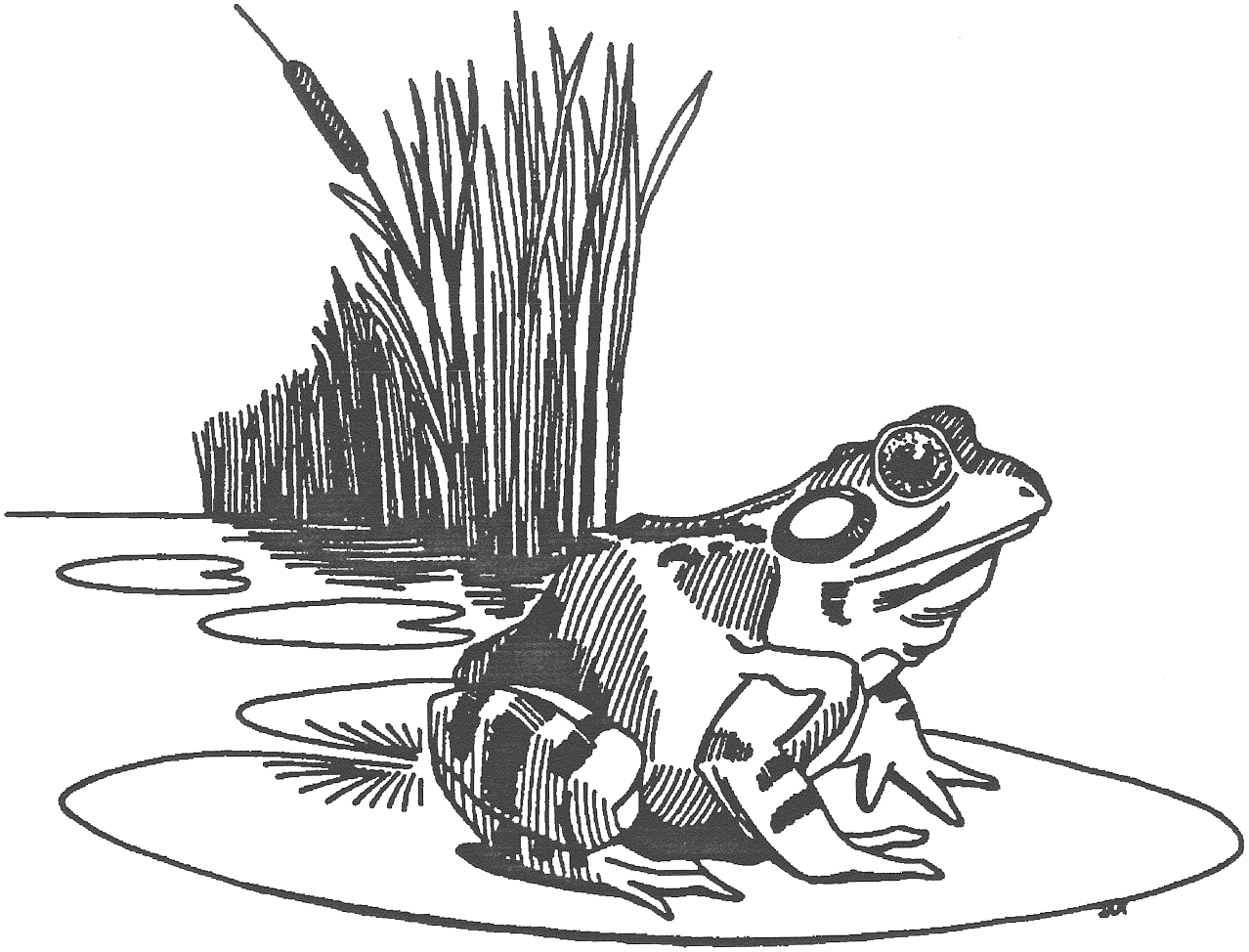
KING'S MARK ENVIRONMENTAL REVIEW TEAM



REPORT FOR

HATCH POND WATERSHED

KENT,
CONNECTICUT

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

HATCH POND WATERSHED

KENT, 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

Kent Land Trust

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 Inland Wetlands Commission and the Town. 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.

JUNE 1991

ACKNOWLEDGMENTS

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

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I would also like to thank Susan Anderson, Secretary of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to Richard Sinclair, The Kent Land Trust, and Meg Enkler of Litchfield S&WCD for their assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

An environmental review was requested by the Kent Land Trust for the Hatch Pond Watershed located in South Kent near the New Milford Town Line. The study area includes Hatch Pond, Leonard Pond and Mill Pond. The Land Trust requested the review to obtain information about the area for reference use in the event of future development in the watershed and to educate the residents concerning ecologically sound practices.

The character of the watershed is rural with limited future development. South Kent School, located on the southwestern side of the watershed, is planning developments in the near future. Hatch Pond and Leonard Pond are very popular recreation sites with public access. Mill Pond is privately owned.

The purpose of this review is to inventory and assess existing natural resources, particularly wetland and water resources, and discuss the impacts of future development. This environmental information will be used to assist the Town in guiding conservation and development in this area.

The review process consisted of 4 phases: (1) inventory of the site's natural resources; (2) assessment of these resources; (3) identification of resource problem areas; and (4) presentation of planning and land use guidelines. Based on the review process, specific resources, areas of concern, development limitations and development opportunities were identified.

Topography

The watershed occupies a relatively narrow, steep sided, southward draining valley. The transition of land from the valley floor to the steep sides of Spooner Hill and Segar Mountain is very abrupt. Elevations range from 390 feet above mean sea level to 1,200 feet above mean sea level. The watershed consists of mostly steep, rocky uplands with a narrow lowland occupied primarily by ponds and wetlands.

Bedrock Geology

Bedrock underlying the site consists of 2 distinct types: metamorphosed limestone or marble and metamorphic schist. The valley occupied by the ponds and wetlands occurs because it is underlain by the marble which is much less resistant to erosion. The schist is a strongly layered, weather resistant, dark colored, mica and quartz-rich rock. Scouring by continental glaciers has intensified the contrasting topography.

Surficial Geology

The 2 major surficial geologic deposits that occur on the site are till and stratified drift. Till is particularly thick on Spooner Hill and consists of a hardpan material made up of a mixture of silt, sand, cobbles and boulders. The fine-grained

character of the till significantly limits development. Stratified drift deposits underlie the ponds and wetlands and a small area in the northern parts of the basin. The deposits primarily contain sand and gravel. The glacial deposits are a major factor in determining the soil and drainage characteristics of the uplands.

Hydrology

The Hatch Pond drainage basin occupies approximately 2,330 acres. The basin's steep terrain and geologic materials create a situation where water runoff passes through the basin, draining southward down to Womenshenuk Brook and to the Housatonic River. Groundwater also tends to move down the slopes to the valley, discharging into the wetlands and ponds. Rapid surface runoff is increased by the slopes, shallow to bedrock soils and the low permeability of the till soils.

General Conditions and Limitations for Development

The land in the basin, as defined by the topographic, geologic and hydrologic characteristics, presents significant limitations for development. The steep, rocky terrain creates a situation of significant flow variations for the main stream. The shallow to bedrock soils and the low permeability of the hardpan soils cause rapid surface runoff. The increases in runoff cause erosion as quickly moving surface water carries eroded materials, fertilizers and chemicals to the wetlands and ponds in the valley. Additionally, development costs will be increased because most of the upland area has bedrock close to the surface and steep slopes. Only a small portion of the valley bottom is not a wetland or a pond, and most of the remaining developable land is adjacent to the wetlands and waterbodies.

Soil Resources

The soils within the Hatch Pond Watershed are mostly formed from glacial till deposits over schist, gneiss and granite bedrock. The predominate soil texture is loam. The most abundant soils are Rockland, Hollis, Charlton, Paxton and Peat and Muck soils. Most of these soils have severe limitations for development due to slope, wetness and shallow depths.

Nutrient, Erosion and Sediment Control

The key to controlling the eutrophication process in lakes and ponds is controlling the amount of nutrients such as phosphorous that are transported to the waterbodies. Sources of nutrients include construction site erosion, failing septic systems, properly functioning septic systems, fertilization of lawns and gardens, disposal of vegetation from yard upkeep, stormwater runoff and agricultural erosion. Presently, there is minimal land disturbance, and the area is apparently not suffering from significant erosion. Recommendations include the Town closely supervising E&S control plans for proposed developments, preserving the wetland systems and limiting sources of nutrients.

Water Quality Considerations

The water quality for the 3 ponds is Class A, designating the ponds as suitable for recreational uses such as fishing and swimming. Small shallow ponds in a large watershed tend to be more fertile, having a large sediment and nutrient load which results in accelerated eutrophication. Hatch Pond and Leonard Pond are mesotrophic ponds with recreational use impairment due to algae blooms and excessive aquatic plant growth. No data were available for Mill Pond, but it is assumed that Mill Pond is eutrophic. Leonard Pond has been treated annually to control algae and aquatic weeds. The short-term benefits of an algicide can be significant, but the long-term benefits are probably minimal. The sources of pollution contributing to the degradation of the ponds should be located and controlled. The wetland system should be protected. A diagnostic/feasibility study could be initiated to protect water quality.

Wildlife Considerations

Wildlife habitat at the watershed consists of deciduous and coniferous forests, old field, open fields and several types of wetlands including, open water, forested, and scrub/shrub wetlands. A variety of wildlife is expected to use this area, including deer, ruffed grouse, weasel, raccoon, beaver, otter, fox, coyote, hawks, owls, catbirds, sparrows, juncos, warblers, wood ducks, black ducks, blue herons, Virginia rail brown, creepers, reptiles and amphibians.

Wetlands provide important habitat for a variety of wildlife species. Protection of the wetlands from further degradation from runoff containing sediments and unacceptable levels of nutrients/contaminants is critical. Wetlands can be protected by purchasing the land or creating a conservation easement. Protection of old field/open field habitat is also important. This valuable habitat is usually the first to be developed. If development is imminent, setting aside open space areas should be considered. Additionally, since streams are used as travel corridors by many wildlife species, a 100-foot buffer around streams is recommended for protection. A buffer of undisturbed vegetation around wetlands is recommended for wildlife and protection of the wetlands from siltation.

Because the watershed is in private ownership, management opportunities are limited. Obviously the watershed should be protected from overdevelopment. Setting aside a combination of habitats for open space is desirable. Certain steps can be taken to minimize the effects of development on wildlife, including buffer strips, natural landscaping techniques, maintaining field borders and early successional stage vegetation and maintaining wildlife requirements.

The Canada Geese are naturally attracted to the Hatch Pond/Leonard Pond area, and will be, even if control measures, including creation of an undesirable edge around the water, are implemented. Use of the waterfowl hunting season will lessen the increase in geese population.

Fishery Resources

Limited agricultural, commercial and residential practices have maintained surface water quality as Class A. The fisheries resources were investigated at Hatch Pond in 1959 and the population was found to be composed of largemouth bass, bluegill sunfish, common sunfish, black crappie, chain pickerel, golden shiner and brown bullhead. The populations of the other ponds have never been formally investigated, but informal angler interviews confirm that the populations are similar to that of Hatch Pond.

Nutrient sources should be identified by the Town and controlled or eliminated. The greatest percentage of nutrient inflow to the ponds within the Hatch Pond Watershed apparently are from agricultural runoff, septic system failure/leachate and/or sediment introduction from exposed soils. Efforts should be instituted to control aquatic plant growth. To maintain a viable fishery population, ponds should have approximately 40% aquatic plant coverage. Future developments should be carefully planned and monitored, and a comprehensive E&S control plan should be established and maintained.

Threatened and Endangered Plant and Animal Species

According to the Natural Diversity Data Base, 1 Endangered Specie and 2 Connecticut "Species of Special Concern" have been reported at the watershed. The Bog Rosemary is a State Endangered Specie. The Saw-wet Owl and Turret Snail are Connecticut "Species of Special Concern."

Archaeological Considerations

There are 2 known prehistoric archaeological sites dating to 4,000 years ago located in the watershed. These sites were occupied by hunting and gathering bands of Native Americans utilizing the natural resources of the area. In addition, sites listed on the National Register of Historic Places are located close to the watershed. These cultural resources be considered, and these sites should be preserved in any future development decisions. The Office of State Archaeology is prepared to offer the Kent Land Trust technical assistance in preserving these cultural resources.

Planning Considerations

Land use in the watershed is primarily a mix of single-family homes interspersed with pastures and woodlands. The ponds are used for fishing, boating and swimming. Except for the Bull's Bridge commercial area, the watershed is within the Rural District 40 Zone. Currently, the Town subdivision regulations require no more than 15% of the land area in a proposed subdivision to be permanently reserved for open space. This is a planning tool the Town could use to protect sensitive areas.

Several other planning guidelines exist in the Town's regulations that can be used to encourage sensitive and appropriate development in the future. The TAHD should promote active public education programs to ensure septic systems are properly designed and used. Communication between the Town and the Housatonic Railroad Company should continue.

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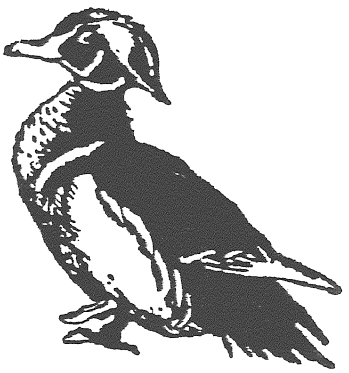


INTRODUCTION

An environmental review was requested by the Kent Land Trust for the Hatch Pond Watershed. The watershed is located in South Kent near the New Milford Town Line. Access is provided by South Kent Road.

The Hatch Pond Watershed study area includes Hatch Pond, Leonard Pond and Mill Pond. Hatch Pond has a surface area of approximately 61 acres and is a popular recreation site. Leonard Pond is approximately 15 acres in size and is also a popular recreation area. Mill Pond is a privately owned 3-acre waterbody. The character of the watershed is rural with limited future development. South Kent School is located on the southwestern side of the watershed. Developments are planned for the school property in the near future. The dominant land use in the area is single-family residential homes with several areas of agriculture.

The purpose of this review is to inventory and assess existing natural resources, particularly water resources, and discuss recreational opportunities, erosion and sediment (E&S) controls and the maintenance and regulatory activities necessary to maintain the watershed. Specific objectives include:

1) Assessing the hydrological and geological characteristics of the site, including geological development limitations and opportunities;

2) Determining the suitability of existing soils to support planned development;

3) Discussing soil erosion and sedimentation concerns;

4) Assessing the impact on water quality;

5) Assessing the impact of development on wildlife;

6) Assessing the impact of development on fisheries; and

7) Assessing planning and land use issues.

THE ERT PROCESS

Through the efforts of the Kent Land Trust and the King's Mark ERT, this environmental review and report was prepared for the Town. This report primarily provides a description of on-site natural resources and presents planning and land use guidelines. The review process consisted of 4 phases:

1) Inventory of the site's natural resources (collection of data);
2) Assessment of these resources (analysis of data);
3) Identification of resource problem areas; and
4) Presentation of planning and land use guidelines.

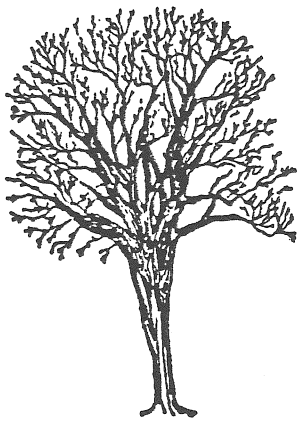
The data collection phase involved both literature and field research. The ERT field review took place on March 27, 1991. Field review and inspection of the site proved to be a most valuable component of this phase. The emphasis of the field review was on the exchange of ideas, concerns or alternatives. Mapped data or technical reports were also perused, and specific information concerning the site was collected. Being on-site also allowed Team members to check and confirm mapped information and identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Results of this analysis enabled Team members to arrive at an informed assessment of the site's natural resource opportunities and limitations. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into the final ERT report.

Figure 1

LOCATION OF STUDY SITE

PHYSICAL CHARACTERISTICS



TOPOGRAPHY

The Hatch Pond Watershed occupies a relatively narrow, steep sided, southward draining valley in the southern part of Kent. The watershed consists mainly of steep, rocky uplands with a narrow lowland comprised primarily of ponds and wetlands. The steep sides of Spooner Hill and Birch Hill form the west side of the valley, and the steep side of Segar Mountain forms the east side of the valley. The valley floor is at an elevation of approximately 390 feet above sea level, and the land rises abruptly to an elevation of approximately 800 feet to the west and to an elevation of approximately 1,200 feet to the east. For the most part, the transition of land from the valley floor to the steep sides is very abrupt with limited amounts of level dry land.

The drainage basin for Hatch Pond is approximately 3.64 square miles or 2,330 acres. It is 2 1/2 miles long and 1 1/2 miles wide. Approximately 1,950 acres or nearly 85% of the land in the watershed is upland, and most of it is steeply sloping. The areas of steepest slopes (i.e., areas with slopes greater than 15%) are shown on Figure 2. Approximately 380 acres or 15% of the land in the watershed is in the valley bottom, and most is either pond or wetlands. Hatch Pond, Leonard Pond and the associated wetlands occupy approximately 285 acres or nearly 75% of the area of the valley floor. The 2 ponds and associated wetlands dominate the valley floor. Hatch Pond has an area of approximately 70 acres, and Leonard Pond has an area of approximately 20 acres, as measured off the topographic map. A relatively large area of wetlands drains southward into Leonard Pond, and a very large area of wetlands occupies the drainage basin between Hatch and Leonard Ponds. Land in the valley floor has been modified by construction of the railroad line and by construction of the main road. Large amounts of fill placed for the rail line have filled parts of the wetlands and have formed dikes which have changed the water flow.

BEDROCK GEOLOGY

The watershed is underlain by bedrock of 2 distinct types. The lowland area is underlain by a metamorphosed limestone or marble. The uplands are underlain by a metamorphic schist which is a strongly layered, weather resistant, dark-colored, mica and quartz-rich rock. The distinct valley occupied by the ponds and wetlands occurs because it is underlain by the marble bedrock which is much less resistant to erosion. During the past several tens of millions of years, the weaker marble has weathered and eroded faster than the surrounding schists. The valley lies atop this eroded marble. Scouring by continental glaciers during the past million years has intensified the contrasting topography of the uplands and lowlands. Figure 3 shows the approximate distribution of marble bedrock. Areas outside the marble are underlain by the mica/quartz schist. Layers in both bedrock types tend to run in the north to northeast direction and tilt steeply to the east. This strong layering is an important factor determining the general north/south orientation of the hills and valleys in the region.

The boundaries on the geologic map are approximately located because much of the contact (i.e., boundary) of the marble is not well exposed, and considerable interpretation was used to locate it. In addition, in many places the marble bedrock grades gradually into the adjacent schists, and there is a moderately wide zone of transition. The bedrock geology was mapped by Richard A. Jackson as a PhD thesis at the University of Massachusetts. A copy of the thesis is on file at the Department of Environmental Protection (DEP) Natural Resources Center.

The presence of marble in the valley is significant because it is a rock made primarily of calcium carbonate (CaC03), whereas schist is composed of silicon and aluminum. As the marble weathers, it enriches the local soil and water with calcium and makes the water considerably less acid. These conditions encourage

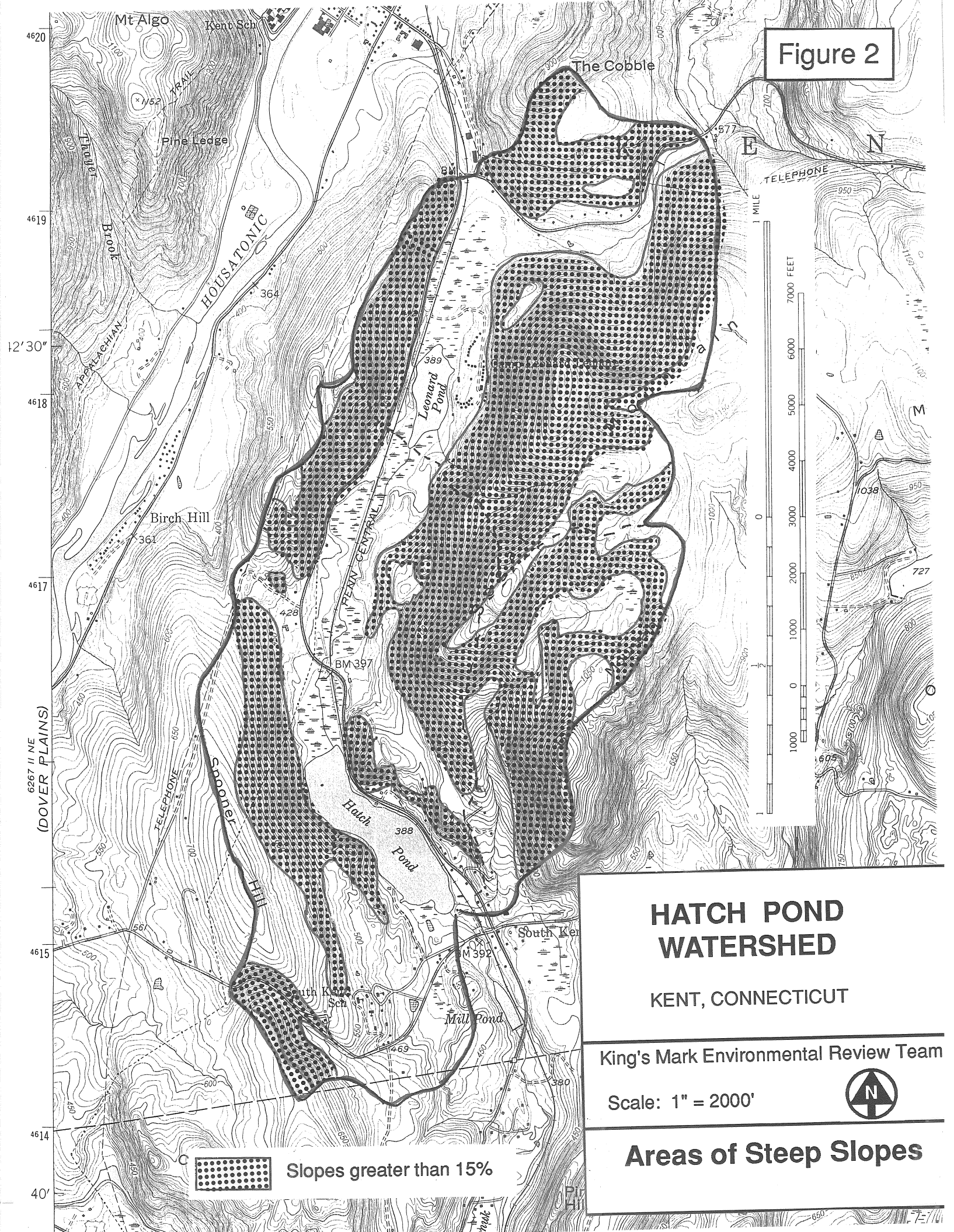


Figure 2
Mt Algo
Kent Sch
The Cobble
Pine Ledge
Trail
Brook
HOUSATONIC
APPALACHIAN
TRAIL
364
BM
577
TELEPHONE
1 MILE
7000 FEET
6000
5000
4000
3000
2000
1000
0
Leonard Pond
Camp Leonard Tompkins
Birch Hill
361
PENN CENTRAL
428
BM 397
Spooner Hill
Hatch Pond
388
South Ken
M 392
South Kent Sch
Mill Pond
469
380
1038
727
605
6267 II NE
(DOVER PLAINS)
4620
4619
4618
4617
4615
4614
12'30"
40'
Slopes greater than 15%
HATCH POND WATERSHED
KENT, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 2000'
N
Areas of Steep Slopes

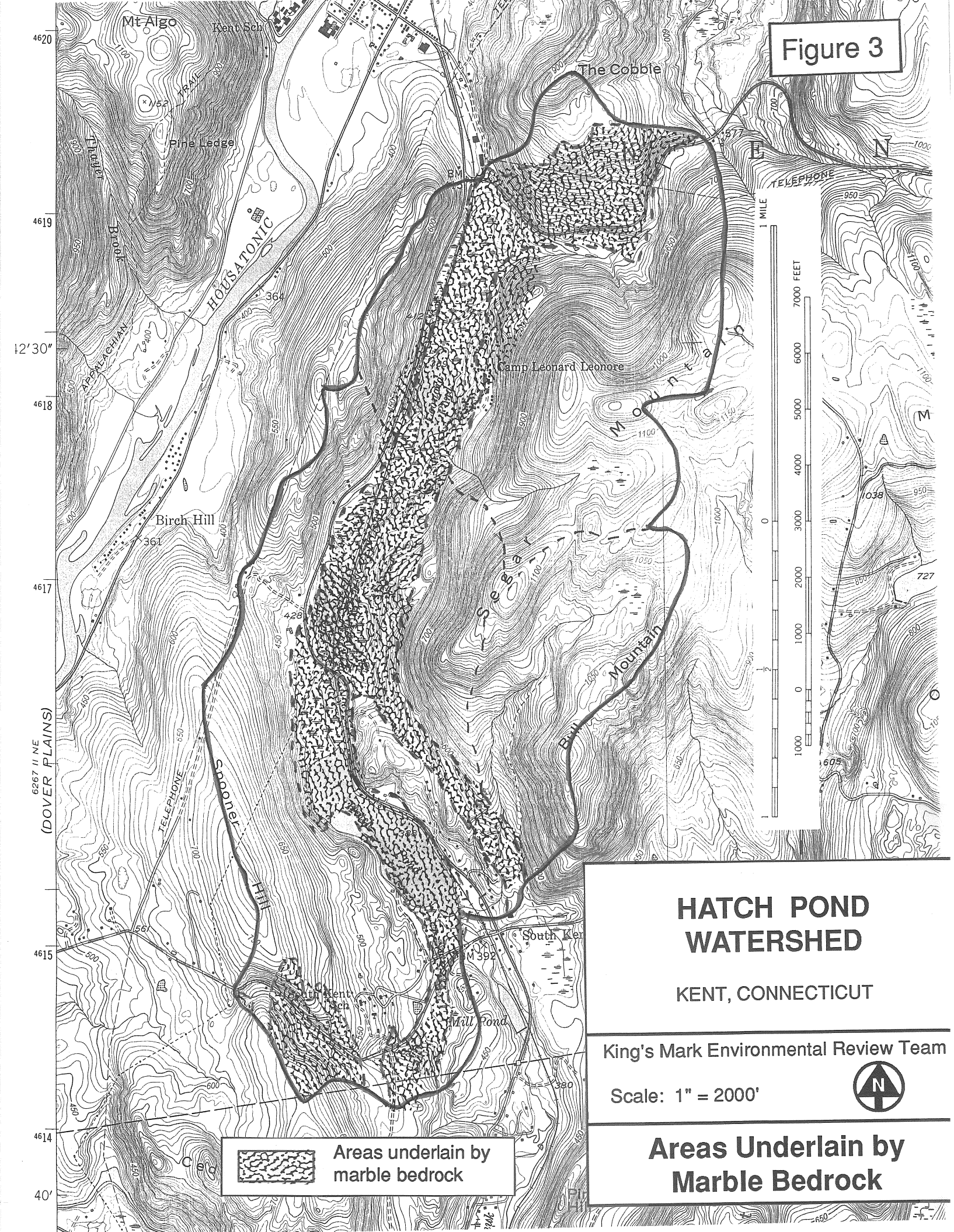


Figure 3
HATCH POND WATERSHED
KENT, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 2000'
Areas Underlain by Marble Bedrock
Areas underlain by marble bedrock
Mt Algo
Kent Sch
The Cobble
Pine Ledge
HOUSATONIC
Camp Leonard Leonore
Mountain
Birch Hill
Bull Mountain
Spooner Hill
South Kent
Mill Pond
TELEPHONE
1 MILE
7000 FEET
(DOVER PLAINS)

the residence and proliferation of certain uncommon plants and animals. Bedrock groundwater wells in the marble may have higher yields than wells in the surrounding schists, but water hardness may be increased in the areas where marble is found.

SURFICIAL GEOLOGY

The surficial deposits comprise the unconsolidated materials that lie on top of the bedrock. They are of varying thickness in this basin and range from very thin on the bedrock ridges to thicknesses of several tens of feet in the valley bottom and on parts of Spooner Hill. These earth materials were deposited by the continental ice sheet that occupied the area approximately 20,000 years ago. The ice sheet covered the land with several thousand feet of ice for several thousand years and melted from this area approximately 16,000 years ago. This ice sheet was the most recent of several ice sheets that have advanced over North America during the last 1.5 million years.

The ice sheet shaped the final landscape of the basin and deposited the unconsolidated ground materials which are at the surface. This glacial process scraped much of the pre-existing lose material from the bedrock, leaving solid bedrock or ledge at or near the surface over much of the uplands. Figure 4 delineates those areas where bedrock is at or very near the surface. To a great extent, these shallow to bedrock areas coincide with the areas of steep slopes.

The glacier moved across the land as a giant bulldozer, depositing in some areas a blanket of debris called glacial till. The till is particularly thick on Spooner Hill (a glacial drumlin-like form) and consists of a hardpan material made up of a mixture of silt, sand, cobbles and boulders. The fine-grained character of this glacial till gives the soils on Spooner Hill significant limitations for development. These limitations

include a high potential for erosion because of steep slopes and increased runoff because of low soil permeability. The low soil permeability also presents significant limitations for septic systems and basement drainage.

As the glacier melted, temporary lakes formed in the valleys, and sand, gravel, silt and clay were deposited by meltwater streams in these lakes. These deposits are called glacial stratified drift. The extent of these deposits are shown on Figure 5. For the most part, stratified drift deposits underlie the ponds and wetlands. A small area of stratified sand and gravel has been mapped in the north end of the basin near the Town swimming park. Several years ago, a subsurface test hole was drilled at the north end of the valley near the intersection of Route 341 and the railroad. The ground materials encountered by this test hole were 15 feet of swamp deposits, underlain by 21 feet of silt and clay, underlain by 5 feet of glacial till. The character and distribution of the glacial deposits are important because they are a major factor determining the soil and drainage characteristics of the upland. In addition, the amount of stratified drift is the major factor determining the low flow characteristics of the pond system.

HYDROLOGY

The Hatch Pond drainage basin occupies approximately 3.64 square miles or 2,330 acres. Figure 6 shows the limits of the drainage area. Within the drainage area all precipitation drains downhill as part of the surface and groundwater flow system, flowing through the wetlands and ponds.

The northern 1.36 square miles or 40% of the basin (approximately 870 acres) drains into Leonard Pond. The outflow of this pond joins with the rest of the drainage of the basin flowing through Hatch Pond. A small, steep stream drains the

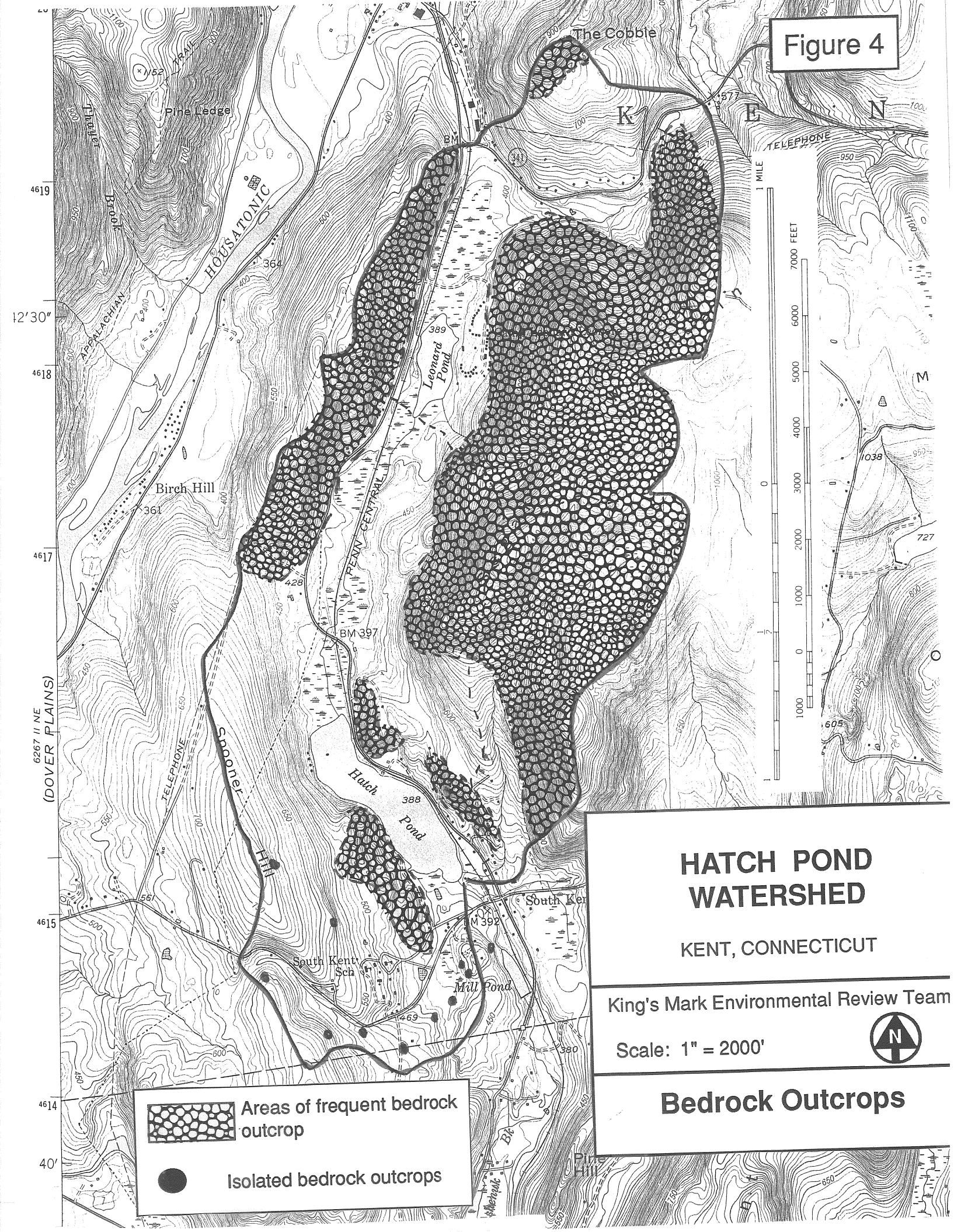


Figure 4
The Cobble
Pine Ledge
Birch Hill
361
364
389
428
388
392
469
380
HOUSATONIC
APPALACHIAN
Leonard Pond
PENN CENTRAL
Hatch Pond
Mill Pond
Spooner Hill
TELEPHONE
South Kent Sch
1 MILE
7000 FEET
6267 II NE
(DOVER PLAINS)
HATCH POND WATERSHED
KENT, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 2000'
Bedrock Outcrops
Areas of frequent bedrock outcrop
Isolated bedrock outcrops

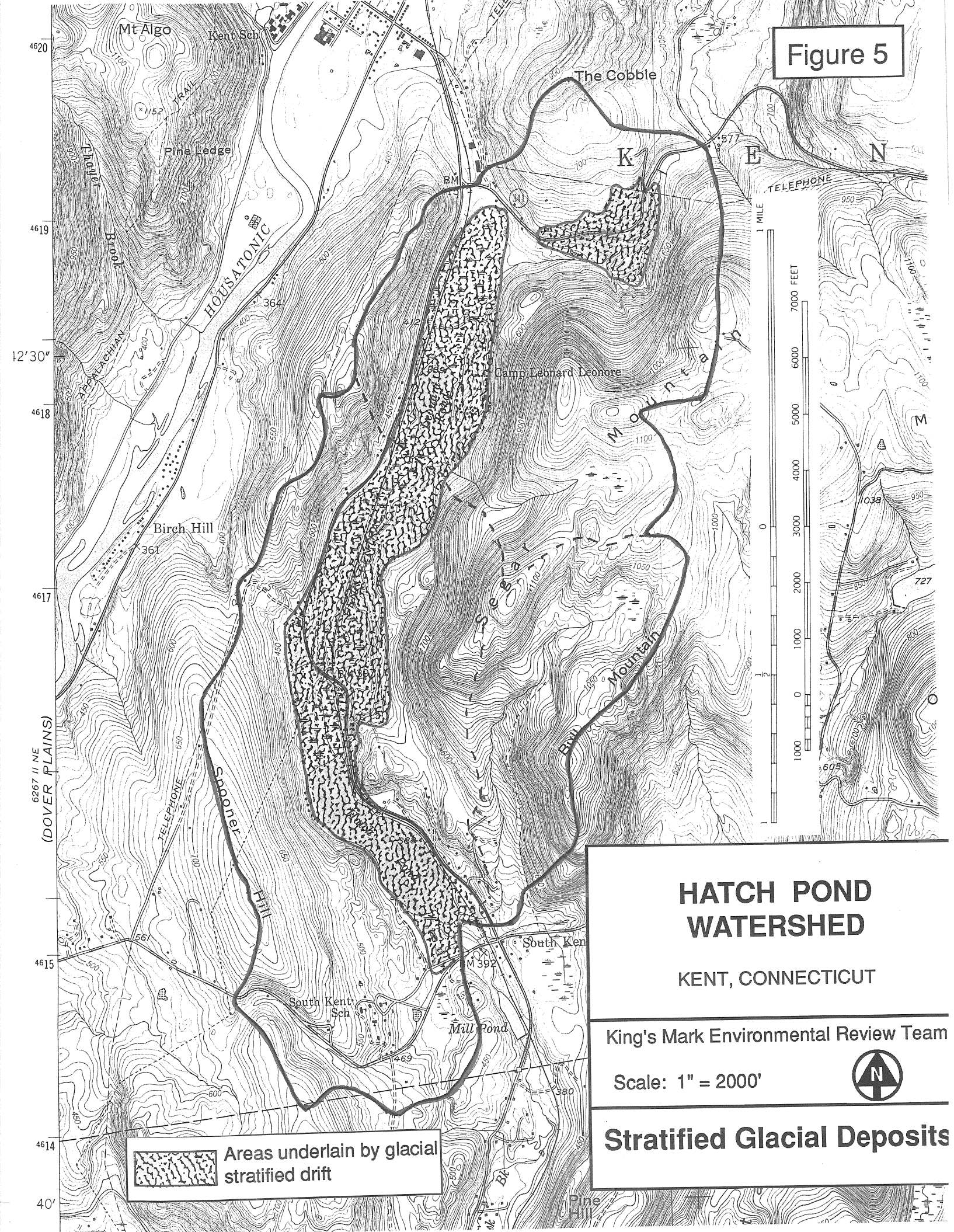


Figure 5
HATCH POND WATERSHED
KENT, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 2000'
Stratified Glacial Deposits
Areas underlain by glacial stratified drift
Mt Algo
Kent Sch
The Cobble
Pine Ledge
HOUSATONIC
Camp Leonard Leonore
Birch Hill
Pleasant View Mountain
Bull Mountain
Snooper Hill
South Kent Sch
Mill Pond
Pine Hill
TELEPHONE
TRAIL
1 MILE
7000 FEET
(DOVER PLAINS)

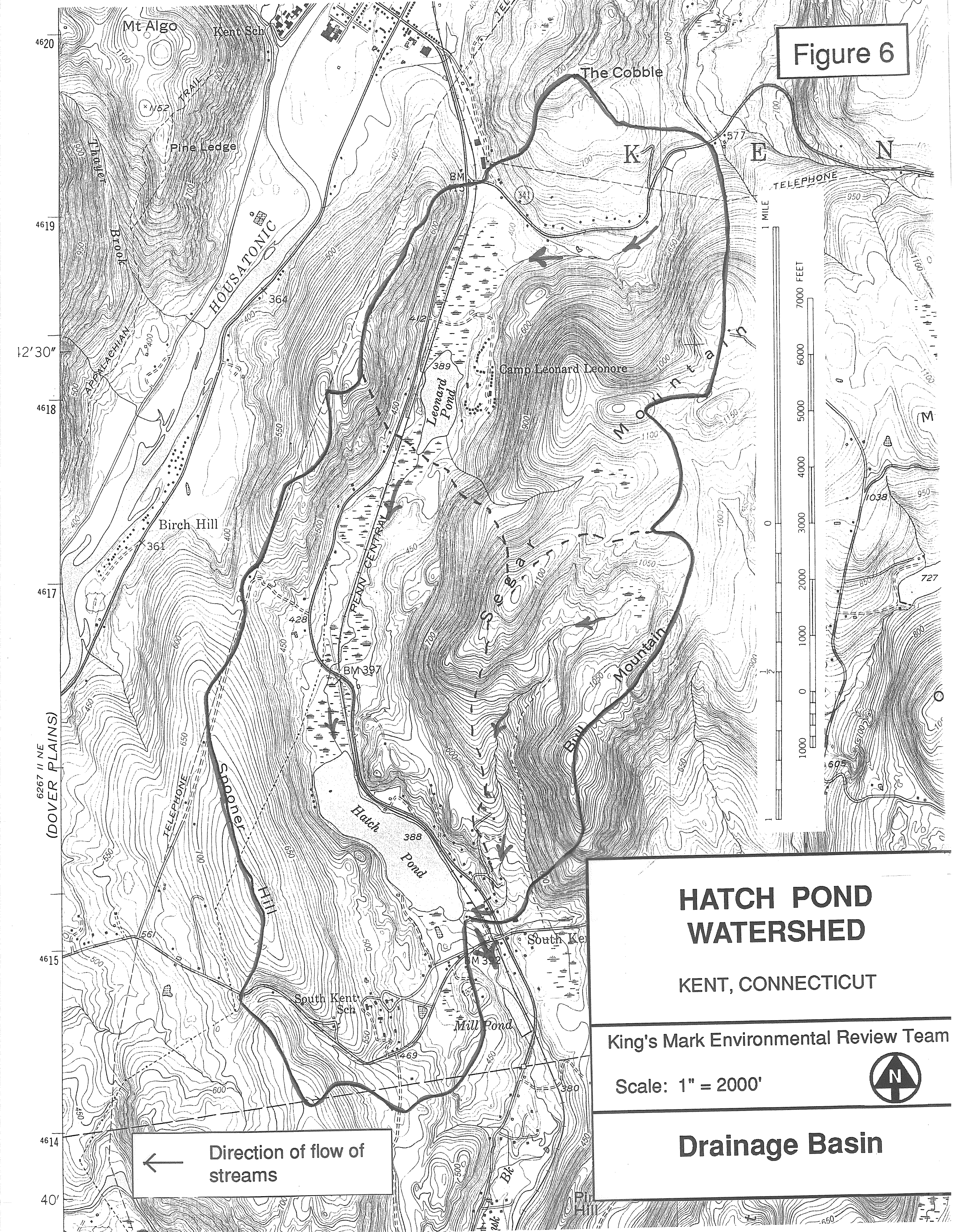


Figure 6
HATCH POND WATERSHED
KENT, CONNECTICUT
King's Mark Environmental Review Team
Scale: 1" = 2000'
Drainage Basin
Direction of flow of streams
Mt Algo
Kent Sch
The Cobble
Pine Ledge
Thayer Brook
HOUSATONIC
APPALACHIAN TRAIL
Birch Hill
Camp Leonard Leonore
Leonard Pond
PENN CENTRAL
Hatch Pond
Spooner Hill
Bull Mountain
Schaghticoke Mountain
South Kent Sch
Mill Pond
TELEPHONE
(DOVER PLAINS)
6267 II NE
1 MILE
7000 FEET
K E N

west side of Bull Mountain and enters Hatch Pond near the pond's outlet at its south end.

The basin's steep terrain and geologic materials create a situation where water runoff passes very quickly through the basin, draining southward down Womenshenuk Brook to the Housatonic River. The steep slopes, shallow to bedrock soils, hardpan soils on Spooner Hill and lack of significant areas of stratified drift all contribute to this characteristic of rapid runoff. The wetlands in the valley bottom tend to offset some of this rapid flow characteristic.

Estimates of typical surface water flows were calculated for the basin. These calculations were made for the outlet of Hatch Pond. The small amount of coarse-grained stratified drift tends to make a flow system with large initial runoff during precipitation events followed by significantly reduced long-term flows.

Surface water flow estimates for this basin are:

	Percent of time flow will equal or exceed:						
	1%	5%	10%	30%	50%	70%	90%
CFS	29	18	13	6	4	2	0.65
GPM	13K	8.1K	5.4K	2.7K	1.8K	900	292
	Peak flows					Low flows	

CFS - cubic feet per second
GPM - gallons per minute
13K = 13,000

* These calculations follow the methods outlined in DEP Bulletin #35, "Streamflow Information for Connecticut with Applications to Land-use Planning," 1982.

Typical summer low-flows for the outlet of Hatch Pond are approximately 0.65 CFS or 300 GPM. During extended dry periods, flows could be half this figure or less. The flow through the outlet of Leonard Pond is approximately 40% of that of Hatch Pond.

Groundwater flow in the basin is interpreted to follow approximately the same direction as the flow of surface water. Groundwater tends to move down the slopes toward the valley bottom, moving in the surficial materials and in the bedrock, discharging into the wetlands and ponds. Groundwater flow maintains the summer stream flows when there is no surface runoff from precipitation. The drainage basin operates essentially as a unit. Any wells or withdrawals of surface water or groundwater that are discharged outside of the basin will reduce the total surface water flow through the basin.

GENERAL CONDITIONS AND LIMITATIONS FOR DEVELOPMENT

The topographic, geologic and hydrologic characteristics define a basin with very specific properties. The steep, rocky terrain creates a situation of significant flow variations for the main stream. Rapid surface runoff is increased by the steep slopes, shallow to bedrock soils and the low permeability of the hardpan soils. Most of the uplands in the basin have one or more of these characteristics. These same characteristics limit groundwater storage and, coupled with the small amount of stratified drift, cause low-flows to decrease rapidly in the pond system during dry periods.

Runoff and water discharges from surface land uses rapidly reach the wetlands and ponds. Rather than sinking in, surface water moves quickly down the steep slopes, eroding any unprotected or disturbed land and carrying water and eroded material to the wetlands and ponds. The use of fertilizers and chemicals on residential and recreational land may directly affect the wetlands and ponds if residues flow beyond the application sites.

The upland conditions make the wetlands and ponds particularly susceptible to impacts from the operation of sanitary waste disposal systems. The limiting factors

of steep slopes, shallow to bedrock soils and low permeability till soils increase the likelihood that poorly designed or poorly maintained septic systems will affect the watercourses in the valley bottom. This risk is intensified if systems are located near permanent or intermittent watercourses or wetlands.

Land uses such as agriculture, which can accelerate erosion and add runoff nutrients and pollutants from fertilizers or other agricultural chemicals, may significantly affect water quality in the wetlands or ponds. Permanently exposed areas such as manure storage areas and animal yarding areas should be of particular concern where the surface is open to erosion and runoff.

In general, land in the basin presents significant limitations for development. The land conditions require special measures to deal with these limitations, requiring greater Town regulation and increased development costs. Under the best development circumstances, there will be considerable risk to the wetlands and ponds of the valley. Most of the upland area has bedrock close to the surface and steep slopes. These conditions increase development costs and increase the likelihood that erosion will occur on land being developed. Much of the remaining upland area, particularly the east side of Spooner Hill, is underlain by hardpan soils with erosion and drainage limitations. Only a small portion of the valley bottom is not wetland or pond, and most of the remaining developable land is adjacent to the wetlands and waterbodies.

SOIL RESOURCES

The soils within the Hatch Pond Watershed are mostly formed from glacial till deposits over schist, gneiss and granite bedrock. The predominant soil texture is loam. A typical soil sequence for the area begins at the top with somewhat excessively drained Hollis soils underlain by well-drained Charlton or Paxton soils.

These well-drained soils are followed downslope by a small section of moderately well-drained Woodbridge soils, which are followed by several types of poorly drained wetland soils. The bottom of the watershed is composed of peat and muck soils that surround and connect the stream and pond system. The most abundant soils are Rockland, Hollis, Charlton, Paxton and Peat and Muck soils (see Figure 7).

Rockland soils (Rh) are soils in which exposed bedrock covers more than 50% of the surface. Slopes are gentle to hilly or steep. These soils are not suitable for cultivated crops, hay or pasture and have little value as woodland, but have value for hiking, camping and other forms of recreation. Most of the exposed bedrock is schist, gneiss and granite.

The Charlton and Paxton soils are most common on their stony phases with slopes ranging from 8 to 25% (CrC, ChC, PdB, etc.). These soils are well-drained and developed in glacial till. Charlton soils are mostly stony or very stony on approximately 2/3 of their total acreage. Their permeability is moderate to moderately rapid on the surface layer and subsoil. The Paxton soils have a compact layer of fragipan at a depth of approximately 2 feet. They commonly occupy smoothly rounded drumlins or drumloidal hills that were elongated on a north to south direction by moving glaciers. Their permeability is moderate in the surface layer and subsoil, but slow or very slow in the substratum.

The Hollis soils are well-drained or somewhat excessively drained, gently sloping to steep soils that are very shallow over crystalline bedrock. They are present mainly on the rocky phases (HxC, HxE, etc.). These soils developed in a thin mantle of glacial till, and the underlying residuum derived from bedrock.

The Peat and Muck soils (Pk) are composed of organic materials deposited in bogs and swamp areas where the watertable is at or near the surface most of the year.

Figure 7 Soils

The soils of the watershed are described more fully in the Soil Survey of Litchfield County, 1970. A summary of soil characteristics and development limitations is found in Appendix A Tables 1-4. Most of these soils have severe limitations for development due to slope, wetness and shallow depths.

NUTRIENT, EROSION AND SEDIMENT CONTROL

The DEP Water Compliance Unit publication "A Watershed Management Guide for Connecticut Lakes," revised 1986, was referenced for this section of the report.

Generally, an acre of residential land will contribute much more phosphorus to a pond than an acre of agricultural land or an acre of woodland in the same location. Residential land adjacent to a pond will contribute more to eutrophication than residential land in distant areas of the watershed. Therefore, maintaining open space is a sound water quality maintenance technique. Sources of nutrients associated with residential land include construction site erosion, failing septic systems, properly functioning septic systems, fertilization of lawns and gardens, disposal of vegetation from yard upkeep and stormwater runoff.

Proper operation and maintenance practices will prevent the premature failure of existing septic systems in the watershed. Septic systems should not be used for the disposal of garbage, solvents, paints, household chemicals and medicines because these materials can cause clogging or can interfere with biological treatment processes. Water conservation should be practiced in households because heavy water use can hydraulically overload a septic system and cause failure. Appendix B lists several water conservation procedures. These procedures were taken from a bulletin issued by the Arkansas Cooperative Extension System (U.S. Department of Agriculture, 1984). A septic tank should be pumped routinely every 3 to 5 years to

remove accumulated scum and sludge which would otherwise move into the distribution system and leaching system, causing clogging and eventual failure.

State highways, town streets and unpaved roads can be sources of sediments in pond watersheds. The Northwestern Connecticut Council of Governments (COG) developed a report entitled "Best Road Maintenance Practices for Critical Watersheds" which should be used as a guide to minimizing erosion and sedimentation from roadways. The report presents detailed information on the design of roadway drainage systems, the management of paved roadways, including sanding operations and early spring street cleaning, the stabilization of road banks with vegetation and proper grading and surfacing of unpaved roads. Sweeping handles coarser dust and litter particles that would otherwise be flushed by rain into storm drainage systems and receiving bodies of water. Studies indicate that street cleaning is most effective in controlling heavy metals and moderately effective in controlling oil and grease, floating matter and salts. The most critical component of catch basin management is a regular inspection and cleaning program. Usually cleanout of sumps is performed when the sump is 2/3 full or less.

Lawns and gardens are generally very efficient at utilizing soil nutrients and preventing their loss through runoff and leaching. However, runoff and leaching of nutrients can occur if fertilizer applications exceed nutrient requirements or if fertilizers are applied prior to storm events which cause runoff. These situations can be avoided if fertilizers are matched to soil requirements and if applications are timed to avoid periods of runoff. Soil test kits can be purchased at a nominal charge from the University of Connecticut Cooperative Extension Service office in Litchfield. The samples are analyzed at the Extension Service Laboratory, and the results identify soil nutrient deficiencies. A thick, dark green weed-free lawn may be aesthetically pleasing, but it requires a higher level of both fertilizers and pesticides to maintain. Higher levels of inputs to lawns also mean higher levels of potential

nutrient pollutants available for transport into the pond via surface runoff and groundwater. For these reasons, lower maintenance lawns are recommended, especially within the streambelts and critical lakeside zones.

Pesticide management for lawns and gardens begins with identification and management of lawn and garden pests (i.e., insects and/or weeds). If pests are deemed to be a real threat to lawn health or garden plants, pesticides should be applied at a minimal rate with the type, method and timing carefully selected according to the targeted pest, using pesticides with the least persistence and volatility. Many lawn care products are applied as "insurance," and pesticides are applied whether or not pests are present at all or in sufficient numbers to constitute a threat. This scheduled or time of year type of application program substantially increases the amount and types of pesticides applied, resulting in increased amounts potentially available for transport to receiving waterbodies. Safe handling, storage and disposal of pesticides and their containers is imperative. Pesticides should be used and disposed of only as directed on the labels. Only pesticides allowed in Connecticut should be used.

Leaves, grass clippings and other vegetative material from yard and garden maintenance should not be deposited in a location where the material may be washed into the pond. Vegetative material will add to the sediment in the pond and will provide plant nutrients upon decomposition. Each property owner should select a suitable site away from the pond and its watercourses for the composting of vegetative material. Composting of garden wastes can conserve nutrients, enrich the soil organic matter and reduce the need for fertilizer inputs.

Buffer zones are strips of grass or other erosion-resistant vegetation planted between a stream or pond and intensively-used land. Buffer strips can be located on the edges of lawns, fields or along streambanks. Grass buffer strips reduce the velocity of runoff and cause suspended sediment to settle out of storm flows. Buffer

strips reduce non-point pollution from agricultural and construction activities. They reduce the effects of development, including lawn maintenance and garden areas, by intercepting surface flows, allowing vegetation the opportunity to trap and convert nutrients into plant growth.

Native varieties of trees, shrubs, grasses and low herbaceous plants are suitable for buffer strip establishment. Species selected should be matched to the soil drainage conditions to ensure that adequate growth will occur. Appropriate shrub species are listed in Appendix C.

Agricultural Land

In general, an acre of agricultural land will contribute less phosphorus to a pond than an acre of residential land in the same location. However, it will contribute more phosphorus than an acre of woodland in the same location. The preservation of agricultural lands in the watershed is an excellent means of preserving water quality. The best lands for agricultural preservation are Prime Farmland soils and Farmland of Statewide Importance soils. Some areas in the watershed contain Prime Farmland soils (see Figure 8). When farmed, this land is highly productive, requires less energy and has less potential for environmental hazards. Landowners interested in preserving farmland can pursue participation in the Connecticut Department of Agriculture Purchase of Development Rights program. Under this program, the State pays the owner the difference between the value of the farmland for agriculture and its value for development. In exchange, the owner agrees not to develop the farmland and use it for agriculture indefinitely.

Wetland Soils

Scientific research has demonstrated that wetlands in a pond watershed play a vital role in regulating the timing of transport of phosphorus to the pond. Consequently, transport of this phosphorus to downstream waters and to the pond occurs at a time of year when the phosphorus is least likely to contribute to nuisance

Figure 8 Important Soil Designations

algae blooms and weed growth. The wetland soils in the watershed include Peat and Muck (Pk). The Pk soils provide an unique ecosystem because they are organic rather than mineral soils and are typically acidic. This is a critical habitat for preservation. The peat is also a marketable resource. A balance between these differing values must be achieved.

Conclusions

The loss of depth of the ponds in the Hatch Pond Watershed has raised concern on the effects of erosion and sedimentation on the ponds. The steep and shallow nature of the soils in the watershed provides conditions for erosion problems. Presently there is minimal land disturbance, and the area apparently is not suffering from significant erosion.

Past development and other land uses such as small single-family home subdivisions and farming may have contributed to the sedimentation of the ponds. The farm located northwest of Hatch Pond has no apparent erosion problems in its fields. The farm contains an animal heavy use area which is visible from the road and is near the north end of Hatch Pond. This area is undergoing some erosion and could be contributing considerable amounts of nutrients to the wetland system. In this area, the cows stand on exposed top soil. Runoff from the area contains sediments and nutrients that could contribute to eutrophication in Hatch Pond. Conservation plans designed to alleviate these types of problems are available through the Litchfield County Soil Conservation Service Office.

Other sources of sediments that were noticed during the field review include the Town's sand mixing pile and road sand washed through stormwater sewers. The Town's sand pile could utilize some runoff control such as some type of cover over the pile to prevent rainwater from washing the sand away and a sediment barrier such as a berm or a maintained silt fence to stop the sand from washing down to the stream. Sand from winter road maintenance enters the stormwater sewer system

and washes into Leonard Pond. There is not enough space to build sediment basins that could catch sediments before they outlet into the pond. However, the catch basins in the stormwater sewer inlets could be cleaned periodically to reduce the amount of sand going into the pond. This is not considered a severe problem. The wetland areas surrounding the ponds are beneficial because they serve as sediment traps and nutrient filters.

To prevent future erosion problems, the Town should require, closely review and supervise E&S control plans for proposed developments. E&S control plans should include:

1) A narrative describing the project, the conservation measures planned, the sequence of installation and the maintenance plan;

2) A map locating the conservation measures proposed and adequately showing natural features and proposed activities; and

3) E&S control details which show how each measure is to be installed.

Methods for controlling construction site erosion and sedimentation are described in the Guidelines for Erosion and Sediment Control for Connecticut, revised 1989. The preservation of all open space, especially inland wetland soils, Prime Farmland and Farmland of Statewide Importance, is recommended. Appendix D contains a list of Resource Publications which may be referenced for more information on watershed management.

WATER QUALITY CONSIDERATIONS

Hatch, Leonard and Mill Ponds are 3 shallow ponds which drain into Womenshenuk Brook, a tributary of the Housatonic River. Boat launches operated by the DEP provide fishing and boating access to both Hatch and Leonard Ponds. Mill

Pond is privately owned with no public access. The major complaints associated with the ponds are algae blooms and aquatic weeds which impair recreational uses.

The water quality classification for all 3 ponds and Womenshenuk Brook is Class A. This classification designates these ponds as recreational waters suitable for fishing and swimming. The ponds may not receive treated wastewater discharges.

Water quality data on Hatch and Leonard Ponds was collected in 1990 by the United States Geological Survey under a cooperative agreement with the DEP (see Appendix E). This information was used to assess these ponds and can be used to support future studies by serving as an initial source of baseline information.

A pond's watershed, or drainage basin, is the land in which all water drains or flows toward the pond. The size of the watershed determines the water quality and fertility of the pond. The watershed is the source of water, nutrients and sediments that affect water quality. The ratio of the size of the watershed to the size of the pond can be used to estimate the extent of nutrient and sediment loading to the pond. Large waterbodies with small watersheds have a comparatively large volume of water to assimilate the nutrients draining from the watershed. Small shallow ponds with large watersheds, including Hatch Pond and Leonard Pond, tend to be more fertile due to the small volume of water in which the nutrients from the watershed are assimilated. Because Mill Pond is small (approximately 3 acres) and has a very large watershed, it naturally receives large inputs of sediments and nutrients. However, because Hatch and Leonard Ponds are upstream from Mill Pond and act as sediment basins, the loading to Mill Pond might be less than expected.

Nutrient and sediment loads are important because they directly affect pond water quality and fertility. Nutrients, primarily nitrogen and phosphorus, promote the growth of aquatic plants and algae. Excessive nutrient loading can cause algae blooms and excessive growth of aquatic plants. Algae blooms form scum and mats

on the pond surface and in general give a "pea soup" appearance, interfering with aesthetic enjoyment of a pond and causing taste and odor problems in water and fish. Algae blooms have impaired Hatch and Mill Ponds. When algae blooms die, the decomposition of plant matter can deplete oxygen in pond waters, which can lead to fish kills. Aquatic plants can form nuisance weed beds which may degrade aquatic habitat and impair recreational uses. Decomposition of aquatic plants such as algae can also deplete dissolved oxygen levels.

Sediments can cause the loss of depth and volume in a pond, and may cause a general increase in the turbidity of pond water. Sediments can originate externally from the pond's watershed, or internally from decaying algae and weeds in the pond itself. Sediments from the watershed are soils that has been worn away by the action of wind, water, ice and gravity. Soil erosion by surface runoff of water and by shoreline wave action are important concerns. Excessive sediment loads can increase silts, clays and fine sands suspended in the water column or smother pond bottoms. This can negatively impact the number, type and distribution of both swimming and bottom dwelling organisms. Sediment accumulations also form shoals, expanding habitat for aquatic plants.

Ponds with large sediment and nutrient loads experience accelerated eutrophication. Eutrophication is a natural process in which biological productivity (i.e., fertility) increases with the age of a pond. Over a long period of time, the pond fills in with accumulated dead aquatic plants, as well as sediments, silt and organic matter from the watershed. During the later stages of the eutrophication process, the waterbody evolves into a wetland. The rate at which a pond receives nutrients and sediments from its watershed determines the rate of eutrophication. Cultural eutrophication occurs when eutrophication accelerates due to increased sediment and nutrient loads caused by human use of watershed lands.

The 3 basic states of eutrophication are called oligotrophic, mesotrophic and eutrophic. Oligotrophic refers to lakes and ponds in the early phases of the eutrophication process. These ponds are characterized as deep, clear, infertile and sparsely populated by algae and aquatic plants. Mesotrophic ponds are in the middle phases of the eutrophication process and exhibit intermediate conditions. Eutrophic ponds are in the later phases of eutrophication and are characterized as relatively shallow with fertile, turbid waters. They have dense blooms of algae and/or dense beds of aquatic plants, seasonally poorly oxygenated bottom waters and substantial sediment accumulations.

Hatch and Leonard Ponds are mesotrophic ponds with recreational use impairment due to algae blooms and excessive aquatic plant growth. Data to assess the trophic status of Mill Pond is not available. However, it is assumed that Mill Pond is a eutrophic pond. The ratio of the watershed area to pond volume is very large, and the pond receives large inputs of sediments and nutrients. The small capacity of Mill Pond does not provide much dilution of nutrient-rich runoff. The low water level further encourages aquatic weed bed formation because light can penetrate to the bottom of the pond, providing the energy for photosynthesis. For these reasons, Mill Pond is probably eutrophic.

Like Mill Pond, all lakes and ponds exhibit a natural tendency towards a trophic state, which can be assessed based on the relationship of the morphology of the pond and the size of its watershed. This natural trophic tendency can be assessed by graphing the watershed area/pond surface area ratio versus the pond's mean depth. Graphing this information for Hatch and Leonard Ponds indicates that both have a tendency towards a eutrophic state. Although the 2 ponds are currently mesotrophic, the potential exists for these ponds to become more eutrophic. Employing measures to protect pond water quality now will slow the eutrophication process.

The trophic states of Hatch and Leonard Ponds were determined from water quality monitoring data for total phosphorus, total nitrogen, summer chlorophyll-a (i.e., a measure of algae density during the peak growth period), Secchi depth (i.e., a measure of water clarity) and the extent of summer aquatic plants. Summer Secchi depth is a parameter frequently used to measure water quality. The Secchi disk is a 20 centimeter disk, painted white or black and white, which is lowered into the water. The observer measures the depth at which it can no longer be seen. This depth is referred to as the Secchi depth of the pond. Usually, the greater the Secchi depth, the better the water quality of the pond. Even though Hatch Pond is classified as mesotrophic, the summer Secchi depth was characteristic of eutrophic lakes at 1.5 meters (4.9 feet). Leonard Pond was characteristic of mesotrophic lakes at 2.1 meters (6.9 feet).

Total phosphorus is usually the limiting nutrient for phytoplankton (i.e., algae) productivity. The term "limiting nutrient" refers to that particular nutrient in shortest supply relative to the growth needs of an organism. When the limiting nutrient becomes depleted, growth stops, even though other nutrients are still available. An increase in the supply of the limiting nutrient results in a corresponding increase in growth. Total phosphorus was high in both Hatch and Leonard Ponds. Consequently, algae blooms have been observed in Hatch Pond.

Total nitrogen closely relates to waterbody productivity and may be limiting to aquatic plant productivity. Total nitrogen was high in Hatch Pond. When monitored in 1990, dense aquatic vegetation covered the entire shoreline of the pond to depths of 7 feet. This may be a natural condition of the pond because the same measurements were recorded over 30 years ago. In the 1959 Fishery Survey of the Lakes and Ponds of Connecticut, Hatch Pond was described as having excessive beds of submerged and emergent vegetation over most of the pond bottom and aquatic vegetation that choked the shallow sections of the northern and southern ends. Leonard Pond also

exhibits extensive aquatic vegetation growth in the shallow areas (i.e., < 9 feet) of the pond.

Leonard Pond has been treated annually with an algicide-herbicide combination to control algae and aquatic weeds. Copper sulfate is an algicide which inhibits algal photosynthesis and alters nitrogen metabolisms. Copper sulfate is often effective and appears to have controlled algae problems in Leonard Pond for short periods of time. However, using an algicide does not address the cause of the algae problem. Possible negative impacts due to the use of copper sulfate include toxicity to fish and other aquatic organisms, as well as dissolved oxygen depletion if large areas of the pond are treated within a short period of time.

Diquat is a herbicide that controls aquatic weeds. It is less effective in controlling aquatic weeds than copper sulfate is in controlling algae in a pond. This ineffectiveness may be due to the absorption of diquat to suspended particles in the water. Although diquat does not persist, it can remain toxic in pond sediments for months. Alternatives to chemical management of aquatic weeds could be incorporated as part of an overall vegetation management program for Hatch and Leonard Ponds.

The short-term benefits of using algicides and herbicides can be high, but the long-term benefits to cost ratio is probably very low. Other methods of controlling aquatic weeds and algae that might prove more cost efficient are presented in the DEP publication "Guide For Connecticut Lakes & Ponds on the Control of Algae and Aquatic Weeds" (see Appendix F). Alternatives to herbicides in controlling excessive aquatic plant growth include weed harvesting, benthic weed barriers and dredging.

The sources of pollution that contribute to pond degradation in the 3 ponds are called non-point source pollutants because they emanate from land areas in the watershed and do not enter the ponds at any single point. Non-point sources of pollution contribute nutrients, sediments and organic matter that accelerate

eutrophication. A wide variety of non-point sources, associated with different types of land uses, can impact water quality. Examples include stormwater runoff from a road, drainage from a cornfield and soil erosion from a construction site. Although the impact of any individual non-point source may not noticeably effect a pond, the cumulative effect of many non-point sources in the watershed can be great.

Possible sources of nutrients and sediments affecting pond water quality include soil erosion, stormwater runoff, septic systems and agriculture. Heavy erosion on the east and south sides of the public access area of Hatch Pond was observed. Serious natural erosion can occur on land with steep slopes. This is a concern for all 3 ponds because of the steep slopes in the watershed. Common sites of erosion include construction sites, roadway embankments, roadway drainage ditches, cultivated fields and timber harvesting areas. Best Management Practices (BMPs), special land use practices and structural measures used to control non-point sources of pollution reduce the transport of pollutants to surface waters. The Connecticut Council on Soil & Water Conservation publication entitled "Connecticut Guidelines for Soil Erosion and Sediment Control" provides information on BMPs which may be used to minimize erosion and sedimentation near Hatch Pond.

Erosion from construction sites can be particularly severe. Future development in the watershed must utilize soil E&S controls. Connecticut's Soil Erosion and Sediment Control Act, Sections 22a-325 to 22a-329 of the General Statutes, provides for a Statewide coordinated E&S control plan for land being developed. Each Town is required to adopt planning and zoning regulations requiring an E&S control plan for disturbed areas greater than 1/2 acre in size. The Town must certify the technical adequacy of the plans and must provide for inspection of installation of the control measures. The Town may consult with the County Soil & Water Conservation District (S&WCD) for technical review of plans. Any observed incidents of turbidity or siltation in the ponds or Womenshenuk Brook should be reported to the Town Zoning

enforcement authorities or the Town Inland Wetlands enforcement authorities for inspection and follow-up corrective action.

Stormwater runoff can transport pollutants such as leaves, branches, litter, trash, animal excrement, salt, sand and fluid leaks from motor vehicles and paved areas. This contributes nutrients, sediments, decomposable organic matter, hydrocarbons, heavy metals and road salts. Road sand washing through stormwater sewers and runoff from the Town's sand mixing pile might be contributing sediments to the ponds. Areas contributing stormwater conveyed pollution should be identified and prioritized, and BMPs should be employed where appropriate.

Town planning and zoning regulations requiring stormwater runoff control plans for proposed developments are an effective means of implementing stormwater runoff management. Stormwater control measures should be incorporated into the site development plan so that the appropriate runoff BMPs become an integral component of permitted land use activities at a development site.

Septic systems located near the ponds are possible sources of nutrients and sediments. Proper design, installation, operation and maintenance of septic systems protect water quality. The DEP publication "Septic Systems Manual: A guide to On-Site Subsurface Sewage Disposal for Local Land-Use Officials" should be used as a guide on the legal and technical aspects of the design and installation of on-site subsurface sewage disposal systems for future development in the watershed. The manual should be consulted by Commission members when reviewing applications for planning, zoning and wetland permits which involve the installation of new septic systems in the watershed.

Agricultural lands are potential non-point sources of sediments and nutrients. Erosion in an animal heavy use area has been observed at a farm northwest of Hatch Pond, which may contribute nutrients and sediments to the pond. Animal waste

BMPs appropriate for this situation include construction of storage areas, diversion and treatment of stormwater and specialized manure spreading practices. Information on the status of agricultural BMPs in the watershed can be obtained from the Litchfield County S&WCD.

Maintaining wetlands in the watershed in their natural states provides protection for water quality in all 3 ponds. Wetlands act as a nutrient and sediment sink. During the spring and summer growing seasons, wetland plants remove significant amounts of nutrients from overlying waters. During the fall and winter, wetlands release nutrients as wetlands vegetation decays. Therefore, wetlands delay the transport of nutrients until after the growing season when the nutrients are unlikely to contribute to nuisance algae blooms and aquatic weed growth.

To protect the water quality of all 3 ponds, the wetlands must be maintained in their natural state. Connecticut's Inland Wetlands and Watercourses Act, Section 22a-36 through 22a-45 of the General Statutes, protects wetlands by providing for the regulation of activities in wetland areas. The Inland Wetlands Commission members are responsible for the protection of a pond when acting on permit applications for regulated activities in the watersheds.

To protect the water quality of Hatch, Leonard and Mill Ponds and slow the eutrophication process in each pond, the Three Ponds Study Group of the Kent Land Trust could continue as a committee to promote wise land use within the watershed and recommend appropriate pond management methods for the ponds. Management of pond resources is an on-going process with no finite goal. If the Land Trust is serious concerning protecting the water quality of the ponds, this committee could implement the tasks outlined out in this report.

The first step the committee should take is identifying potential problems in the watershed. Land uses such as agriculture or construction are potential sources of nutrients and sediments that should be identified. Land use information up to 1980

is available from the Northwestern Connecticut COG and could be roughly updated to 1990 using aerial photos of the watershed available from the DEP Natural Resources Center or local land use maps. Secondly, the committee should identify critical areas. If severe erosion or sedimentation is occurring in the watershed, it should be controlled by implementing appropriate BMPs. Next, watershed management practices should be initiated. The DEP publication "A Watershed Management Guide For Connecticut Lakes" (see Appendix G) provides information on watershed management practices. Public education for the residents in the watershed is an integral part of the protection of pond water quality. Finally, regulations or zoning may be necessary to resolve problems between land use and pond use.

Initiating a diagnostic/feasibility study can also protect water quality. The diagnostic portion of a diagnostic/feasibility study estimates the degree to which a waterbody can be improved. It answers questions relating to sources of nutrients, sedimentation and organic matter loading and the present condition of the pond. The feasibility section of the study evaluates appropriate measures to improve water quality. A diagnostic/feasibility study should be conducted by a competent limnologist or engineer with a limnology background. The DEP Lakes Management section can assist with the selection of a consulting firm to perform a diagnostic study.

Since baseline information on Hatch Pond and Leonard Pond has already been collected and public access is available, these ponds are eligible for a diagnostic/ feasibility study grant from the DEP. Appendix H contains a grant application. If funds are available for the grant program, the State grant is 75% of the cost of the diagnostic/feasibility study. Currently, funds are not available. This program can only make grants to municipalities or lake associations with taxing authority. Therefore, the Town of Kent must apply for the grant on behalf of the Kent Land

Trust. If the Town is interested, the Lakes Management section of the DEP Bureau of Water Management should be contacted at 566-2588 for more information.

BIOLOGICAL RESOURCES

WILDLIFE CONSIDERATIONS

Description of Area/Habitats

The Hatch Pond Watershed includes a large area of land which encompasses 3 ponds. All of the land is currently under private ownership. The watershed contains many types of habitat: deciduous woodlands, coniferous woodlands, woodland ecotone, old field, open fields and several types of wetlands, including open water, forested wetlands and shrub/scrub wetlands.

At present, the watershed supports light residential development, some agriculture, a private school and some recreation facilities based at Leonard Pond. A major portion of the watershed is undeveloped. Leonard Pond has a State public access area for small boats, and Hatch Pond is accessible from South Kent Road.

The watershed includes a variety of terrain. The valley area contains gently rolling land which gradually rises up to the west to form Birch Hill and Spooner Hill. The land rises much more steeply on the eastern side to form Segar Mountain and Bull Mountain.

Wildlife habitat is the complex of vegetative and physical characteristics that provide for all the requirements of wildlife, including food, shelter, resting, nesting and escape cover, water and space. Generally, the greater the habitat diversity and degree of interspersion of various habitat types, the greater the variety of wildlife there is using an area. Because of the variety of habitats in the watershed and the degree of mixing of these habitat types, the watershed provides excellent wildlife habitat. The abundance and diversity of wetlands in the watershed increase its value for wildlife. In addition, because the watershed is located in an area of the State where development has been minimal, it is a valuable section of wildlife habitat.

A wide variety of wildlife species are expected to utilize the watershed to serve all their needs, while many other species find it a place to meet some requirements.

These species include deer, ruffed grouse, weasel, raccoon, beaver, otter, fox, coyote, hawks, owls, catbirds, sparrows, juncos, warblers, wood ducks, black ducks, blue herons, Virginia rail, brown creepers and a variety of reptiles and amphibians. A comprehensive list of species which could utilize the watershed is found in Appendix I. Because the watershed encompasses such a great area and many habitat types, including the varied and productive wetlands, the species list is quite long.

Due to the large size of the watershed and limited time, this report provides an overall assessment of the habitat types, their value to wildlife populations and some general recommendations for preserving those values. For a comprehensive resource inventory, the services of a consulting biologist should be secured.

An Environmental Review was previously conducted on Emery Park (May 1988), which contains extensive coniferous habitat. A portion of Emery Park (owned by the Town of Kent) lies within or adjacent to the Hatch Pond Watershed. The Emery Park ERT report should be referenced concerning habitat descriptions, use and recommendations applying to the coniferous areas within this watershed.

Forestland: A large area is covered by hardwood forest (i.e., deciduous woodlands), where an occasional conifer is found or scattered stands or groups of conifers are found. This hardwood forest type habitat is important for many species of wildlife. Forested areas provide an abundant source of food in the form of mast, berries, buds, insects and catkins. Cover is provided for species such as fox, bobcat, raccoon, deer and coyote, and nesting and roosting sites are provided for many birds species.

The snag trees (i.e., dead trees) in the area are a source of insects which serve as food for many species, including woodpeckers and chickadees. Den trees or trees with cavities can serve as a nesting or denning place for animals such as squirrels and raccoons.

Typical species found in hardwood forests in the watershed include various oaks, hickory, white ash, beech, birch and sugar and red maple. Typical understory species include service berry, ironwood, various viburnums such as hobble bush, northern arrowwood, maple leaved viburnum, laurel, witch hazel and many others.

A major portion of the watershed is covered with coniferous forest, especially Segar Mountain, Bull Mountain and Spooner Hill. This coniferous cover is dominated by hemlock, but also contains pine. Coniferous forest provides important cover for wildlife, especially during the winter. It also provides roosting sites for species such as turkey vultures, hawks and wild turkey and provides preferred nesting sites for species such as the ruby crowned kinglet.

Deciduous woodland and coniferous woodland provide important feeding, nesting and roosting sites along with extensive cover. Because the forestland area is large and many parts of it are uninterrupted by development, many species utilize this area. Species such as the bobcat, who prefer extensive areas of forest where there is little development, could utilize some of the habitat offered in the watershed.

Old Field/Open Field/Mowed Areas: Old field habitat found in the watershed is an important habitat type for many species of wildlife, ranging from moles and meadow voles to foxes, cottontail rabbits and deer. Because old field habitat provides a variety of vegetational types, including grasses, herbs, shrubs and small trees, it provides for the needs of a variety of wildlife species. Old fields offer structural diversity due to the varying heights and growth forms of the plants found there. This contributes to the usefulness of this habitat type for wildlife.

The open agricultural fields mowed for hay or used for pasture have less vegetational diversity, but also provide important habitat for small mammals, predators such as the coyote and birds such as the bluebird. Insect production tends to be higher in grassy/herbaceous openings, making these areas attractive to birds and mammals that feed on insects. Other species which make use of open field and

old field habitat include eastern kingbirds, mockingbirds, flycatchers, blue and goldenwinged warblers, kestrels, red-tailed hawks, eastern screech owls and woodchucks.

These old field, open field and mowed areas not only increase the overall diversity of the watershed, but also increase the "edge" or "edge effect." Edge effect is the phenomenon that occurs where vegetational types meet with a high degree of interspersion, and vegetational diversity or richness is achieved. Because of this phenomenon, the needs of a wide variety of wildlife species can best be met.

Wetlands: The watershed contains large areas of wetlands, including wooded deciduous wetland, shrub/scrub wetland and open water. Most of the wetlands are underlain with peat deposits. Because of their size, diversity and proximity to a variety of habitats, these wetlands provide excellent wildlife habitat for a variety of species. Wetlands support a high diversity of wildlife due to the complexity of the vegetative structure, high productivity and abundant food supply which allow for a high carrying capacity. There are many wildlife species that require access to streams or waterbody margins for survival, even though they may spend much of their time in other habitats. Part of the food supply for many vertebrates is secured through the high abundance and diversity of insect populations that are typical of wetland ecosystems. A wide variety of species uses these wetland areas, including waterfowl, wading birds, turtles, salamanders, frogs and various birds and mammals.

Because wetlands increase the habitat diversity of an area and offer a variety of food and cover to wildlife, they are important areas to consider for protection. Acre for acre, wetlands and their associated riparian zones exceed all other land types in wildlife productivity. In addition to their value as wildlife habitat, wetlands serve other valuable functions, including water recharge, sediment filtering, flood storage,

etc. For these reasons, the development of, filling in and/or crossing of wetlands should be avoided or limited whenever possible.

A variety of wetlands is found in the watershed. At the northern end of the watershed is an area of shrub/scrub wetland dominated by alder, cattails and phragmites. This area shades into an area dominated by large red maples considered palustrine forested wetlands. Most of the remaining wetlands at the north and south ends of Leonard Pond and the north and south ends of Hatch Pond are shrub/scrub type wetlands. These areas are characterized by grassy/sedge tussocks containing shrubs and some emergents. Some larger, mainly dead trees are scattered in the wetlands, but are found predominantly along the edge. Shrub species include alder, willow, blueberry, winterberry, swamp rose, spirea, various viburnums and dogwoods. Emergent and herbaceous vegetation include cattails, arrowhead, leatherleaf, skunk cabbage, pond lily, sedges, grasses and sensitive fern. These wetland areas contain some bog type plants along with the more typical shrub/scrub species found in Connecticut wetlands. Often times shrub/scrub wetlands in the northwestern part of the State are former bog sites that have become dominated by shrub species. Mill Pond is characterized as open water containing some emergents along the edge and shrub/scrub type habitat at its northern end.

Because of the diversity and extent of the wetlands found in the watershed, a variety of habitat is provided for a wide range of species that require wetlands exclusively and those that utilize wetlands along with other types of habitats. Mammals such as the fox and raccoon use these areas to forage and hunt in. Browsers such as deer feed in these areas on the diversity of vegetation. Osprey, Canada geese, wood ducks, black ducks, mallards, blue herons, Virginia rails, beaver, otter, painted and spotted turtles, yellow spotted salamanders and bull frogs make extensive use of these wetlands. Wetlands are attractive areas for a variety of

wildlife species because of their vegetational and structural diversity. They provide feeding, nesting, loafing, breeding and cover sites.

The value and usefulness of this major wetland to wildlife is increased because it is surrounded by undeveloped forest and field habitat. This value is further augmented because this area of the State is still undeveloped relative to the majority of the State.

Another wetland area lies off Camp Flats Road and is currently being mined for peat. Although not directly observed, the habitat value in this area is greatly diminished because of the removal of vegetation/soil and disturbance to wildlife.

In addition to the 3 major ponds, there are 2 small ponds which provide open water habitat at the farm and at the private school. Although these ponds provide wildlife habitat, their usefulness is somewhat limited because of the lack of a buffer or strip of vegetation around them which could provide additional food and cover. While allowing shrubby vegetation to grow up around a pond increases the overall habitat value for wildlife, it may cause associated nuisance problems by attracting beaver. (See Appendix J for more information on beaver.) The snag trees in the wetland areas provide abundant insects for birds such as woodpeckers and tree swallows. Trees with cavities provide needed nesting sites for cavity nesting birds.

The stream connecting the various wetlands in the wetland system and the streams entering from the side hills provide travel corridors for many species of wildlife to travel within the watershed and to and from the watershed. Many species of wildlife utilize this wetland/stream corridor, including mink, otter and coyote.

Recommendations

Because the watershed is in private ownership, management options are limited. However, there are a number of recommendations concerning habitat protection and comments on possible development effects and mitigation that can be offered.

Obviously, the watershed should be protected from overdevelopment. Ensuring a continuance of the habitat diversity, including forestland, farmland and wetland, will retain the value of the watershed for wildlife. Protection of the wetlands from further degradation from runoff containing sediments and unacceptable levels of nutrients/contaminants is also important.

Wetlands presently provide important habitat for a variety of wildlife species and function as areas for absorption of natural runoff. Any planned diversion of stormwater into wetlands will increase water flow, sedimentation and pollution. This will alter the present ecological structure of the wetland and reduce many of its functions. Sedimentation and filtration plans may alleviate some of these problems, but the long-term effects of stormwater diversion into wetlands tends to be negative. Retention and filtration systems may still allow fine silt and pollutants to enter wetlands. These facts should be considered when reviewing future development in the watershed.

Overdevelopment, sedimentation, pollution and large scale vegetation alterations/removal will have negative impacts on the wildlife habitat provided by the wetlands. Extensive vegetation removal in wetlands may have severe impacts on wildlife, especially reptiles and amphibians. Altering sites used for cover, food, breeding habitat and hibernation may eliminate species dependent on specialized habitat and reduce numbers of more adaptable species. Sedimentation can also have deleterious effects on vegetation, small vertebrate and invertebrate life forms. This can cause adverse effects in the food chain.

Hatch Pond and Leonard Pond are primarily used for recreation, both private and public. The primary recreation on Hatch Pond is fishing. A private school also uses the pond for crew practice, and there is some use by small boats. Leonard Pond has a small recreational cabin resort community, along with some other overnight facilities. Leonard Pond has a small State public access area, mainly used by

fisherman and duck hunters. Although this intermittent activity represents a disturbance to wildlife, it is probably tolerable to most species. Development along the ponds represents a long-term disturbance, but if it does not increase significantly, use of the area by most forms of wildlife already present should continue. Increased development will correspondingly diminish the habitat value for wildlife.

Wherever possible, a 100-foot buffer zone of natural vegetation should be maintained around wetland/riparian areas to filter and trap silt and sediments. These vegetated zones also provide important wildlife habitat and maintain the wildlife habitat of the wetland itself by acting as a buffer.

Open agricultural and reverting old field habitat are important habitat types. These habitats are often lacking or diminished in supply in some areas because they are usually the first habitat types to be developed. These areas are important to protect from development.

Canada geese are usually aesthetically pleasing to most residents, but they can become a serious nuisance in some cases. If geese become a nuisance, there are measures that lakefront property owners could take which might help, including creation of an undesirable edge such as an abrupt drop-off and gravel or chip surfaces that geese find undesirable. Geese find the grass zone around ponds and lakes prime feeding habitat. (See Appendix K for more suggestions on discouraging geese.) Geese will continue to be naturally attracted to the Hatch Pond/ Leonard Pond area, even if control efforts are implemented. The wetland area containing the grassy hummocks provides abundant nesting habitat, and the available lawns and farm fields provide areas to graze in. Control measures might give some relief to individual property owners. Continuing use of the waterfowl hunting season will lessen the increase in the local goose population.

Beaver have been active in Hatch Pond, Leonard Pond and most of the other suitable wetlands in the watershed over the years. Beaver are expected to remain in

the area as long as a suitable food source is present (see Appendix J). Beaver will continue to take down trees, dam culverts and build lodges until the food supply or suitable trees/shrubs are all taken down. Because of the large acreage of wetlands, abundant food supply and relatively high beaver populations in this area of the State, beaver will probably continue to be a nuisance to some landowners. Their ability to cause serious problems should be balanced with the important role beaver have in wetland creation/enhancement. Population management through the use of the regulated beaver trapping season to lower the population levels can lessen conflicts between man and beaver. The regulated beaver trapping season runs from December 1 through February 28. (See Appendix J for more information on beaver and beaver management.)

Land Acquisition/Conservation Easements/Open Space

An option for protection of the watershed is purchase of lands, especially the wetlands. The wetlands and sites bordering the wetlands, especially those that could be built on, should be the first priority. If an outright purchase cannot be made, then perhaps a conservation easement can be created. Protection of the old field/open field agricultural land is the second priority. This valuable type of habitat is decreasing in Connecticut.

If development is imminent, setting aside open space areas should be considered. Whatever type or combination of types of areas are set aside, setting aside an "island of open space" surrounded by development is the least desirable for wildlife. Open space areas should be connected. The logical base for the wildlife corridor/open space system is the stream/wetland corridor. Woodlands are important to wildlife, and the ecotones formed at wetland and woodland edges provide additional habitat where a dense understory provides cover and screening from human disturbance. Therefore, these areas are important for protection. Also, there should be ancillary corridors that extend from this system into and through the

developed area, encouraging the movement of wildlife into and through the residential development. The area should have natural travel pathways for wildlife (i.e., streams, valleys and ridgetops) to enter and exit to other open space areas outside the development. The open space area is more valuable to wildlife if not traversed by roads which may impede the movement of wildlife. Open space areas should contain a variety of habitats.

In general, several management guidelines are recommended to all landowners/homeowners in the watershed to preserve some of the wildlife habitat value. These measures are especially beneficial for owners of new homes to be built in the area:

1) Utilize natural landscaping techniques (i.e., avoiding and/or minimizing lawns and chemical applications) to lessen acreage of lost habitat and possible wetland contamination.

2) Stonewalls, shrubs and trees should be maintained along field borders.

3) Implementation of backyard wildlife habitat management practices should be encouraged, including providing food, water, cover and nesting areas. On small acreages with many buildings, landscaping can provide habitat and make an area attractive to wildlife. Leave as many trees as possible around the buildings. This will not only benefit wildlife by providing food, cover and nesting sites, but will also be more aesthetically pleasing for the residents of the development. Plant trees and shrubs which are useful to wildlife and landscaping. Large expanses of lawn with no trees or shrubs present should be discouraged.

4) Maintain a 100-foot buffer of natural vegetation between any wetland or riparian (stream) zone and any development, lawn, garden, etc.

In a small but heavily developed and populated State like Connecticut, where available habitat continues to decline on a daily basis, it is critical to maintain and enhance, where possible, existing wildlife habitat.

FISHERY RESOURCES

Site Description

The Hatch Pond Watershed is relatively undeveloped with forested land predominating. Limited agricultural, commercial and residential land use practices have maintained surface water quality as Class A. Hatch Pond, Leonard Pond and Mill Pond are connected by a wetland stream.

Hatch Pond has a surface area of approximately 61 acres, a maximum depth of 26.2 feet and an average depth of 11.5 (based upon 1959 survey data). Although the pond is natural in origin, the water level has been raised slightly by a dam. Hatch Pond is warmwater and mesotrophic in nature as evidenced by an abundance of aquatic vegetation and low dissolved oxygen conditions in deeper water areas during summer months.

Leonard Pond has a surface area of approximately 15 acres. Other specific data concerning the physical parameters of this pond are not available. Based solely upon visual observation, Leonard Pond appears to be relatively shallow with an abundance of aquatic plant growth. Observable physical conditions classify the pond as warmwater.

Mill Pond has a surface area of approximately 3 acres and is artificial in nature. Other specific data concerning physical parameters of this pond are not available. Based solely upon visual observation, Mill Pond appears to be relatively shallow with an abundance of aquatic plant growth. Observable physical conditions classify the pond as warmwater.

Aquatic Resources

The fisheries resources of Hatch Pond have been formally investigated by the DEP Inland Fisheries, most recently in 1959. At that time, the fishery population of Hatch Pond was composed of largemouth bass, bluegill sunfish, common sunfish,

black crappie, chain pickerel, golden shiner and brown bullhead. The existing fishery population is probably similar, as confirmed by informal angler interviews. DEP Inland Fisheries manages Hatch Pond for the aforementioned species by establishing creel and/or length limits. Hatch Pond is accessible to the general public via a right-of-way along a portion of the eastern shore.

The fisheries resources of Leonard Pond have not been formally investigated by the DEP Inland Fisheries. The existing fishery population is anticipated to be similar to that of Hatch Pond, as confirmed by informal angler interviews. Creel and/or length limits, established by DEP Inland Fisheries, are the sole methods utilized to manage the existing fishery population. Leonard Pond is accessible to the general public via an established right-of-way located on the western shore.

The fisheries resources of Mill Pond have not been formally investigated by the DEP Inland Fisheries. The existing fishery population is anticipated to be similar to that of Hatch and Leonard Ponds. There is no public access to Mill Pond.

Impacts

Hatch, Leonard and Mill Ponds are moderately shallow and are susceptible to nutrient influx. Development within the immediate watershed is limited, likewise limiting nutrient inflow. Potential nutrient sources currently include runoff from agricultural areas, failing septic system discharge and sediment introduction from tributary streams.

A build-up of nutrients will degrade water quality, resulting in an overabundance of aquatic plants. An overabundance of aquatic plants can cause "stunting" (i.e., overabundance of small fish with extremely slow growth rates) due to the inability of large predatory fish to find and consume small fish in heavy plant cover. An overabundance of plants may also cause winter or summer "fish kills" by consuming large amounts of oxygen during the night, during prolonged periods of cloudiness or under the cover of ice and snow.

Recommendations

The greatest percentage of nutrient inflow to the ponds within the Hatch Pond Watershed apparently is from agricultural runoff, septic system failure/leachate and/or sediment introduction from exposed soils. Town officials should inventory the watershed in an effort to identify nutrient sources. Once identified, nutrient sources should be eliminated or, at the very least, controlled.

For future development, the Town should consider these recommendations:

1) Maintain a minimum 100-foot open space buffer zone along a development's closest encroachment to both intermittent and perennial streams. No construction or alteration of riparian habitat should take place within this zone. The width of the buffer zone should be increased in areas of steeper terrain.

2) Establish a comprehensive E&S control plan with mitigative measures (i.e., hay bales, silt fence, etc.) to be installed prior to and maintained through all development phases.

3) Design and implement an effective stormwater management plan to contain stormwater runoff on-site and not allow runoff to discharge directly into surface watercourses.

4) Limit liming, fertilizing and the introduction of chemicals to developed land susceptible to runoff into watercourses.

Efforts should be instituted to control aquatic plant growth within Hatch Pond and Leonard Pond because they contain viable fishery populations and are popular areas for water-based recreation. To maintain a viable fishery population, ponds should have up to approximately 40% aquatic plant coverage. Aquatic plants in an abundance of greater than 40% can result in adverse impacts to both the fishery resource and the aquatic ecosystem in it's entirety.

Aquatic plants can be controlled by both chemical and mechanical means. The State of Connecticut does not provide plant control services. However, lists of commercial companies specializing in either chemical or mechanical means can be made available to the Town if requested.

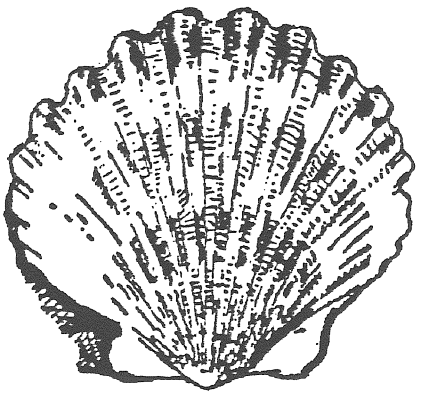
THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to Natural Diversity Data Base maps and files, these species have been reported from the watershed:

Species Name	Proposed State Status	Date Last Observed
Bog Rosemary, *Andromeda glaucophylla*	State Endangered	1903
Saw-whet Owl, *Aegolius acaudatus*	State Special Concern	1985
Turret Snail, *Valvata tricarinata*	State Special Concern	1979

Natural Diversity Data Base information includes all information regarding critical biologic resources available at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geologic 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. Consultation 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. New information is incorporated into the Data Base as it becomes available.

ARCHAEOLOGICAL RESOURCES



ARCHAEOLOGICAL RESOURCES

A review of the State of Connecticut Archaeological Site Files and Maps shows 2 known prehistoric sites within the Hatch Pond Watershed. Site 68-007 is located in the South Kent area and is an Archaic/Woodland camp. The site was used by hunting and gathering bands of Native Americans between 4,000 and 2,000 years ago. Recovered artifacts, including stone spearpoints, knives and lanceolate, are probably associated with hunting activities. Site 68-006 is located along the east bank of Hatch Pond and is a Late Archaic (4,000 to 3,000 years old) rockshelter encampment. Stone tools of quartz and flint were excavated, and the site represents a similar occupation as Site 68-007. Land immediately west of the watershed along the Housatonic River has yielded additional evidence of Native American occupations. Historically, the Schaghticoke Indian Reservation included more land in Kent than its current boundaries.

While no historical archaeological sites are listed in our files, the industrial mill ruins of the South Kent area could be considered archaeological resources. In addition, Bull's Bridge, Kent Iron Furnace, Flanders Historic District and the Captain Beardsley House are historic sites listed on the National Register of Historic Places and are close to the watershed study area.

Systematic archaeological surveys elsewhere in Litchfield County have demonstrated the importance of wetland systems for Native American settlement. Dr. Russell Handsmen, Research Director at the American Indian Archaeological Institute, suggests that these interior wetland systems were perhaps more important than primary river terraces and floodplains. As a result, undiscovered archaeological resources are expected to be found in the Hatch Pond Watershed. The watershed has a high potential for many prehistoric sites, as well as those relating to historic Schaghticoke Indians.

It is recommended that any future land use decisions made for the watershed consider the below ground archaeological resources that are known to exist there. The Office of State Archaeology is prepared to offer the Kent Land Trust any technical assistance on the preservation of these cultural resources.

LAND USE AND PLANNING CONSIDERATIONS

PLANNING CONSIDERATIONS

Existing Land Use and Development Pattern

The Hatch Pond Watershed, as seen from its road system, is primarily a mix of single-family homes interspersed with pastures and woodlands. There is no municipal sewer or water service in the watershed. Other land uses include a cluster of commercial uses in the vicinity of the Bull's Bridge/South Kent Road intersection, a working farm, institutional uses (i.e., the South Kent School), a summer residential camp, a humus extraction operation, a Department of Transportation outside storage site and a single industry on the northern edge of the watershed. There is no preserved open space, but there are informal public access points to Hatch Pond within the rail line and South Kent Road right-of-way. The ponds are used for fishing, boating and swimming, although there is no public beach or designated public swimming area.

South Kent Road is the major transportation route bisecting the watershed. The road connects New Milford, a more intensely developed community of 29,000 people, with Kent, a rural community of approximately 2,900.

South Kent Road and the rail line (owned by the Housatonic Railroad Company) are in the watershed's low-lying elevation and have determined a linear settlement pattern oriented along Hatch Pond, and to a lesser extent, the 2 other ponds. Some of the homes along the ponds were probably originally constructed as summer cottages, but many now serve as year-round residences, implying an increased septic effluent loading than the cottages may have been designed for. More recently constructed homes have been developed in subdivisions up the slopes from South Kent Road. Spooner Hill Estates is a prominent example.

Current Zoning and Subdivision Regulations

Except for the Bull's Bridge commercial area, the watershed is within the Rural District 40 Zone, requiring a minimum lot size of approximately 1 acre, and larger lot sizes as determined by soil type. Study limits did not permit an analysis of how many potential buildable lots the watershed contains based on soil type. The Rural District 40 Zone permits single-family and 2-family dwellings, home occupations, professional offices in dwelling units, agricultural uses, parks, cemeteries and a variety of institutional uses such as hotel, motel or indoor restaurant by special exception.

Because the Town of Kent is a member of the Torrington Area Health District (TAHD), any new development will be subject to careful regulation of septic systems and well locations. The public health code as administered by TAHD should minimize adverse effects of new development on water quality of the 3 ponds.

The Town subdivision regulations allow Planning and Zoning Commission members to require no more than 15% of the land area in a proposed subdivision to be permanently reserved for open space. This represents a planning tool Commission members may utilize to protect shoreline access to ponds, restrict development in sensitive wetland areas and reserve land for playgrounds or parks in future developments.

Other Relevant Plans

The State Policies Plan for the Conservation and Development of Connecticut 1987-1992 designates areas associated with the 3 ponds and wetlands as "Preservation Areas." These lands are among the State Plan's second priority for preserving. The recommended policy for these areas is:

> "Foster the identification of significant resource, heritage, recreation and hazard areas of statewide significance and advocate their protection by public and quasi-public agencies in their planning and investment

> decisions; avoid support of structural development except as directly consistent with the preservation values."

The remainder of the watershed is designated in the State Plan as "Conservation Areas," the State Plan's third priority for preserving. The recommended policy for these areas is:

> "Plan and manage for the long term public benefit the lands contributing to the state's need for food, fiber, water and other resources, open space, recreation and environmental quality, and insure that changes in use are compatible with the identified conservation values."

The Northwestern Connecticut Regional Plan of Development reinforces the State Plan by setting forth advisory goals for Land Use in Rural Areas and for Environmentally Sound Development in Rural Areas, as follows:

> "To preserve and conserve areas within the region that are of environmental, historic, archaeologic and cultural significance and to encourage development occurring outside of village centers to be environmentally sound and consistent with the region's rural landscape.
>
> To encourage adoption of local regulations, local programs and state programs that promote environmentally sound land use, development at a density that reflects the region's soil system and is consistent with the region's rural character."

The Kent Town Character Study & Open Space Plan, while not yet adopted by the Town, maps and analyzes the Town's resources in a manner that offers planning guidelines useful to the Town. The Study's Landscape Pattern Map identifies areas within the watershed that show a "Suburban Development" pattern, "Normative Developed Landscape" and "Mid-block Undeveloped" areas.

The "Normative" areas are within a band of 1,000 feet on either side of roads and contain a spatial arrangement of structures, fields, walls, treerows, etc., that are typical throughout the Town and that establish the overall physical and visual character of the area. Much of the watershed along the roads falls within this designation. The more recent developments such as Spooner Hill Estates are shown

as "Suburban." "Mid-block" areas occur on the steep and relatively undeveloped slopes of Segar and Bull Mountains. These areas are relatively inaccessible, and provide a passive land bank for the future. How these mid-blocks are cut into over the next decades will be critical to either sustaining the current density and mix or transforming these areas to more suburban in image, density and pattern.

Recommendations

Through the Town's existing regulations and other planning documents, there are several planning guidelines that can be used to encourage sensitive and appropriate development. Organizations such as the Kent Land Trust may wish to encourage preservation through conservation easements of certain sensitive areas, particularly shoreline access points to Hatch Pond, and possibly Leonard Pond. These efforts need not be in reaction to a development proposal, but could be initiated by the Land Trust at any time. The TAHD should promote an active public education program to ensure that seasonal property converting to year-round use is designed with adequate septic disposal systems. Communication between interested local groups and Housatonic Railroad officials should continue, particularly on the subject of herbicide use.

Appendix

For Appendix Information please contact
the ERT Office at 860-345-3977

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 - an 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 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 land owner/ 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 approximately two (2) reviews per month.

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