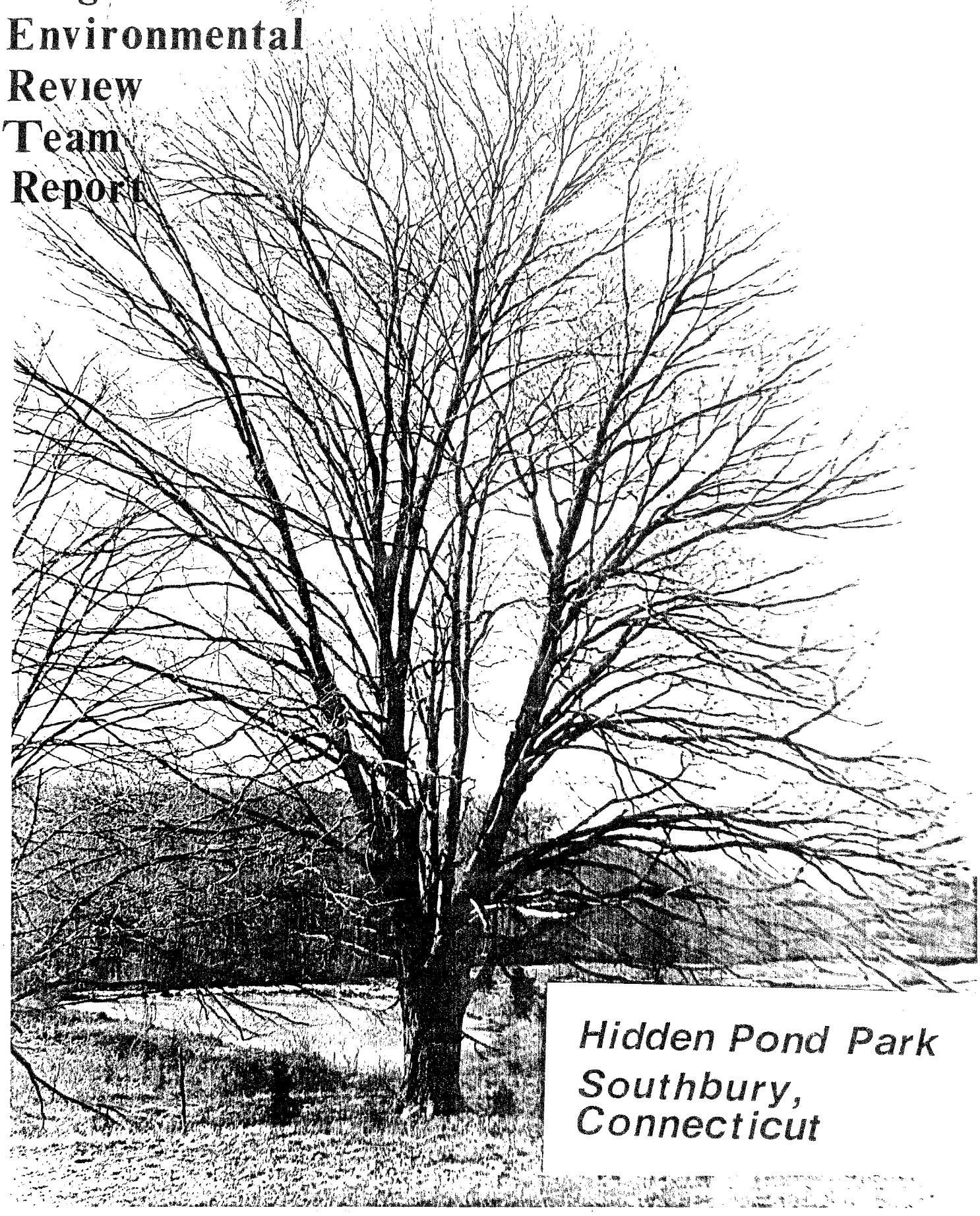
King's Mark Environmental Review Team Report



Hidden Pond Park
Southbury, Connecticut

HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

Environmental Review Team Report

Prepared by the King's Mark Environmental Review Team
of the King's Mark Resource Conservation
and Development Area, Inc.

Wallingford, Connecticut

for the

Southbury Parks and Recreation Commission

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Southbury. The results of the Team action are oriented toward the development of a better environmental quality and long-term economics of the land use. The opinions contained herein are those of the individual Team members and do not necessarily represent the views of any regulatory agency with which they may be employed.

MAY 1987

ACKNOWLEDGEMENTS

The King's Mark Environmental Review Team Coordinator, Keane Callahan, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this study:

* Willianm Warzecha, Geologist
  Department of Environmental Protection - Natural Resources Center

* Kipen Kolesinskas, Soil Resource Specialist
  U. S. Department of Agriculture - Soil Conservation Service

* Joseph Hickey, State Park Planner
  Department of Environmental Protection - Parks and Recreation

* Timothy Barry, Fishery Biologist
  Department of Environmental Protection - Fisheries Bureau

* Charles Fredette, Lake Specialist
  Department of Environmental Protection - Water Compliance Unit

I would also like to thank Laverne Mendela, Secretary, and Janet Jerolman, Cartographer of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to Gerry Lombardo, Parks Director for the Town of Southbury for his cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Southbury Parks and Recreation Commission requested that an ERT be done on Hidden Pond Park, a town-owned undeveloped park. The Park is approximately 58 acres in size and located in the northeastern part of Southbury off Old Waterbury Road. The Park is primarily forested with an approximately four-acre pond occupying its southwestern portion. Numerous wetland corridors also occur in the Park (p. 1).

The Town is interested in developing the Park into a passive/active recreational area. Therefore, the Town asked the ERT to: (1) assess the soil and geohydrological resources of the Park, particularly the wetland soils to determine suitabilities for development; (2) assess pond characteristics and determine the feasibility of the pond for recreational uses; and (3) evaluate the entire Park for recreational opportunities, focusing on the pond (p. 1).

Geology

Although the exact depths to bedrock in the Park are unknown, it is probably less than 10 feet in most places. It is probably shallower (less than five feet) in those areas designated as Charlton-Hollis soils. Although the underlying bedrock would probably be a suitable well source for drinking water, it appears that a public water supply is available to the Park should the need for water arise (p. 6).

Overlying bedrock throughout the Park are two surficial geologic materials: (1) till and (2) seasonally wet areas which overlie till deposits, primarily along the watercourses in the northern reaches of the study area (p. 6).

Geological Development Limitations

Most of the geologic limitations, such as seasonally wet areas, topographic conditions and shallow to bedrock soils should not have a significant adverse effect on the passive recreation potential of the Park. However, these limitations would certainly be a hindrance to certain types of active recreational development such as ballfields or soccer fields. Active recreational development would undoubtedly require extensive and costly engineering (p. 7).

Hydrology

Most of Hidden Pond Park is located in the headwater region of Bullet Hill Brook. The northeast and southeast corners of Park are drained by unnamed tributaries to Eightmile Brook (p. 7).

The pond does not appear to be very deep and probably has an average depth of not much more than a few feet. Seasonal watercourses originating north and northeast of the pond carries drainage into Hidden Pond. From its point of outflow from Hidden Pond, Bullet Hill Brook drains an area of about 73 acres or 0.114 square miles. Almost 60 percent of this watershed is within the boundaries of Hidden Pond (p. 7).

The Town questioned on the review day whether or not Hidden Pond has any recreational bathing potential. The Connecticut Department of Health Services recommends that inland bathing facilities provide a minimum of 1,000 gallons of dilution water per bather per day and the hydrogeological conditions present in this small watershed area cannot support a large bathing load in Hidden Pond. Undoubtedly, the cost of constructing a beach and other facilities would be quite high (p. 10-11).

Sanitary Facilities

Since the Park is not served by a public sewer line, an on-site septic system would need to be constructed. In this regard, there does appear to be sufficient area in the eastern parts of the Park where a small leaching system could be constructed. This would be in the area designated as Charlton-Hollis soils (p. 12).

Soil Resources and Development Suitabilities

The area with the most suitable soils for a pavilion, picnic area and associated restroom facilities/waste disposal system, is on the part of the CrC map units in the southeast portion of property overlooking the pond. Although the soils in this area are a complex of deep to shallow well drained soils, large enough areas of deep Charlton soils can be found so that any blasting or filling will be minimal (p. 16).

Because of the variable depth to bedrock, exposed bedrock and areas with a stony surface, most of the non-wetland soils on the parcel have many limitations for the development of playing fields. Blasting, filling and stone picking would be necessary and probably cost prohibitive. There is the potential to develop a few small open fields ($\geq$ one acre in size) for volleyball, playground, etc. by concentrating on the deep Charlton soil areas in the CrC units (p. 17).

The soil resources on the site offer a variety of slopes, vistas, and ecosystems. Interesting areas to include in a trail system are the very poorly drained soils of the wetland in the northwest portion, the drumloidal till ridge at the northern end, the watercourse and drainageway on the eastern side, the pond area, and the various small rock ourtcrop ridges (p. 17).

Fishery Resources

The aquatic resource is most likely dominated by warm-water fish species. Bluegill sunfish were observed on the pond during the ERT field review. Additionally, largemouth bass, brown bullhead, pumpkinseed sunfish, crappie, yellow perch, golden shiner and chain pickeral may also be present (p. 18).

It is the opinion of the ERT's Fishery Biologist that there is presently a scarcity of fish attracting cover such as large boulders, weed beds, stumps, and brush piles in the pond. For this reason, it is advised that some sort of fish attracting devices be added to the pond (p. 19).

Recreational Development Potential

Due to shallow to bedrock soil conditions and the presence of inland wetlands, intensive development of Hidden Pond Park for recreational

purposes will be limited. The Park therefore can more appropriately be managed as a natural open space area (p. 21).

Swimming Potential of Hidden Pond

Since Hidden Pond is a small and shallow water body with a very small watershed, it is limited in supporting a public swimming area. The pond is therefore most suitable for recreational fishing, ice skating, and as an attractive focal point in the center of the Park (p. 21).

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NATURAL RESOURCE CHARACTERISTICS

INTRODUCTION

The Southbury Parks and Recreation Commission requested that an ERT be conducted on Hidden Pond Park, a town-owned undeveloped park. The Park is approximately 58 acres in size and located in the northeastern part of Southbury off Old Waterbury Road (Figure 1).

The Park is primarily forested with an approximately four-acre pond occupying its southwestern portion. Numerous wetland corridors, dominated by Ridgebury, Leicester and Whitman soils, also occur in the Park.

The Town is interested in developing the Park into a passive/active recreational area with nature trails, pavilion and parking areas, ballfields, and fishing and swimming opportunities of the pond. Therefore, the Town requested the ERT to: (1) assess the soil and geohydrological resources of the Park, particularly the wetland soils to determine suitability for development; (2) assess pond characteristics and determine the feasibility of the pond for recreational uses (i.e., is an in-depth study of the pond needed to determine its feasibility to support recreational use?); and (3) evaluate the entire Park for recreational opportunities, focusing on the pond. The information generated by the ERT will then be used by an architect retained by the Town to develop a conceptual site plan for the Park.

TOPOGRAPHY

Hidden Pond Park consists of a 58-acre parcel of wooded land located in northeastern Southbury. The terrain throughout the Park is characterized by

slopes ranging from gentle to moderate. The topography in the Park is controlled largely by the underlying bedrock. Maximum and minimum elevations are 730 and 650 feet above mean sea level, respectively (Figure 2).

The major surface water body on the parcel is Hidden Pond, which is about four acres in size. This man-made pond was constructed at some point between 1934 and 1965. The pond was constructed by excavating a former wetland area and the pond appears to be relatively shallow. It is fed by two south-flowing seasonal brooks on the north side of the Park.

GEOLOGY

The surficial geology (i.e., unconsolidated materials overlying bedrock) encompassing the site has not been published to date. However, there is preliminary information at the DEP's Natural Resource Center in Hartford which may be reproduced. In addition, the Soil Survey for New Haven County (1979) was referenced for this section of the report. A bedrock geologic map (QR-30, by Robert Scott) for the quadrangle has been published by the Connecticut Geological and Natural History Survey.

Bedrock Geology

Scott has identified the rock underlying the site as a subunit of the Hartland Unit I Formation (Figure 3). It is described as a laminated, non-rusty-weathering gneiss comprised of the minerals quartz, biotite, plagioclase and muscovite. Gneisses are crystalline, metamorphic rocks (i.e., rocks geologically altered by great heat and pressure). These stresses caused the separation of platy, flaky and elongate minerals such as biotite and muscovite, and granular minerals such as quartz and feldspar. This mineral

FIGURE 1

LOCATION OF STUDY SITE

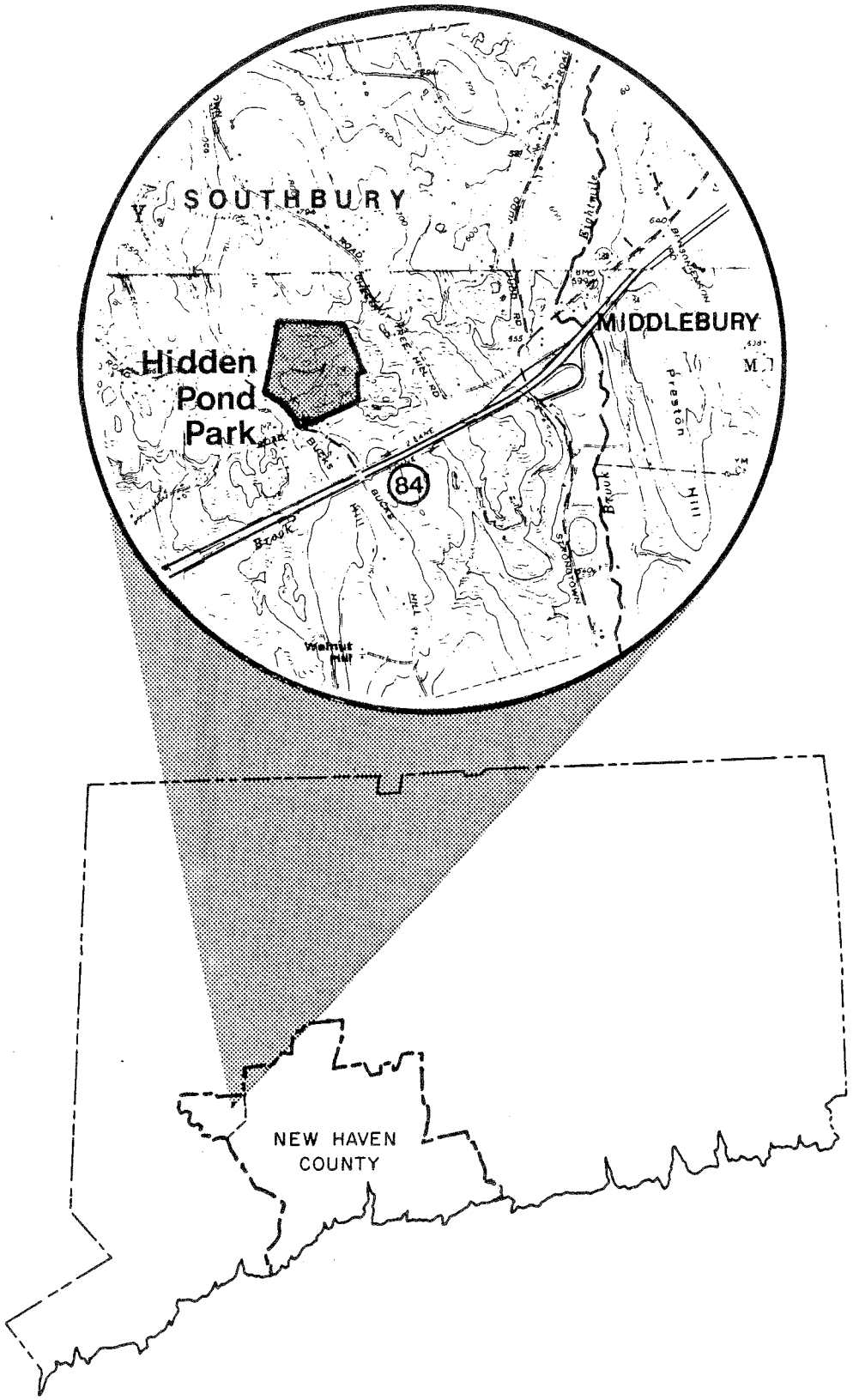
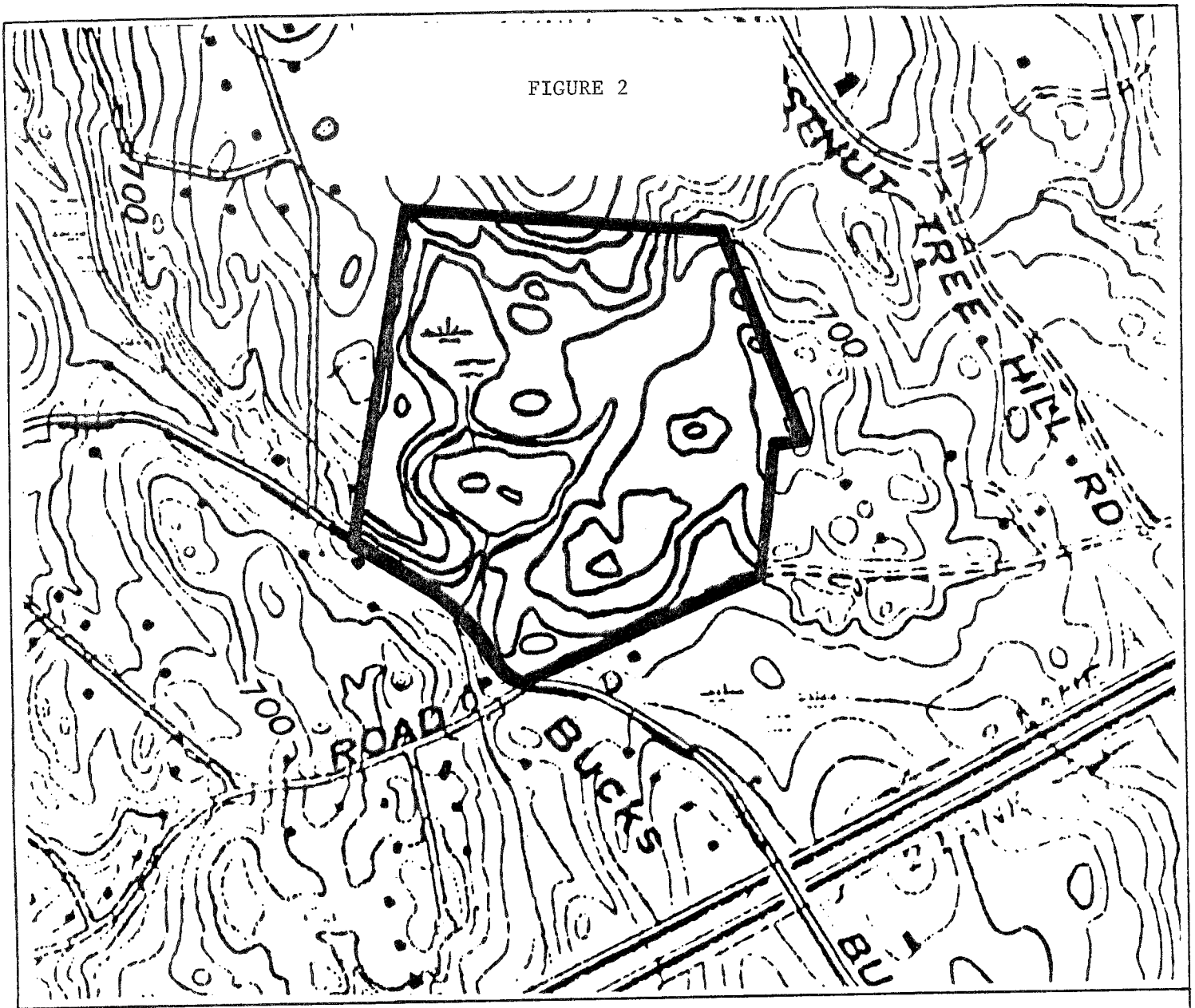


FIGURE 2



HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

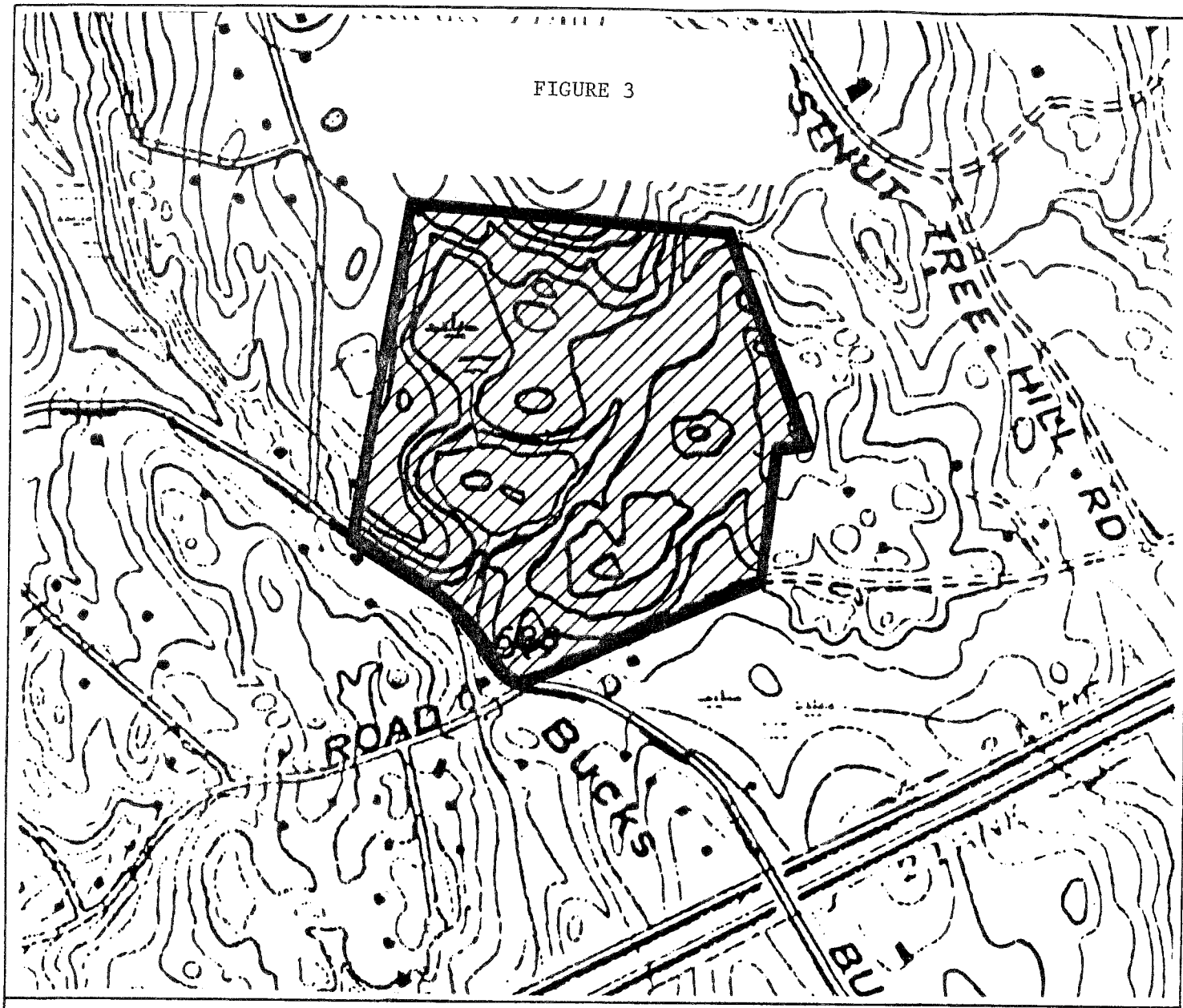
TOPOGRAPHY

King's Mark Environmental Review Team

0 660'

N

FIGURE 3



HARTLAND UNIT I FORMATION

HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

BEDROCK GEOLOGY

King's Mark Environmental Review Team

0 660'

N

arrangement gives the rocks a banded appearance. Because the rocks underlying the site contains many layers of platy and elongated minerals, it has a more laminated or layered appearance. The rocks underlying the site are believed to be of Cambro-Ordivician geologic age or approximately 448 to 532 million years old.

Although the exact depths to bedrock in the Park are unknown, it is probably less than 10 feet in most places. It is probably shallower (less than five feet) in those areas designated as Charlton-Hollis soils (see Figure 6). Although the underlying bedrock would probably be a suitable well source for drinking water, it appears that a public water supply is available to the Park should the need for water arise.

Surficial Geology

Overlying bedrock throughout the Park is a surficial geologic material known as till (Figure 4). Till consists of rock particles and fragments that were accumulated by a moving sheet of glacier ice and later redeposited directly from the ice. The glacier acted as a giant bulldozer, churning up pre-existing soils and scraping, gouging and breaking bedrock surfaces. Since the ice collected rock particles of all sizes and since these particles were not sorted by meltwater, till contains everything from clay to boulders and it is locally very variable in texture. Two major till varieties have been observed in Connecticut: (1) a fairly loose, coarse-grained till and (2) a finer-grained, compact, often crudely-layered till. It appears that most of the till on the site is the fairly loose, coarse-grained variety. The compact variety appears to cover the northern portions of the Park.

Seasonally wet areas overlie till deposits primarily along the watercourses in the northern reaches of the study area. These wet areas are referred to a

Ridgebury, Leicester Whitman soils. Because these soils range from poorly to very poorly drained, they are considered to be "regulated areas" under Chapter 440 of the Connecticut General Statutes (see Figure 4).

Most of the geologic limitations, such as seasonally wet areas, topographic conditions and shallow to bedrock soils should not have a significant adverse effect on the passive recreation potential of the Park. However, these limitations would certainly be a hindrance to certain types of active recreational development such as ballfields or soccer fields. Active recreational development would undoubtedly require extensive and costly engineering.

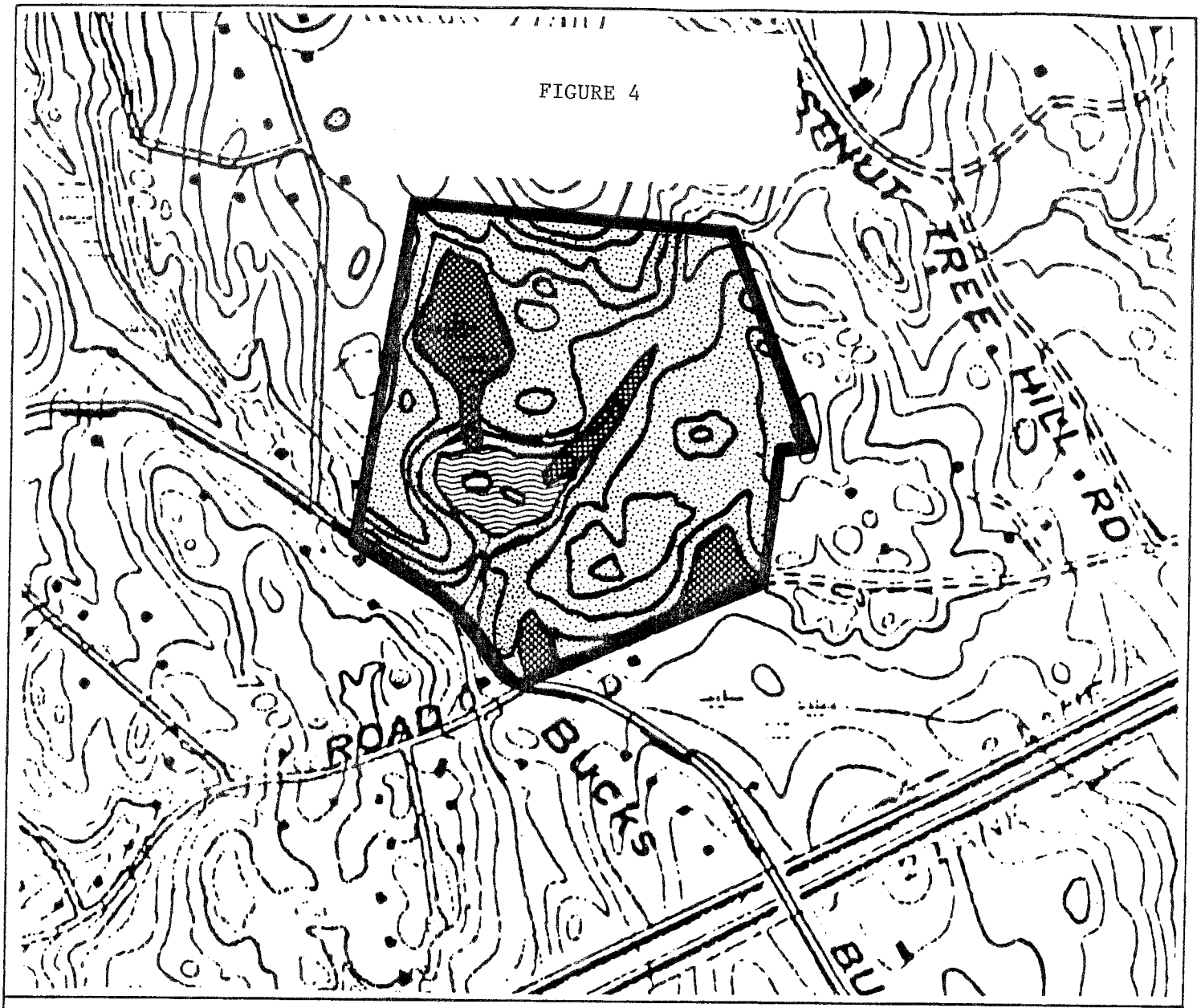
HYDROLOGY

Most of Hidden Pond Park is located in the headwater region of Bullet Hill Brook. The northeast and southeast corners of Park are drained by unnamed tributaries to Eightmile Brook (Figure 5).

As mentioned earlier, the major surface water body in the Park is Hidden Pond. No bathymetric information on Hidden Pond was available to Team members. The pond does not appear to be very deep and probably has an average depth of not much more than a few feet. Seasonal watercourses originating north and northeast of the pond carries drainage into Hidden Pond. From its point of outflow from Hidden Pond, Bullet Hill Brook drains an area of about 73 acres or 0.114 square miles. Almost 60 percent of this watershed is within the boundaries of Hidden Pond.

Precipitation which takes the form of surface runoff flows across the surface of the land until it reaches a brook or surface water body. Precipitation may also be absorbed into the ground. Once it is absorbed, the

FIGURE 4



TILL

SEASONALLY WET AREAS

OPEN WATER

HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

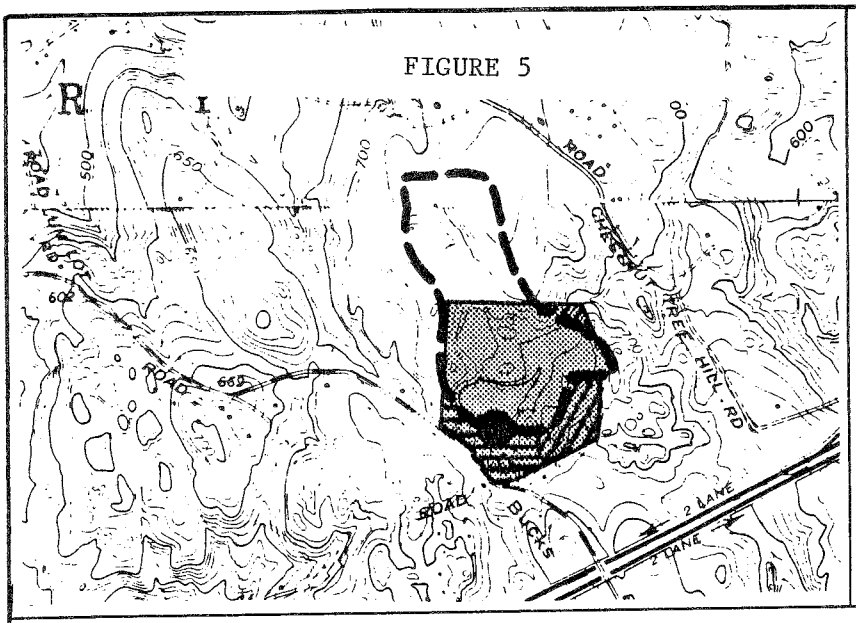
SURFICIAL GEOLOGY

King's Mark Environmental Review Team

0 660'

N

FIGURE 5



HIDDEN POND PARK
SOUTHBURY, CONNECTICUT

WATERSHED BOUNDARY

King's Mark Environmental Review Team

0 2000'

STUDY AREA

WATERSHED BOUNDARY FOR BULLET HILL BROOK FROM ITS POINT OF INTERSECTION AT THE OUTLET OF HIDDEN POND

PORTION OF PARK WHICH ULTIMATELY DRAINS TO EIGHTMILE BROOK

AREA OF PARK WHICH DRAINS TO BULLET HILL BROOK

water may either be returned to the atmosphere through evaporation and plant transpiration or percolate downward to the water table and become groundwater. Once the water reaches the groundwater table it moves slowly downslope by the force of gravity, ultimately discharging to the surface in the form of a spring, wetland, stream or directly into a lake or pond. Generally speaking, groundwater flow in the watershed parallels the surface flow pattern and is largely controlled by the underlying bedrock or compact layer present in some of the till-based soils.

Although there is no gaging station at the outlet of Hidden Pond, it is possible to estimate the flow duration characteristics of the outlet stream using a method described in Stream Flow Information for Connecticut with

Applications to Land-Use Planning. (Michael A. Cervione, Jr., Connecticut Department of Environmental Protection, No. 35). Table 1 estimates the flow duration characteristic of Bullet Hill Brook at the outlet of Hidden Pond.

The mean annual outflow from Hidden Pond is estimated to be about 0.2 cubic feet per second and is equalled or exceeded only 30 percent of the time. In other words, the flow would not be exceeded 70 percent of the time.

TABLE 1

Flow Duration Characteristics
of Bullet Hill Brook at the Outlet of Hidden Pond

Percent of time flow equalled or exceeded	1	10	30	50	80	90	95	99
Flow equalled or exceeded in CFS	1.15	.4	.2	.105	.028	.0136	.008	.007
Flow equalled or exceeded in million gallons per day	.74	.26	.13	.07	.02	.009	.005	.004

The Town questioned on the review day whether or not Hidden Pond has any recreational bathing potential. The Connecticut Department of Health Services recommends that inland bathing facilities provide a minimum of 1,000 gallons of dilution water per bather per day. The volume of dilution water available depends on both the capacity of the water body, which is estimated to turnover twice each year and the amount of water flowing through it. The formula used to calculate bathing capacity is:

$$N = \frac{(V/180) + F)}{1{,}000}$$

where N represents the number of bathers, V represents the volume of the pond, and F represents the flow rate in gallons per day (see Table 1 above). Since

no bathymatic information was available, the Team's Geologist had to make a few assumptions concerning pond characteristics such as average depth of water. Based on the above calculation, Hidden Pond, which is estimated to be about three million gallons of water and has a mean annual outflow of about 0.13 million gallons per day, would have a theoretical capacity of about 146 bathers. However, because the pond would be used during low flow periods, (i.e., summer months), it would be more practical to use flows which are exceeded 90, 95, and 99 percent of the time. These flow rates would be most likely to occur during summer months when the pond would be used for bathing. If these flow values (see Table 1 above) are plugged into the aforementioned bathing load formula, Hidden Pond would have a theoretical capacity of 25, 22, and 18 swimmers, respectively. As a result, it can be seen that the hydrogeological conditions present in this small watershed area cannot support a large bathing load in Hidden Pond. Undoubtedly, the cost of constructing a beach and other facilities would be quite high. In conclusion, it does not seem cost effective to create a bathing area on Hidden Pond which could only support 18 to 25 swimmers at the most. On the other hand, the pond has high aesthetic values and could be used for ice skating during winter months. Depending upon its ability to support fisheries, it might also be used as a fishing pond.

It should be pointed out that the outlet structure for Hidden Pond, an 18 inch corrugated metal pipe is in a state of disrepair. Every effort should be made to correct the outlet structure.

According to the Water Classification Map for the Lower Housatonic River Basin, the surface water quality of Hidden Pond is classified as "A." This means that overall water quality is good and that the water has potential for fish and wildlife habitat; recreational use; agricultural, industrial supply and other ligitimate uses, including navigation.

SOIL RESOURCES

Introduction

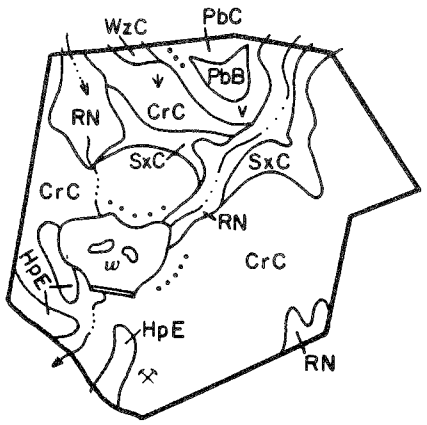
The soils on the parcel have dominately formed in deep (<20 inches) loamy till deposits over bedrock. The soils are so intermingled on the landscape that it was not possible to map them separately. Other soils have formed in the depressional drainageways and in a small area of dense till deposits on the northern part of the property. A shallow pond approximately four acres in size is at the confluence of the two drainageways.

Portions of the property were evaluated with spade and auger, other portions were evaluated by air photo interpretation and the use of the Soil Survey of New Haven County (1979). A slightly revised soil map at a scale of 1" = 1000' has been included (Figure 6). Because of the number of soil map units on the parcel, basic information about soil properties and interpretations is included in Table 2. Below is some site specific information about the map units used.

Sanitary Facilities

Town officials noted on the review day that sanitary facilities would probably be required if Hidden Pond Park is developed. Since the Park is not served by a public sewer line, an on-site septic system would need to be constructed. In this regard, there does appear to be sufficient area in the eastern parts of the Park where a small leaching system could be constructed. This would be in the area designated as Charlton-Hollis soils (see Figure 6).

FIGURE 6



HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

DISTRIBUTION OF SOILS

King's Mark Environmental Review Team

0 1000'

INTERMITTENT STREAM

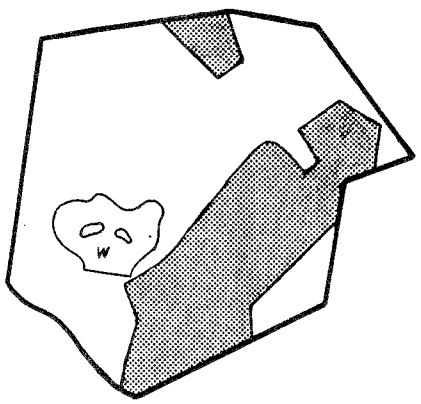
WET SPOT

SHORT STEEP SLOPE

BORROW PIT

WATER

FIGURE 7



HIDDEN POND PARK

SOUTHBURY, CONNECTICUT

SUITABLE DEVELOPMENT AREAS

King's Mark Environmental Review Team

0 1000'

PORTIONS OF THE PARCEL MOST SUITABLE FOR THE DEVELOPMENT OF FACILITIES

TABLE 2 SOILS LIMITATION CHART

HIDDEN POND PARK: SOUTHBURY, CT

MAP UNIT NAME	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	MAJOR LIMITATIONS TO THE DEVELOPMENT OF: PICNIC AREAS	PATHS AND TRAILS	PLAYING FIELDS	ROADS AND PARKING AREAS
CrC-Charlton-Hollis fine sandy loam, 3-15% slopes	Complex of deep to shallow glacial till soils over bedrock. Formed in loamy materials	Well drained to excessively drained 6 ft.	Variable slopes	None	Variable depth to bedrock	Variable depth to bedrock
HpE-Hollis-Charlton fine sandy loam, 15-35% slopes	Complex of shallow to deep glacial till soils over bedrock. Formed in loamy materials.	Excessively drained to well drained 6 ft.	Slope	Slope	Slope Depth to bedrock	Slope Depth to bedrock
PbB-Paxton fine sandy loam 3-8% slopes	Glacial till soils formed in dense loamy materials	Well drained 1.5 - 2.5 ft.	None	None	Slope if over 6%	None
PbC-Paxton fine sandy loam 8-15% slopes	Glacial till soils formed in dense loamy materials	Well drained 1.5 - 2.5 ft.	Slope Large stones	None	Slope Large stones	Slope
RN-Ridgebury Leicester and Whitman extremely stony fine sandy loam	Glacial till soils formed in loamy materials	Poorly drained to very poorly drained +1 1.5 ft	Wetness Large stones	Wetness	Wetness Large stones	Wetness Large stones

MAP UNIT NAME	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	MAJOR LIMITATIONS TO THE DEVELOPMENT OF: PICNIC AREAS	PATHS AND TRAILS	PLAYING FIELDS	ROADS AND PARKING AREAS
WzC-Woodbridge extremely stony fine sandy loam 3-15% slopes	Glacial till soils formed in dense loamy materials	Moderately well drained 1.5 - 2.5 ft	Large stones Slope Seasonal wetness	Seasonal wetness	Slope Large stones	Large stones Seasonal wetness
SxC-Sutton extremely stony fine sandy loan 3-15% slopes	Glacial till soils formed in loamy materials	Moderately well drained 1.5 - 3.0 ft.	Large stones Slope Seasonal wetness	Seasonal wetness	Slope Large stones	Large stones Seasonal wetness

Soil Map Units

Charlton-Hollis Soils (CrC)

Included with this unit in mapping are small areas of exposed rock outcrop and areas of moderately deep to bedrock soils. Also included are narrow areas of steeper slopes and areas of moderately well drained soils. The portion of this unit north of Waterbury Road (southeast portion of property) contains areas of deep Charlton soils approximately 0.5 to 1.5 acres in size.

Ridgebury, Leicester and Whitman Soils (RN)

Included with this unit in mapping are alluvial soils along the watercourses and a small area of very poorly drained soils formed in shallow organic deposits over stony till (in the large wetland area in the northwest portion of the property).

Development Suitabilities

Pavilion and Picnic Area

The area with the most suitable soils for a pavilion, picnic area and associated restroom facilities/waste disposal system, is on the part of the CrC map units in the southeast portion of property overlooking the pond. Although the soils in this area are a complex of deep to shallow well drained soils, large enough areas of deep Charlton soils can be found so that any blasting or filling will be minimal. An area for a waste disposal system could be located by deep test pits to locate the areas dominated by Charlton soils. Slopes on this area overlooking the pond are dominately gently sloping (3 to 8 percent slopes), so locating areas for picnic tables would be simple.

Playing Fields and Other Recreation Facilities

Because of the variable depth to bedrock, exposed bedrock and areas with a stony surface, most of the non-wetland soils on the parcel have many limitations for the development of playing fields. Blasting, filling and stone picking would be necessary and probably cost prohibitive. There is the potential to develop a few small open fields ($\geq$ one acre in size) for volleyball, playground, etc. by concentrating on the deep Charlton soil areas in the CrC units. Tennis courts in close proximity to the pavilion on Waterbury Road could be constructed in these flat benches of deep soils with a minimum of grading. The portion of the site with the most potential for these facilities is in the southeast part of the property.

Nature and Hiking Trails

The soil resources on the site offer a variety of slopes, vistas, and ecosystems. Interesting areas to include in a trail system are the very poorly drained soils of the wetland in the northwest portion, the drumloidal till ridge at the northern end, the watercourse and drainageway on the eastern side, the pond area, and the various small rock ourtcrop ridges. A trail system could be easily maintained since there are few steep slopes, the soils are not highly erodible, and wetland crossings can be minimized. Surface stones are a minor limitation for hiking and cross-country ski trails.

Hidden Pond Area

Hidden Pond appears to have been formed by damming a depressional area of very poorly drained soils at the confluence of two drainageways. A small amount of excavating and filling of a low dam created the shallow pond. The dam and outlet structure (culvert) are in poor shape. A channel was eroded

around the culvert and trees and shrubs are growing on the dam, which may or may not be constructed of suitable material. The dam needs to be cleared, a proper outlet structure installed, and an emergency spillway constructed. The dam could be raised which would increase pond area and depth but it may be difficult to locate enough suitable embankment material on-site. Dredging or further excavation of the pond is possible, but depth to bedrock and an area to deposit any spoil could be major limitations. Any work on the dam or pond may be subject to local, state, and possibly federal approval. The current shallow pond has value for education in wildlife habitat, but the potential could be improved. The soils and slopes on the pond and upland edges do not lend themselves to the construction of a perimeter road system and would decrease aesthetic and wildlife values.

FISHERY RESOURCES

Hidden Pond appears to be a shallow, eutrophic pond. While it appears to have some "flow through" due to a small feeder stream, it may be susceptible to "winter kill" because of its shallowness and decaying aquatic macrophytes which were observed along the perimeter.

The aquatic resource is most likely dominated by warm-water fish species. Bluegill sunfish were observed on the pond during the ERT field review. Additionally, largemouth bass, brown bullhead, pumpkinseed sunfish, crappie, yellow perch, golden shiner and chain pickeral may also be present. "Stunting" is a phenomenon that usually occurs in panfish populations in small ponds. It is an indicator of an unbalanced fish population, most often associated with a low ratio of predator to prey spcies. It is suggested that, if possible, some

netting or other means of sampling of fish populations be conducted by the Town in order to assess the health of the fishery in the pond. This pond appears to be well suited for family and/or children's recreational fishing due to the openings found along the shoreline. Fishing access to the pond is good for both shore and "car-top" boat fisherman.

The absence of an outlet structure (i.e., surface water or deep water release gate) for pond level control is a considerable disadvantage in Hidden Pond. If installed and used properly, this mechanism could serve a dual function to both: (1) control of development of aquatic macrophytes and (2) enhance the existing fishery. Late fall drawdowns of several feet every 3 to 4 years might be advisable if a weed problem begins to develop.

It is the opinion of the ERT's Fishery Biologist that there is presently a scarcity of fish attracting cover such as large boulders, weed beds, stumps, and brush piles in the pond. For this reason, it is advised that some sort of fish attracting devices be added to the pond. Fish attracting devices or artificial reefs have proved to be very effective in enhancing small pond fisheries by increasing the amount of suitable habitat for such species as largemouth bass, sunfish and yellow perch. These devices can be easily made from a variety of material such as old brush, discarded christmas trees or tires. The materials are tied together, cemented at the base, and sunk at various locations (both deep and shallow) be either placing them on the ice shortly before ice-out or with the aid of a boat. They can be marked with small floats to enable fisherman to more easily find them or simply left unmarked. The devices have been shown to work quite well by congregating both fish and fisherman to a specific site. Labor to build the artificial reefs could possibly be supplied from youth groups such as the Boy Scouts, Girl Scouts or other organizations. The DEP - Western District Fisheries staff

could provide some technical assistance in the form of helping with material selection, size and placement of devices, and best time of year to install them.

A good ratio of shallow to deep water areas and some, small patches of aquatic weeds are ideal for enhancing small pond fisheries. Weed beds provide diversity of habitat and are desireable in a warm-water fishery. However, when extensive areas of a pond become heavily infested with aquatic weeds than a less than optimum balance of the fish populations can develop. Maintaining open patches in large weed beds enables predatory species to prey more efficiently on forage fish, thus exerting some control over their populations. Controlling weed growth can also help influence the fish populations by enhancing angling opportunities. Open patches can be maintained by installing materials which prohibit weed growth. Two such products are Dartex and Aquascreen. These materials can be laid over the desired areas during any time of year and prohibit weed growth by preventing sunlight from reaching the bottom pond sediments. If earth-moving operations are being considered in or near the pond, then the creation of some deep "holes" in the pond bottom would be desireable.

RECREATIONAL AND PARK PLANNING CONSIDERATIONS

RECREATIONAL AND PARK PLANNING CONSIDERATIONS

RECREATIONAL DEVELOPMENT POTENTIAL

Due to shallow to bedrock soil conditions and the presence of inland wetland areas, intensive development of Hidden Pond Park for recreational purposes will be limited. Therefore, extensive site improvements for ballfields or tennis courts will be costly and probably better located on more suitable soils elsewhere in the town.

The Park therefore can more appropriately be managed as a natural open space area, with trails for hiking and cross-country skiing, and perhaps for environmental education. Other potential recreational facilities which may be considered are: (1) a possible picnic shelter or small pavilion; (2) siting a number of picnic tables adjacent to the pond; and (3) a small parking lot, probably near the intersection of Bucks Hill and Waterbury Roads.

SWIMMING POTENTIAL OF HIDDEN POND

Hidden Pond is a small and shallow water body with a very small watershed. The pond's dam reaches a maximum of 4 to 5 feet high and lacks a water control structure. This allows water to simply run through an eroded channel through the dam, thereby lowering the pond level by at least one foot.

Using the Department of Health Services standard of 1,000 gallons of water/person/day and low flow guideline of 50,000 gallons/square mile/day, Hidden Pond, with a relatively small watershed, is very limited in supporting a public swimming area (see Hydrology section of report for more detail). The pond is therefore most suitable for recreational fishing, ice skating, and as an attractive focal point in the center of the Park.

RECREATIONAL USE ALTERNATIVES

(1) As previously stated, the Park basically should be managed as passive open space area with low intensity usage except perhaps in the vicinity of the pond.

(2) It is encouraged that the dam be improved or upgraded, including the installation of a water control structure with spillway. This would raise the pond level, thereby improving the pond as fish habitat as well as forestalling eutrophying conditions. In this regard, some deepening of the pond and removal of the islands also would be useful.

(3) Develop a picnic pavilion in the clearing southeast of the dam and overlooking the pond.

(4) Develop a small parking lot alongside Old Waterbury Road for ease of surveillance by town police after dark. Although much of the road frontage is steep and rocky, two locations physically are feasible. The more western of these is level, but has a poor sight line regarding traffic coming from the east. The more eastern of the two sites is at the crest of a slight rise, with good sight line visibility in both directions. However it is directly opposite a private residence.

(5) Develop an unpaved service road for maintenance, patrol, emergency vehicles, etc., leading from the parking lot to the picnic pavilion/dam area. Slope and soil conditions seem feasible from either parking lot option.

(6) Develop a system of hiking and nature study trails with appropriate signing to assist in interpretation of park features. With widening, such trails could also be used for cross-country skiing.

ADDITIONAL CONCERNS

Since the physical and biological characteristics of Hidden Pond Park appear inadequate in meeting the Town's desire for a multi-use facility offering ballfields, tennis courts, picnicking, trails and perhaps swimming, it is suggested that other areas in town be investigated to support such recreation opportunities. A few areas are discussed below.

Ballfields and Tennis Courts

Locate on level, well-drained, non-stony areas on terraces adjoining the Pomperaug River floodplain or along Route 6.

Swimming Areas

If an indoor swimming facility is desired as indicated by the Town, it could provide year-round use for school and public swimming programs and would be a desirable asset for a fast-growing community as Southbury. In the absence of a suitable pond site, Southbury's outdoor swimming options might include:

(1) A pool with chlorination and filtration system.

(2) A bypass pool along the Pomperaug River fed by a combination of groundwater infiltration, groundwater pumped in and/or river water in an appropriate combination so as to provide sufficient turnover of water.

(3) Some combination of (1) and (2) above.

If one of these options is considered, it is encouraged that the Town inspect the Mill Woods Pool in Wethersfield. The pond-like character of Mill Woods is aesthetically far superior to the typical crowded concrete pool with the necessary high degree of regulation by lifeguards. Mill Woods Pool began as a bypass pool and then was gradually transformed into an attractive semi-natural pond/pool with the following features:

(1) A concrete bottom in the main swimming area to avoid turbidity from human activity with resultant rescue problems.

(2) Source of water from the municipal system, ensuring a high initial quality of water.

(3) An effective chlorination and filtration system which maintains a high degree of clarity as well as sanitary quality in the water.

APPENDIX A

PROCEDURES FOR LAKE/POND STUDY

A number of key parameters need to be analyzed in any lake/pond study in order to accurately assess the biological, chemical and physical characteristics of a lake/pond. Some parameters are very general in nature such as name and location of the waterbody; other parameters are very specific such as surface area, depth, volume or chemistry characteristics of the waterbody.

Appendix A outlines in detail the information needed to conduct a successful and comprehensive study of Hidden Pond. An example is also enclosed to illustrate a typical lake/pond classification inventory study.

If the Town of Southbury plans to pursue a more comprehensive study of Hidden Pond, it is encouraged that this format be used. This will provide the necessary framework to generate baseline information needed to make an informed decision concerning the use and development of Hidden Pond.

INTRODUCTION

The information contained in this classification inventory was compiled as part of a cooperative agreement between the U.S. Environmental Protection Agency (E.P.A.) and the Connecticut Department of Environmental Protection (D.E.P.), Water Compliance Unit, under Section 314 of the Federal Clean Water Act.

This information will supplement additional lake studies by serving as an initial source of baseline information.

An outline format is used to present the information for each lake included in the inventory. The following is a brief explanation of each item in the inventory.

I. Name: Name of the lake or pond.

II. Location:

Town - Town or towns in which the lake is located.

U.S.G.S. Quadrangle - Topographic quadrangle maps are published by the U.S. Geological Survey Topographic Division at a scale of 1:24,000 (one inch = 2,000 feet). Each quadrangle is identified by a U.S.G.S. geographic name. A quadrangle is an area approximately 6 miles wide by 9 miles long, or about 55 square miles. Boundaries are determined by 7.5 minutes of latitude and longitude, not by political boundaries.

U.S.G.S. Quadrangle Number - For convenient reference, a number is assigned each quadrangle. The first number listed is taken from the numerical system of the Natural Resources Center, D.E.P. The number shown in parentheses is taken from the system used by the Water Compliance Unit, D.E.P.

Basin Information - The name identifies the location of the lake in one of eight major river basins, as defined under Section 303(e) of the Clean Water Act. The 4 digit number which follows designates the drainage basin according to the D.E.P., Natural Resource Center's recently published Drainage Basins Map. For example, the basin identification number for Ball Pond in New Fairfield is 6402. The 6 indicates the major basin is the Housatonic. The 4 represents the regional basin, in this case the Candlewood Basin. The final two digits, 02, identify the subregional basin as Ball Pond Brook.

Latitude and Longitude - The geographic coordinates of the lake's approximate center were obtained from U.S.G.S. topographic maps.

III. Physical Characteristics:

Surface area, maximum depth, mean depth - These morphological characteristics were taken from a survey conducted by the Lake and Pond Survey Unit of the State Board of Fisheries and Game in 1959, when available.

Volume - The volume of each lake was calculated by multiplying mean depth by surface area.

Retention Time - The retention time is the time period required for a lake to flush once. This value is calculated from the formula retention time = $\frac{V}{R \times D \times N}$ where V = lake volume, R = rate of runoff in watershed, D = drainage area, N = a constant equal to the number of seconds in one year. The value for R was obtained from U.S.G.S. streamflow data for the water years 1931 to 1960 for the local geographical area.

Bathymetry - A bathymetric map is one in which depth contours are delineated. When available, bathymetric maps are provided in the 1959 Fishery Survey of the Lakes and Ponds of Connecticut.

Watershed Area - A watershed or drainage area is that land area which contributes water to the lake. Water from precipitation is contributed either as surface runoff or as groundwater flow.

IV. National Eutrophication Survey (N.E.S.):

The National Eutrophication Survey was conducted by the Federal Environmental Protection Agency during the early 1970's. The objective of N.E.S., which began in 1972, was to examine the accelerated eutrophication of selected freshwater lakes. The scope of the investigation encompassed nutrient sources, concentrations, and their impact on these systems. This information serves as a foundation for coordination between national, local and state agencies regarding best management practices for the abatement of point and non-point pollution within the watershed.

V. National Pollution Discharge Elimination System (NPDES)

The NPDES is a federal wastewater discharge permit program, administered by the Connecticut DEP under delegation from the EPA, to regulate the discharge of pollutants into waterways from all specific point sources. The program was established by Section 402 of the federal Clean Water Act.

VI. Public Access:

This information includes access available to any member of the public through state facilities, as well as access limited to town residents.

VII. Biological/Chemical Data:

Trophic classification - All of the lakes within this survey were classified by the Connecticut Agricultural Experiment Station (C.A.E.S.). Twenty-three lakes were classified as part of an independent study conducted by the CAES which was published as CAES Bulletin #759 in October 1975. These lakes are designated by an asterisk. The remaining forty-seven lakes were classified by the CAES during a 1979-1980 cooperative agreement with the DEP, Water Compliance Unit. The twenty-three lakes classified in the 1973-1974 study have since

been reevaluated utilizing the modified classification system employed during the 1978-1979 study. The revised classifications appear in this inventory.

The lakes are grouped into six categories: oligotrophic, oligomesotrophic, mesotrophic, meso-eutrophic, eutrophic or highly eutrophic. Total phosphorus, total nitrogen, chlorophyll-a, and Secchi depth were the parameters used to determine the trophic state of each lake. The ranges for each criterion are given in the following table:

Category	Total P	Total N	Summer Chlorophyll-a	Summer Secchi Depth[1]
	ppb			M
Oligotrophic	0-10	0-200	0-2	6+
Oligo-mesotrophic	10-15	200-300	2-5	4-6
Mesotrophic	15-25	300-500	5-10	3-4
Meso-eutrophic	25-30	500-600	10-15	2-3
Eutrophic	30-50	600-1000	15-30	1-2
Highly Eutrophic	50+	1000+	30+	0-1

[1] For lightly colored lakes with 5 to 15 ppm Pt units of color.

Aquatic Weeds - The information on aquatic weeds was compiled from field estimates for the 47 lakes included in the 1979-1980 surveys conducted by the CAES. This data is not available for those lakes classified during the 1973-1974 study. The terms given are used to indicate the predominance of weed beds in terms of area and density. The terms used to describe area designate the approximate percentage of the lake area which is occupied by weed beds. The terms are defined as follows: small (0-5%), intermediate (5-15%), large (15-30%) and extensive (30-100%). Density of weed growth was described as sparse, moderate or dense.

A plus symbol (+) following the area/ density information, designates those cases where weed growth was altered by winter drawdown, a method of weed control.

Biological/Chemical Data - The water chemistry data for each lake is presented in tabular form. A brief definition of each parameter listed follows. Unless otherwise noted, the results are reported in parts per billion.

Transparency - A measure of water clarity by a standard Secchi disk. Reported in meters.

Sample depth - The depth at which the sample was taken. The abbreviation "comp." indicates a vertical composite sample of the entire water column.

Alkalinity - A measure of water hardness. Reported in milli-equivalents/liter.

Chlorophyll-a - A pigment associated with photosynthesis which serves as an index of algae productivity.

Soluble Phosphorus - A measure of the phosphorus which is dissolved in the water.

Total Phosphorus - A measure of both soluble and particulate phosphorus.

NH_4-N - A measure of nitrogen which is present as forms of ammonia.

NO_3-N - A measure of the inorganic nitrogen in the form of nitrate.

Dissolved Oxygen - Temperature - Depth Profiles - These graphs depict the dissolved oxygen concentration in parts per million and the water temperature in degrees centigrade at various intervals of depth.

VIII. Land Use

This information was compiled and mapped by the regional planning agencies in 1977 as part of the Connecticut Areawide Waste Treatment Management Planning Program established under Section 208 of the federal Clean Water Act. Fifteen categories of land use were defined by the study. The number of acres of each land use and the percentage of the total watershed utilized by each is presented. The lake surface area is included within the water category.

IX. Erosion and Sedimentation:

Sites of erosion and sedimentation were identified and mapped in 1977 as part of the Connecticut Areawide Waste Treatment Management Program, established under Section 208 of the federal Clean Water Act. Sources of erosion and sedimentation were classified as either road-bank, cropland, construction, stream banks, or mining. The number of each of the sources was noted.

X. Topography:

Topography describes the watersheds natural features including hydrologic relationships and local relief.

XI. Surficial Geology:

The surficial geology describes the nature and distribution of the surface materials between the bedrock and the land surface.

I. Name: 1860 RESERVOIR

II. Location:

Town - Wethersfield

U.S.G.S. Quadrangle - Hartford South

U.S.G.S. Quadrangle Number - 52 (69)

Basin Identification: Major - Connecticut; Subregional #4010

Longitude - 72^{o} 41' 35"

Latitude - 41^{o} 40' 34"

III. Physical Characteristics:

*Surface Area - 35 Acres

* Maximum Depth - 3.5 ft. (1.67 m)

* Mean Depth - 2.0 feet (0.61 m)

Volume - 3,049,200 cu. ft. (86,344 m^3)

Retention Time - 26 days

Bathymetry - Not available

Watershed Area - 0.81 sq. miles (209.79 ha)

*Town of Wethersfield Report, EIS, Sept. 24, 1975

IV. National Eutrophication Survey: No

V. National Pollution Discharge Elimination System Permits (NPDES): None

VI. Public Access: Town recreation area - undeveloped -open to public.

VII. Biological/Chemical Data:

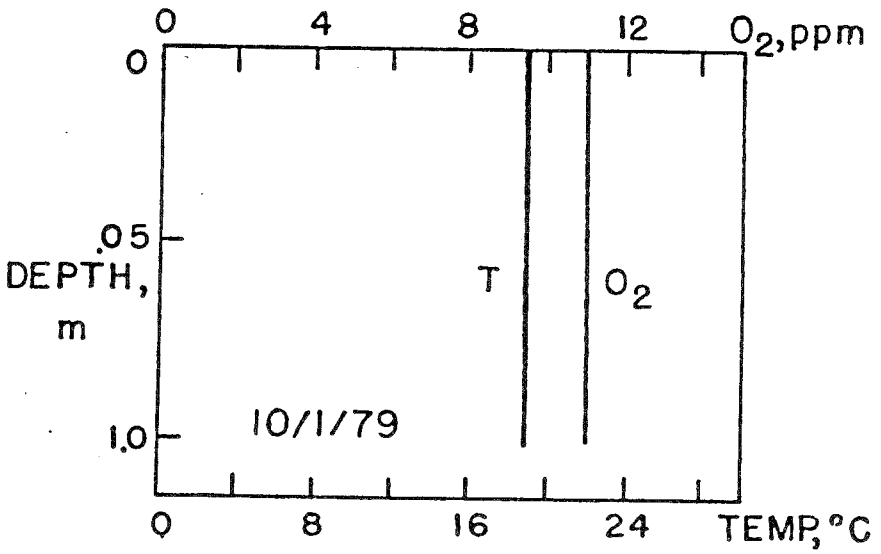
Trophic Classification - highly eutrophic

Aquatic Weeds - extensive/dense

1860 RESERVOIR
(Wethersfield, CT)

Date	Transparency	Sample Depth	Alkalinity	Chlorophyll-a	Soluble P	Total P	NH_4-N	NO_3-N	Soluble N	Total N
	m		meq/l	ppb						
4/24/79	>1	comp	1.43	-	21	59	45	18	635	1158
10/1/79	>1	0-1	1.21	7	2	32	144	20	1058	1260

Water Chemistry Data



Temperature and Dissolved Oxygen Profile

Depth	Temperature	Oxygen
m	°C	ppm
0	19.0	11.2
1	19.0	11.2

Temperature and Dissolved Oxygen Data, 10/1/79

Aquatic Macrophyte Notes

Aquatic weeds, particularly Ceratophyllum (Coontail), were extremely dense throughout this very shallow impoundment. During the spring visit, weeds were dense also, and about one-half the lake was covered with mats of the filamentous algae Spirogyra.

VIII. Land Use:

Categories of Land Use	Area (Acres)	Percentage of Total Watershed
Low Density Residential 2 dwell/Ac		
Moderate Density Residential 2-8 dwell/Ac	172	41.4
High Density Residential 8 or more dwell/Ac	17	4.1
Institutions - schools, colleges, churches, etc.		
Commercial		
Industrial		
Openland - parks, golf, campground, cemeteries, open idle lands	17	4.1
Crop Land - vegetables, tobacco, general	40	9.6
Orchard - orchards and horticulture		
Dairy and Poultry		
Forest Plantation		
Resource Extraction		
Wetland	23	5.5
Water	15	3.6
Woodland	132	31.7

IX. Erosion and Sedimentation: None

X. Topography:

This impoundment is surrounded almost entirely by contiguous wetlands which extend the length of the watershed. These wetlands serve to drain the watershed in the absence of any defined streams. Relief in the watershed is slight.

XI. Surficial Geology:

Most of the watershed consists of glacial till. The soils surrounding the western half of the lake are swamp deposits.

NOTES

NOTES

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, 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 - a 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns and/or developers 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 and/or developers in the review of sites proposed for major land use activities. 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 recreational/open space projects.

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

REQUESTING AN ENVIRONMENTAL REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality, or the chairman of an administrative agency such as planning and zoning, conservation, or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District, and 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 purposes of review, and a statement identifying the specific areas of concern the Team should investigate. When this request is approved by the local Soil and Water Conservation District and King's Mark RC & D Executive Committee, the Team will undertake the review. At present, the ERT can undertake two (2) reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil and Water Conservation District or Keane Callahan, ERT Coordinator, King's Mark Environmental Review Team, King's Mark Resource Conservation and Development Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.