingford Family YMCA has been working to meet the needs of the children, families, adults, and seniors in the Wallingford area. The Family YMCA provides traditional Y Character building programs including swimming, health and fitness, sports, youth activities, leadership training, child care, summer camp, aerobics, and much more. All programming, hiring, and volunteer recruitment is focused on four core values: caring, honesty, respect, and responsibility. Long before it was fashionable; the Y was advocating and practicing value and character building in all of its programs. We remain committed to the National and International YMCA philosophy of building strong kids, strong families, and strong communities.

The Wallingford Family YMCA is dedicated to providing a safe, fun and enriching experience for all of our camp participants. Each of our camps is structured to create an environment that fosters the development of leadership, sportsmanship, self-confidence and independence in our participants. In 2001, The YMCA expanded and improved the already top of the line camp, creating Camp Ulbrich, Camp Gaylord, Teen Camp, and the Counselors In Training Program. All of our programs emphasize the four core YMCA values of Caring, Honesty, Respect and Responsibility.

Goals and Objectives:

Provide day camping and outdoor educational experience to the youth of the Greater Wallingford Community including scout groups, Recreation Department, Boys & Girls Club etc.
The YMCA's projection for the summer of 2008 program is to service around 175 campers (ages 4 – 11) with a staff of 29. The camp would run from the end of June to mid August 2008 with off-season programming available.

Target Participants:

Existing YMCA Summer Day Camp Program – ages 4-15
Wallingford Community children – ages 4-15
Surrounding communities not yet served by a quality Day Camp – ages 4-15

Strategies and Tactics:

The Wallingford Family YMCA to collaborate with the Town of Wallingford by managing quality summer day camp services and off season programming where as the Town of Wallingford will provide the land, and recreational space on a permitted basis through the Recreation Department. The Wallingford Family YMCA will be responsible for obtaining/operating within the State Department of Health License and the American Camping Association, recruitment/training/management of camp staff, providing supplies and equipment and Camp leadership.

Launch Team Participants:

Sean Doherty, YMCA Executive Director
John Gawlak, Director of Parks and Recreation
Danielle Bradley, YMCA Operations Director
Michelle Bjorkman, Superintendent of Recreation
Sarah Markesky, YMCA Youth/Camp Director
Erin O'Hare, Environmental Planner
Craig Turner, Youth Services Director
Roman Mrozinski, Southwest Conservation District Executive Director

Proposed Timeline:

Date	Action Steps
November 2007	Partnership proposal accepted Launch Team formed
November-December 2007	Discuss concept plan and logistics(transportation/pools) Discuss fee structure and program budget.
December 2007 – January 2008	Community survey and focus groups conducted Site work begins
December 2008	YMCA staff begin to work on program plans
January 2008	Develop marketing plan
February 2008	Implement marketing plan Begin to recruit staff
March 2008	Implement marketing plan Site work and preparation
April 2008	Plan for equipment and supplies to be ordered Site work and preparation
May 2008	Paperwork due to State of Connecticut for Camp license Finalize all site work.
June 2008	Hire staff, secure volunteers – provide camp training
June 23, 2008	1st day of Camp 9:00am Opening Ceremonies

Program Initiatives

Our programs will encompass the traditional favorites such as field games and crafts to outdoor and nature experiences. The concept of evening programs such as Talent Night and Scavenger Hunts have also been discussed. The activities planned for summer 2008 include:

- Archery
- Arts and Crafts
- Drama
- Fishing
- Nature hikes
- Soccer
- Swimming
- Baseball/Softball
- Sing-a-longs and skits
- Outdoor Education
- Campfires
- Adventure Trips

Daily Camp Program

Each day begins at approximately 9:00am with each individual group gathering. (Extended care will be available from 7:00am-9:00am at the YMCA) Each counselor meets with his/her campers for check-in. Lunches and afternoon snacks are collected and put in camp's refrigerators.

9:15 – 9:30	The entire camp gathers for the morning assembly to raise our country's flag, to sing camp songs and hear the words for the day.
9:30-11:45	Morning activity time.
11:45 –12:00	All camp assembles for skits, announcements and daily sharing time.
12:00-1:00	Groups pair up and eat lunch at their selected camp site each day. Campers are required to bring their own lunch.
1:00 – 2:00	A theme is developed for each session which provides for variety, creativity and fun.
2:00 – 3:00	Afternoon recreational time.
3:00	Afternoon assembly and preparation for departure. (Extended care is available 4:00-6:00pm. at the YMCA)

Camp Facilities

- Bertini Park parking, open space, and trails
- Swimming activities will be coordinated offsite at either the YMCA or Community Pool.
- Access to power and telephone.
- Water supply
- Sanitary facilities to accommodate 1 toilet per 25 campers
- Portable tent(s) to accommodate up to 175 campers for inclement weather, shelter from the sun and arts/crafts. (Long range development would include a permanent pavilion.)
- A natural Amphitheater would be used for daily camp assemblies, parent's day/nights, dramas, etc.
- An archery range and equipment will be provided by the YMCA.
- Tent platforms can also be positioned throughout the area that can be used as a place for groups to go and do group activities as well as a place for the First Aid Coordinator.
- Dayton Pond will be utilized for fishing and outdoor education/exploration.
- Camp overnights will have a designated space for camp fires, tents and overnight activities.
- The YMCA will provide the equipment necessary to develop a low ropes course on the top section of the park. During off camp hours the course will be locked up for safety. Organizations/School groups interested in utilizing the course can with a certified instructor present(YMCA or Park & Rec)

Transportation

Parents will be required to drop off and pick up their children daily from the YMCA. Swimming will be contracted through a bus company to either the YMCA or Community Pool. Campers will be required to have a parent permission slip signed prior to bus travel. The fee for the buses will be incorporated into the Summer Camp session rate.

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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Fishing Piers:
Design Guidelines to Enhance Recreational Fishing
11/1/2005

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Introduction

The purpose of this document is to provide guidance to those interested in building a recreational fishing pier or similar structure. Staff of the Marine Fisheries Division and Inland Fisheries Division has had the opportunity to review a number of proposals for fishing piers and similar structures submitted by municipalities, businesses and private associations. These reviews are typically conducted through the various DEP application processes for grants and permits. Staff observed that some proposals did not fully consider how siting and design affects the function of a pier. Therefore, this document was prepared to assist individuals with the design of a functional pier and to encourage consultation with DEP staff early in the siting and design phase.

Three key aspects of fishing pier design are discussed in this document. First, properly siting the pier is important to provide the best fishing experience and reasonable access. Second, the pier must be designed to enhance, rather than hinder, fishing opportunities. For example, the lack of functional railings has been a problem in the past. The problem stemmed from confusion over applicability of State Building Code (SBC), Occupational Safety and Health Administration (OSHA) codes and Americans with Disability Act (ADA) guidelines. And third, amenities that increase the utility of a pier should be included.

Readers should note that this document is not intended to provide a comprehensive discussion of pier design or the various issues that one may encounter when proposing a facility. Further assistance can be obtained by consulting the resources listed at the end of the document.

Siting Considerations

Potential fishing pier locations should be evaluated for their proximity to productive fishing areas. In many cases, the suitability of a site may already be known by local anglers, or can be determined by observing the level of current angler activity and success. But in general, productive fishing can often be found in areas that feature structural diversity and varied bathymetry. In lakes and ponds, features that attract fish include submerged and emergent vegetation, vegetation overhanging banks, rock piles and dropoffs. In streams, fish take advantage of the cover created by rocks, undercut banks, logs and deep pools. Larger rivers

may have all of these features and more, such as deep channels. Fishing piers should be sited such that anglers will be within casting distance of these features. Indeed, one of the advantages of building a fishing pier is that it can allow shore-based anglers to reach features that lie beyond normal casting distance from the shore.

In coastal areas it is important to examine the depth of water at all tide stages. From the perspective of achieving the most diversified and productive fishing experience, the least desirable locations are relatively featureless tidal flats where there is no water under the pier for extended periods. It should be noted, however, that even these locations could be productive for certain species during the right tidal stage and season.

Fishing piers should also be located in areas where the public can access them. Adequate parking is essential, and the pier should be within a reasonable walking distance and have an accessible (ADA) route to the pier.

The Marine Fisheries Division can be contacted for assistance with the evaluation of potential sites in coastal waters. The Inland Fisheries Division can assist with siting piers on lakes, ponds, rivers, and streams (refer to Resources for contact information).

Design Considerations

The purpose of this section is to address several issues that have been encountered when reviewing pier designs. These are: 1) how the ADA guidelines, SBC and OSHA codes apply to recreational fishing piers; 2) the importance of functional railing design; and 3) the inclusion of amenities and public information signs.

As discussed above, the design of recreational fishing piers has been well detailed in a number of publications. Readers are encouraged to explore these and other resources listed at the end of this document for detailed assistance with pier design.

1. The Americans with Disability Act, State Building Code and U.S. Occupational Safety and Health Administration Issues relative to fishing piers

The Federal ADA requires that all public facilities provide access for persons with disabilities. Prior to 2002, the ADA did not specify design guidelines that would provide barrier-free access for recreational facilities, including fishing piers. To address this issue, the States Organization for Boating Access (SOBA) published a document called *Design Handbook for Recreational Boating and Fishing Facilities* (Wilson 1996). The document described existing national Architectural and Transportation Barriers Compliance Board (Access Board) standards that apply to recreational facilities, and recommended a number of guidelines for structures not addressed by the Access Board standards[2]. The guidelines addressed structural features such as approach slopes (e.g. pathways, gangways), deck board spacing and railing designs.

On September 3, 2002, the Access Board issued a final rule titled *Final Accessibility Guidelines for Recreation Facilities*. The final rule, which is an amendment to the Americans

[2] The Access Board is the designated agency responsible for developing minimum ADA accessibility guidelines.

with Disabilities Act Accessibility Guidelines (ADAAG, 36 CFR Part 1191), includes guidelines for fishing piers. The guidelines are similar to those developed by SOBA, but are not as extensive. In light of the new rule, SOBA will be updating the 1996 *Design Handbook for Recreational Boating and Fishing Facilities*.

As of this writing the U.S. Department of Justice has not yet adopted the final rule. The guidelines are not mandatory until the rule is adopted[3]; however, since a facility must be accessible pursuant to ADA, the rule can be used to design an accessible facility (refer to the Access Board website for a full discussion).

Piers, boardwalks and platforms constructed over water are subject to the SBC. Exemptions from the code can be obtained for the purpose of constructing a functional fishing pier and to meet ADA requirements (Christopher Laux, State Building Inspector, pers comm.). The most common example is the need to obtain an exemption from the code specifying a minimum railing height of 42", which is too high for fishing piers (see below). Project designers should contact the State Building Inspector to discuss their project and the need to apply for a Request for Modification or a Request for Accessibility Exemption for the purpose of building an ADA compliant fishing pier.

During the rulemaking process culminating in the Final Accessibility Guidelines for Recreation Facilities, the Access Board determined that the OSHA codes do not apply to recreational fishing piers since OSHA standards are restricted to job responsibilities performed in a workplace. However, in instances where a pier is used for both work and recreational purposes, the OSHA standards may apply. This issue is addressed in the final rule.

For additional information about how OSHA codes and the SBC relate to the adopted guidelines, readers are encouraged to refer to the Access Board's Recreational Facility Final Rule posted on the Access Board website. In addition, since SBC, OSHA and ADA codes and guidelines may be revised from time to time, the appropriate agencies should be consulted to obtain the most current information.

2. Railing design considerations

The railing design strongly affects an angler's ability to fish from a pier. Depending on the height of the railing and spacing of vertical elements (posts, balusters, etc.), a railing can either hinder or enhance fishing. In general, it is easiest to fish from a pier that does not have a railing. However, most individuals constructing piers wish to have some type of railing for safety and liability reasons.

To address safety issues, designers often use specifications that conform to the SBC, which requires railings to be a minimum of 42" high and vertical elements spaced such that a four-inch sphere cannot pass through any opening. However, these specifications can render a pier almost useless for the purpose of fishing. For children, persons in wheelchairs and even

[3] According to Paul Beatty, Accessibility Specialist with the Access Board, the guidelines must be adopted by the U.S. Department of Justice, but there is no required time frame to do so.

many adults standing at a railing, a height of 42" is too high to cast over and retrieve lines, and it can be very difficult to bring fish over such a high railing. Many people like to sit in a chair while they are fishing, but a 42" railing makes this very difficult and unenjoyable. But as discussed above, it is not always necessary to construct railings to SBC specifications if the proper exemptions to the SBC are obtained.

Designers should first consider whether a railing is necessary for safety or other concerns. For instance, the Engineering Unit of the DEP Agency Support Services Division evaluates site characteristics to determine if a railing is necessary on fishing platforms less than 24" to 30" above the ground or water (Eric D. Ott, PE, Supervising Civil Engineer, Engineering Unit, pers comm.). For example, a pier located in strong current upstream of a waterfall represents an obvious case where a railing would be required.

If a railing is necessary, then it is important to consider who will be using the facility. A pier built for the general public might have a different railing design than one built primarily for children. In the latter case, a lower railing may be needed to enable children to fish from the pier.

The guidelines adopted by the Access Board in combination with the SOBA guidelines can be used as a starting point for a railing design that will provide reasonable opportunities for most anglers. Similar to SOBA, the Access Board proposed rule specifies that a *minimum* of 25% of the railing should be a *maximum* height of 34". The lower sections must be dispersed throughout a fishing pier or platform to enable anglers with disabilities to have access to different areas of the pier. SOBA has additional guidelines that define the width of the lowered sections, gaps in the railing for the purpose of retrieving fish, and spacing of vertical elements to avoid creating a feeling of confinement for those in wheelchairs.[4]

The Access Board and SOBA guidelines should be considered only as a starting point because the full benefits of a pier may not be realized if it is built according to the minimum guidelines. For example, if only 25% of the railing is at a lower height, the ability of many anglers to fully utilize the pier could be greatly compromised. Those who are unable to fish over higher railings will not be able to fish if the lowered railing areas are occupied. The lowered openings determine where some people will be able to fish from the pier, even though that may not be the best place to fish from on any particular day.

To address these concerns, we recommend the following railing guidelines, which have been adapted from the Access Board and SOBA guidelines:

- If a railing is needed, it should be no higher than 34" throughout areas where fishing is possible (i.e. wherever there is a suitable water depth), with the exception of areas where serious user conflicts may occur (e.g. adjacent to slips in a marina).

[4] The SOBA documents mentioned above describe the experience of sitting in a wheelchair and looking through balusters spaced 4" apart as like being inside a cage

- The top rail board should slant inward approximately 45 degrees. An angled top rail discourages people from sitting on top of the rail, or placing tackle boxes and other items on it, which could be knocked off into the water. A slanted rail also provides anglers in wheelchairs, seated anglers, and children a more comfortable rest to lean upon.
- To eliminate the "cage" effect experienced by those in wheelchairs or who are shorter than the railing height, horizontal midrails and vertical supports should be spaced to reduce visual impediments. SOBA guidelines specify that a horizontal midrail should be positioned at half the height of the top rail. Vertical supports should be 4 feet apart. A curb with a height of 2" should border the edge of the deck.
- To make landing fish easier, there should be gaps in the railing that are free of any obstruction. SOBA guidelines recommend a minimum gap of 9" wide, with gaps no more than 8 ft apart.

Many of the SOBA guidelines, including the reduced railing height and horizontal and vertical spacing, have been successfully incorporated into piers constructed and maintained by the Connecticut DEP and Department of Transportation, including the piers at Ferry Landing State Park in Old Lyme, Baldwin Bridge Boat Launch in Old Saybrook, and Fort Trumbull State Park in New London. Similarly, the city of New London has incorporated some of the guidelines in the design of New London Waterfront Park. In some of these cases the minimum guidelines were exceeded, such as the Ferry Landing State Park pier, which has 34" high railings throughout the pier and a very open support structure.

3. Amenities and access information

Amenities such as cutting boards, rod holders, lighting, and running water enhance fishing from a pier (Breem and Rigby 1986, Buckley and Walton, 1981). By providing cutting boards, fewer anglers will cut bait on railing and deck surfaces. Rod holders can be made of PVC pipe, or if an angled top rail is part of the design, holes can be drilled into the top rail to hold rods. A good example of this method is the Fort Trumbull fishing pier – holes were drilled about every two feet in a 2 x 8 angled cap rail made of recycled plastic. Lighting is helpful for night fishing, serving to attract fish as well as enhancing safety and security. A supply of running water allows anglers to clean their hands and equipment.

Fishing piers should be adequately posted to inform the public that fishing is allowed. Similarly, parking areas and access routes should be clearly indicated. Signs listing rules for pier use and current fishing regulations should be posted. Fishing regulation posters may be obtained from the Marine Fisheries Division in Old Lyme, or from the Inland Fisheries Division in Hartford.

Summary of Considerations and Recommendations

1) Fishing pier siting considerations.
   - Fishing pier should be located in productive fishing areas. Factors to consider include:
     - Knowledge of local anglers.
     - Casting distance to underwater features that might attract fish, such as rock piles, submerged vegetation and channels.
     - Types of fish likely to be caught.
     - Sufficient water depths at various tide stages and seasons.
   - Sites should be evaluated for suitable parking and access to the pier.

2) Fishing Pier design considerations.
   - Railing design
     - The need for a railing should be evaluated and used only when necessary.
     - Railings should be as low as possible, and not exceed 34".
     - Avoid closely spaced balusters; preferred vertical support spacing is a minimum of 4 feet.
     - If a horizontal midrail is used, it should be positioned at half the height of the top rail.
     - Place gaps in the railing that are free of any obstruction. Gaps should be a minimum of 9" wide and no more than 8 ft apart.
   - Incorporate handicapped accessibility features.
   - Incorporate amenities such as cutting boards, rod holders, lighting, and running water.
   - Post public access signs, fishing regulations, and other information concerning natural resources and fisheries.

Resources
Publications offering ADA guidelines for recreation/fishing piers and platforms:

United States Access Board. 2003. Accessible Fishing Piers and Platforms. This free document is available on-line at www.access-board.gov, or by calling the U.S. Access Board at 1-800-872-2253.

Wilson, K. 1996. Design Handbook for Recreational Boating and Fishing Facilities. Prepared for: States Organization for Boating Access, P.O. Box 25655, Washington D.C. 20007. Available for a fee from SOBA at www.sobaus.org.

Technical advice for ADA recreational guidelines and fishing pier construction:

Architectural and Transportation Barriers Compliance Board (Access Board) web site: www.access-board.gov.

Connecticut Department of Environmental Protection, Bureau of Financial and Support Services, Agency Support Services Division. Phone # 860-344-2513 (Portland

Office).

Suggested contact: Eric D. Ott, PE, Supervising Civil Engineer, Engineering Unit. Mr. Ott helped develop the SOBA guidelines, has been involved in the construction of State of Connecticut recreation facilities and provides guidance to those interested in constructing piers, including fishing piers. He has put into practice many of the SOBA guidelines.

Office of Technical and Information Services, Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW., suite 1000, Washington, DC 20004-1111. Telephone number (202) 272-0012.

Suggested contact: Paul Beatty, Accessibility Specialist. Mr. Beatty staffed the Board's Passenger Vessels Advisory Committee, assisted with the Recreation Access Advisory Committee, and was extensively involved with the development of final Accessibility Guidelines for Recreation Facilities.

***For general assistance with ADA*:**

Office of Technical and Information Services, Architectural and Transportation Barriers Compliance Board (see above).

State Of Connecticut Office for the Protection and Advocacy for Persons with Disabilities. Phone # 1-800-842-7303 or http://www.state.ct.us/opapd/index.htm

Long Island Sound recreational fishing information, regulation posters and pier siting assistance:

Rod MacLeod, CT DEP, Senior Fisheries Biologist. Marine Fisheries Division, Marine Headquarters, Old Lyme. Phone # 860-434-6043

For comprehensive fishing pier information:

Breem, A. and D. Rigby. 1986. Fishing Piers: what cities can do. The Waterfront Press. ISBN 0-935957-01-4. 76p.

Buckley, R. M. and J. M. Walton. 1981. Fishing Piers, their design, operation and use. Washington Sea Grant, University of Washington, Seattle, WA. Rpt WSG-81-1. 29p.

For examples of fishing pier design in the coastal areas of Connecticut, readers are encouraged to visit piers at the following locations:

Ferry Landing State Park, 333 Ferry Rd, Old Lyme. Fishing pier is on the Connecticut River and Lieutenant River.

Baldwin Bridge (I-95) Boat Launch, Old Saybrook. Pier is on the Connecticut River.

Fort Trumbull State Park, New London. Fishing pier is on the Thames River.

New London Waterfront Park, downtown New London. General public access pier along the Thames River with specific fishing pier components.

Regulatory and permitting information

Structures proposed waterward of the high tide line require authorizations from the DEP's Office of Long Island Sound Programs and the U.S. Army Corps of Engineers. The following offices should be contacted for permitting requirements:

CTDEP, Office of Long Island Sound Programs, Permitting and Enforcement Section, 79 Elm St., Hartford, CT 06106-5127; or, call 860-424-3034

U.S. Army Corps of Engineers, New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts 01742-2751; or, call 800-343-4789

Structures proposed in inland areas may require authorizations from the municipal inland wetlands and watercourses agency, the CT DEP Inland Water Resources Division or the U.S. Army Corps of Engineers. The following offices should be contacted for permitting requirements:

Municipal inland wetlands and watercourses agency.

CT DEP, Inland Water Resources Division, 79 Elm St., Hartford, CT 06106-5127; (860) 424-3019

U.S. Army Corps of Engineers, New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts 01742-2751; or, call 800-343-4789

For structures located in inland areas that are tidally influenced, applicants should contact both the DEP Office of Long Island Sound Programs and the Inland Water Resources Division.

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 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 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.