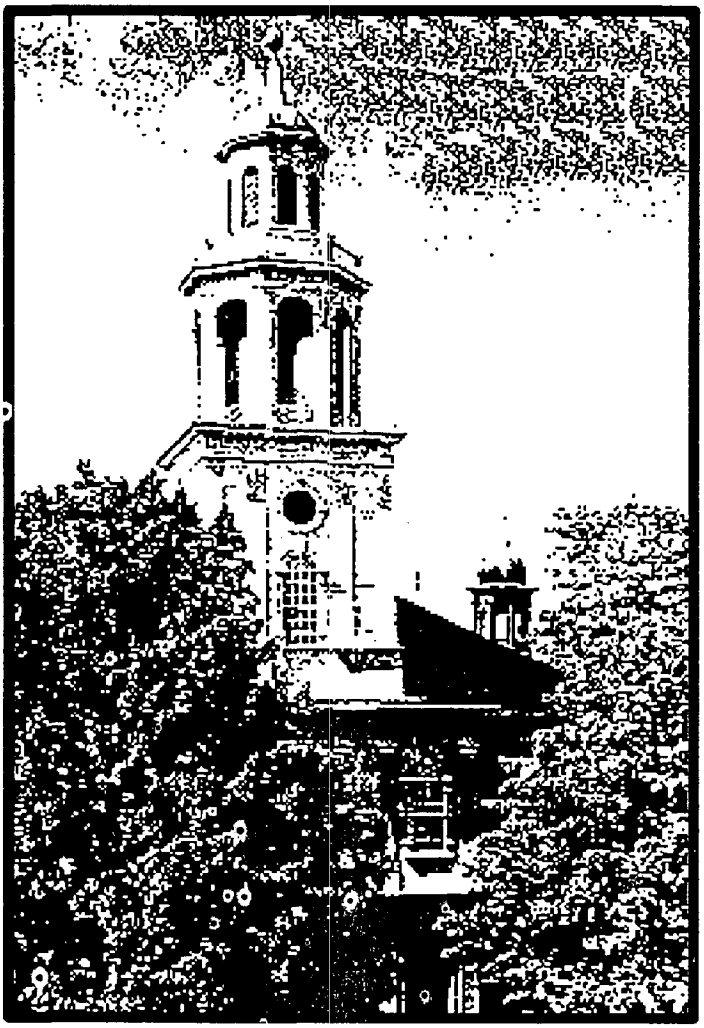
NH WORK TASK 90-5.2.7

Open Space Plan



Town of Exeter
1991

SB
483
.E9
R63
1991

ared by the Rockingham Planning Commission

ATTACHMENT #1L

SB483.E9 R63 1991 c.1

OPEN SPACE AND RECREATION PLAN

for the Master Plan of the

TOWN OF EXETER

Prepared for the

TOWN OF EXETER

and the

PLANNING BOARD

by the

ROCKINGHAM PLANNING COMMISSION

May 1991

The preparation of this plan has been financed by a New Hampshire Coastal Program grant funded in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic Atmospheric Administration.

PREFACE

"Just specimens is all New Hampshire has,
One each of everything as in a show-case
Which naturally she doesn't care to sell."

Robert Frost, "New Hampshire", 1923.

"The river and the forests were their only resources beyond their own stout hearts and bodies. The river provided abundant fish for sustenance, marsh hay for their cattle, a roadway to the sea, and water power for mills. The forest provided the raw materials for a lumber and ship building industry which eventually become the basis for the Town's prosperity."

Edward S. Chase, at the Town's 350th aniversery, 1988, reflecting on the first settlers of Exeter.

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INTRODUCTION

INTRODUCTION

The Town of Exeter, located in the Seacoast Region of New Hampshire, is one of the more historic communities of New England. With a picturesque downtown area and waterfront park located along the Squamscott River, the Town has a number of man-made and natural features which make it a desirable place to live. In terms of Exeter's natural environment, the Town possesses a rich legacy of forests and fields, rivers, streams and wetlands, hilltops and shores. Together, these natural resources provide the community with clean water, habitat for wildlife, protection from flooding, aesthetic and recreational enjoyment, and, in general, a high quality of environment.

Although the above mentioned natural features currently exist in abundance, development pressures are jeopardizing their well being, and their numerous values will continue to be threatened unless the community takes the necessary steps for their protection, preservation, and wise management. The unprecedented development boom of the mid-1980's has resulted in increased traffic congestion, the development of valuable forest and farmlands, decreased recreation opportunities, and the loss of scenic views. Unless a coordinated strategy for natural resource preservation is adopted and implemented, these trends will be back in force when the next development boom arrives.

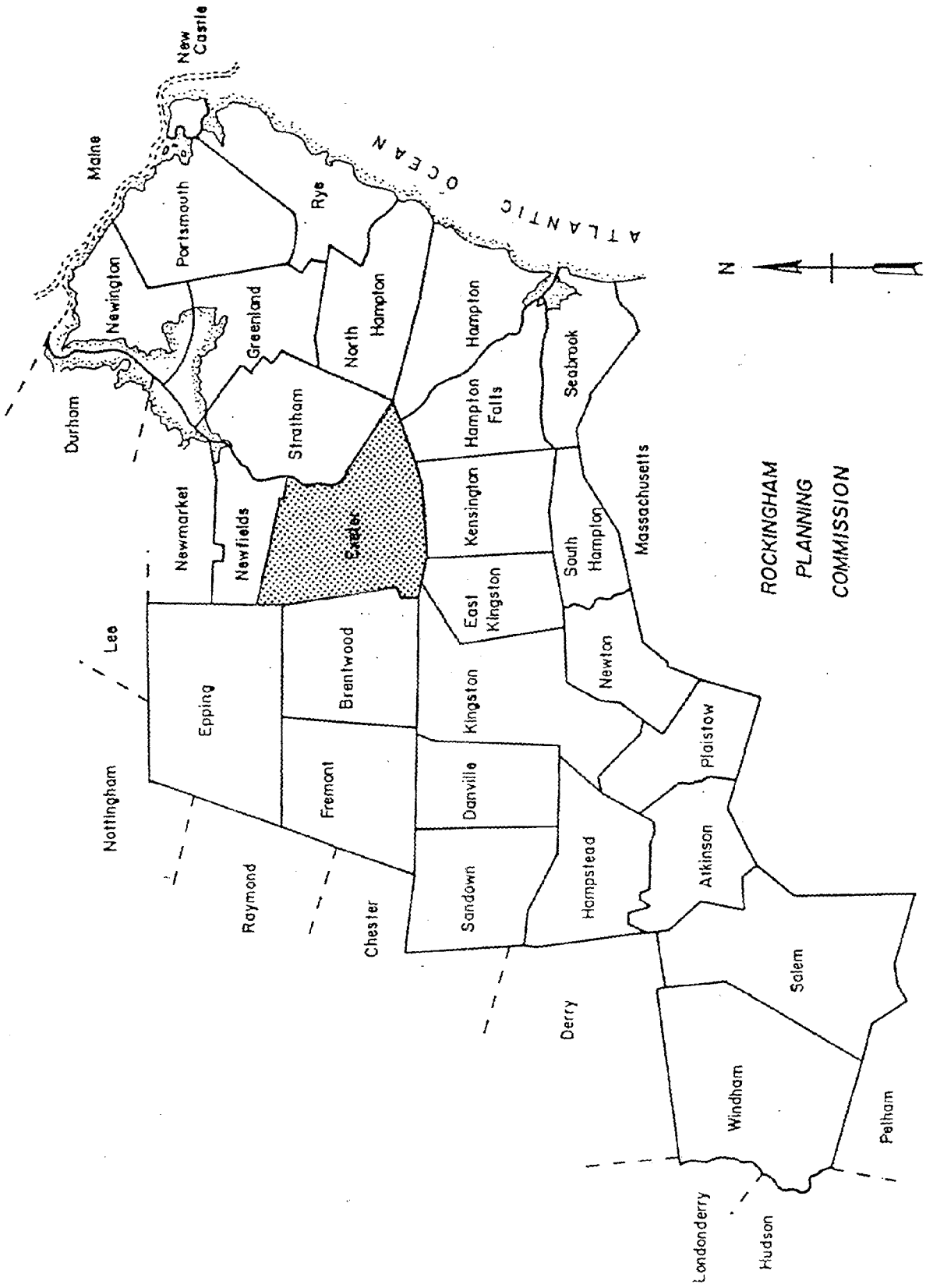
The following document incorporates natural resource planning principals with an open space preservation and management plan in an effort to guide future development towards the most suitable lands, and away from environmentally sensitive, resource-rich areas with high open space values. This plan will identify the Town's most important open space areas, and recommend strategies for their management and protection. Used in conjunction with the other chapters of the Exeter Master Plan, this document can serve as a useful guide for public officials and citizens in their efforts to achieve a balance between community growth and the protection of the natural environment.

Exeter has an extensive history of open space planning, although such efforts may not be noticed by the average citizen on a day-to-day basis. This plan presents an inventory of the Town's unique open space values, an inventory of existing open space areas, and a guide for the establishment of new open space areas. In essence, it's an attempt to rewrite the Johnny Appleseed story. Picture yourself growing up in a country where no one has ever heard of apples, and then, when news about apples finally makes its way to you, you look outside and see that there are apples hanging outside your window, ready to eat. And

then you find out that two generations ago someone came through the area planting a few apple trees, which you had always assumed were just ornamental shrubs. And then you see that there's a package with your name on it, left behind by the apple planter, and inside are more seeds, a couple of shovels, and detailed instructions for setting up more orchards. Exeter residents, consider this plan as the package with your name on it.

MAP 1

LOCATION MAP



OPEN SPACE - A GENERAL DESCRIPTION

OPEN SPACE - A GENERAL DESCRIPTION

For the purpose of this plan, open space will be defined as land areas having natural resources and features worthy of conservation and protection. Such areas can consist of forests, farmland, floodplains, wetlands, and steep slope areas. Open space can also include scenic vistas, recreational areas, and historic sites. Too often, open space is considered to be merely lands which are not currently developed or being used in some manner. The multiple resource values of open space lands are often overlooked. Open space values can be categorized as follows:

1. environmental protection (e.g. erosion control, flood water retention, groundwater recharge, etc.);

2. forestry and agriculture;

3. recreation (both active and passive);

4. habitat for flora (plant life) and fauna (wildlife);

5. aesthetics, (i.e., pleasant scenery, visual relief, maintenance of rural character, scenic vistas, etc.);

6. education and research (outdoor classrooms); and

7. historic and archeological sites.

It is difficult to quantify all the benefits which open spaces provide, especially in monetary terms. Most public open space areas have a relatively low economic return in the short-term, and a low frequency of use for any one individual. Open space is usually considered to be a community resource, therefore, public action is usually the most practical source of preservation and protection efforts. Traditional arguments on the behalf of open space planning have not rested upon economic considerations. Rather, they have been founded upon the need for protecting environmentally sensitive lands, the need for public recreation facilities, and the attractiveness of green spaces. However, the preservation of open space does yield a number of economic benefits; among them are:

1. The prevention of public expenditures in the sense that other types of development can have a net cost to the Town, especially residential development;

2. The production of private income through commercial open space uses, including golf courses, agricultural business and timber harvesting;

3. The yielding of additional property value to adjacent properties; and

4. The maintenance of various "natural process" values which, if disrupted, may require the expenditure of public funds to restore. These values, which may be considered "avoided costs", are further described below.

A common argument against open space preservation is that it results in the loss of potential property tax revenues for the community. This statement may be generally valid for industrial and commercial development, however, it is certainly false for most forms of residential development. For instance, the residents of new neighborhoods, having made substantial personal investments in their new homes, expect to receive adequate public services (e.g., education, police and fire protection, road maintenance, etc.) in return for their property taxes. The above argument assumes that residential development produces public revenues in excess of public costs.

According to a study conducted by the American Farmland Trust, the above assumption is almost always proven false: "...the costs of the public services required to serve new residential communities usually exceeds the tax revenues generated by them..." (source: Density - Related Public Costs, American Farmland Trust, Washington, DC, 1986). As a case study, the Trust evaluated the municipal finances for Loudoun County in Virginia. For every $1.00 of tax revenue generated by the residential sector, $1.28 in public services was expended. The fiscal impacts of residential development have been similar throughout New Hampshire. Therefore, as a general rule, conventional residential development rarely "pays for itself".

Another factor to consider when assessing the economics of maintaining open space is that once open space is developed, a wide array of private and public benefits are lost. Open space can provide sustained economic production which, over the long-term, may exceed those from development options in the short-term. Examples of open space-oriented land uses which provide direct monetary returns include: farm fields, timber stands, campgrounds, and golf courses. In addition, user fees charged for the use of Town-owned open space areas can contribute to a community's general revenue, or be earmarked for specific purposes, such as open space acquisition.

An example of a less direct but measurable economic benefit is what has been termed "location rent", which is the added value of a house or lot situated in close proximity to protected open space. According to the National Association of Home Builders, it is not uncommon for the value of building sites to be enhanced by 15 to 20% in the vicinity of park and recreation areas. The increased value to the landowner is shared by the municipality as well. Because relative property values are higher, assessed valuations and tax revenues are also higher.

In some instances, it is possible to express the "natural process values" of open space in the dollar terms of traditional economic analysis. For example, the value of fish production from a given waterbody can be calculated. After a flood, the negative value of houses built within the floodplain can be determined by assessing the flood damage costs. the value of an aquifer can be calculated by determining the replacement cost (the cost of obtaining alternative water supplies when the existing water supply has been polluted or the recharge rate diminished). But the intrinsic values of open space (e.g., scenic views, unique ecological areas, and historic sites, etc.) are impossible to quantify in economic terms. Still, these values are important to consider because they are an integral part of the Town's character and natural heritage.

The provision of open space areas also has a beneficial effect on man's psychological view of the world around him. In essence, open space areas are a necessary component of man's psychological well being. Man needs to feel connected to the landscape. In the study, Growing Up in Cities (prepared by UNESCO in 1980), interviews with children from different landscape environments around the world found that, without exception, "the hunger for trees is outspoken and seemingly universal."

According to Roger Hart, director of the Children's Environments Research Group at the Graduate Center of the City University of New York, the provision of open spaces is necessary for a child's healthy development as adults. "Part of being a responsible adult is having a sense of responsibility for the environment," he says. "And you can only care for something you've grown to feel a part of." Thus, open space areas are not only beneficial assets for individual property owners and the community as a whole, they are necessary for man's well being.

PHYSICAL CHARACTERISTICS AND LAND USE

PHYSICAL CHARACTERISTICS AND LAND USE

The Town of Exeter consists of approximately 13,056 square acres of land (or 20.4 square miles). According to the 1990 Census, the Town has a current population of 12,481, which results in a population density of 611.8 people per square mile. Exeter is bordered by the communities of Brentwood, Epping, Newfields, Stratham, North Hampton, Hampton, Hampton Falls, Kensington, East Kingston, and Kingston. The majority of the Region's major highways pass through Exeter, including: Routes 51, 85, 88, 101, 101-D, 108, 111, and 111-A. Major watercourses within Exeter include the Exeter River, Little River, and the tidal Squamscott River. For a graphic depiction of Exeter's location within the Regional context, please review Map 1 (Location Map) on the following page.

The following section will discuss the relationship between physical characteristics of land and land use in general. Items to address in this section include: Exeter's bedrock geology, surficial geology, surface topography, soil development suitability, existing land use, and zoning.

1. Bedrock Geology

In southeastern New Hampshire, bedrock was formed from layers of sea bottom sediments deposited and compacted over millions of years into formations of sedimentary rock. These formations were transformed through uplifting, folding, and tremendous heat and pressure into what is known as metamorphic rock.

According to the "Geological Map of New Hampshire", prepared by the US Geological Survey and the NH State Geologist in 1986, there are three major bedrock types within Exeter, all of the metamorphic variety. These bedrock types include: the Exeter pluton formation which covers the majority of the Town's northern half, plus a small strip located in the Town's southeast corner; the Kittery formation which appears as a strip covering the downtown area, as well as two small strips located in the southeast corner, and; the Elliot formation which covers the majority of the Town's southern land area. For a graphic depiction of the Town's bedrock formations, please review Map 2 (Flood Hazards and Bedrock Geology) following page 7.

2. Surficial Geology

The presented information is based on a surficial geology map prepared by the NH State Geologist in 1988. The upper layers of geologic materials above the bedrock formations are known as surficial deposits,

or more easily understood as the earth's surface. In southeastern New Hampshire, these geologic materials were deposited by a glacier more than 10,000 years ago. Within Exeter, there are five types of surficial materials: till, marine silt and clay deposits, contact deposits, freshwater swamp and marsh deposits, and, alluvium deposits. These materials are described in more detail below.

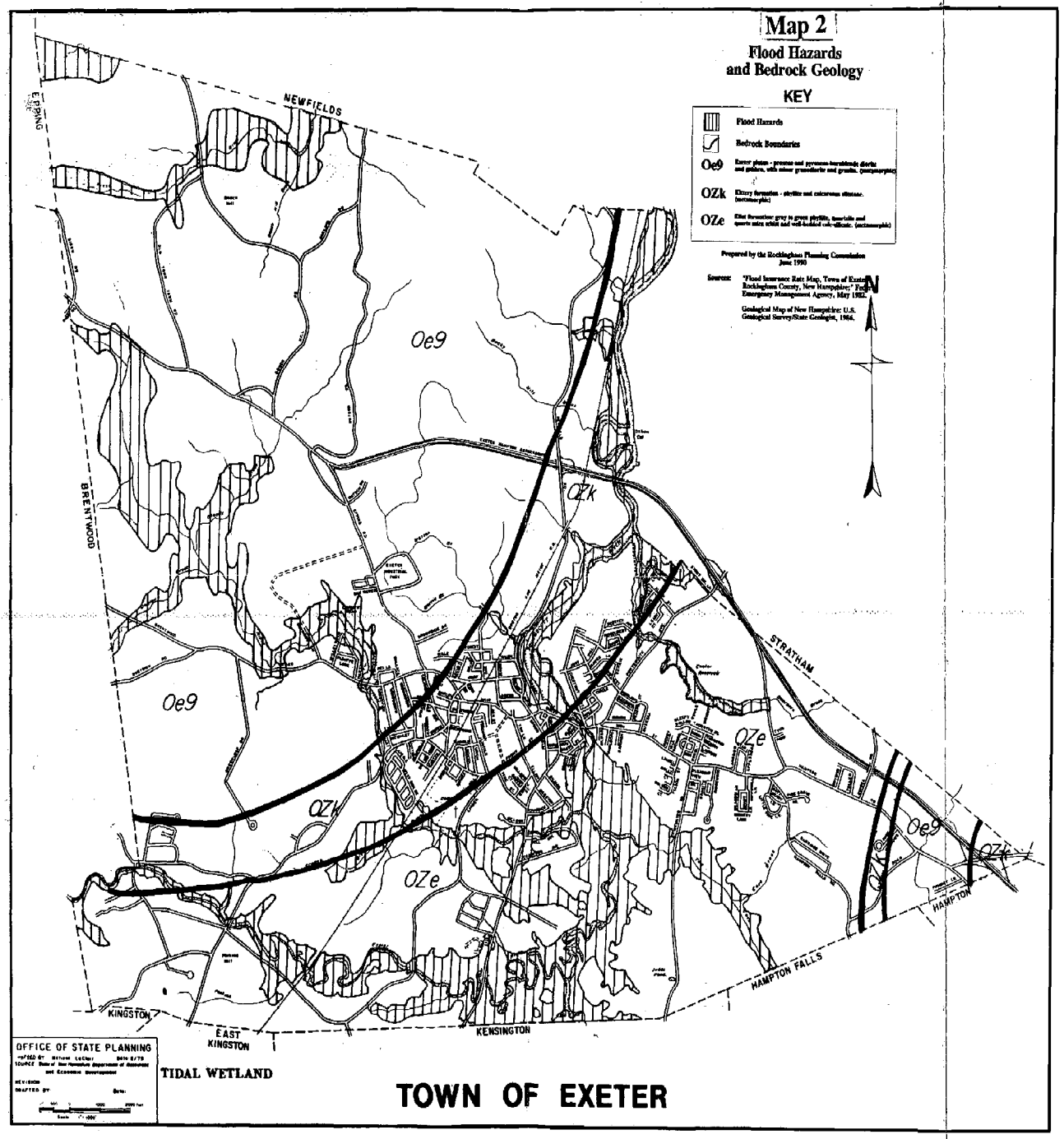
A. Till

As the mile thick glacier advanced from the northwest, it deposited layers of debris made of sand, clay, and gravel, which is collectively known as till. Roughly one third of the Town's surficial geology is characterized by till. Exeter's till areas are found primarily in the northeast corner, as well as the western portion of Town along both sides of the Little River and Dudley Brook. Till usually provides adequate loading capacity for building foundations, thus indicating that till areas are suited for general development purposes. However, if hardpan (an impermeable layer) is located within 18 to 24 inches below the surface, conditions may not be adequate for the placement of on-site septic systems.

B. Marine Silt and Clay Deposits

The formation of these deposits resulted from the following processes: the melting glacier caused a rise in sea level which inundated most of southeastern New Hampshire; marine sediments were formed along the bottom of the ancient sea, as well as its bays and estuaries; the land elevation gradually rose as the weight of the glacier decreased, and the sea level retreated to its present position, leaving the marine deposits in what are now upland areas.

In Exeter, marine silt and clay deposits are the dominant feature in the Town's surficial geology, constituting over fifty percent of the land area. These areas are found in the Town's southern half (including the downtown area), as well as the northwest and southwest corners of the community. Generally, these materials are unsuitable or marginally suitable for development because of a high water table with poor drainage and unstable conditions. In some areas these limitations can be overcome with the provision of adequate drainage facilities and special engineering and design considerations.


Map 2
Flood Hazards
and Bedrock Geology
KEY
Flood Hazards
Bedrock Boundaries
Oe9
OZk
OZe
Prepared by the Rockingham Planning Commission
June 1990
Source: "Flood Insurance Rate Map, Town of Exeter, Rockingham County, New Hampshire," Federal Emergency Management Agency, May 1982.
Geological Map of New Hampshire: U.S. Geological Survey/State Geologist, 1964.
N
NEWFIELDS
BRENTWOOD
STRATHAM
HAMPTON
HAMPTON FALLS
KENSINGTON
EAST KINGSTON
KINGSTON
Oe9
OZk
OZe
OFFICE OF STATE PLANNING
TIDAL WETLAND
TOWN OF EXETER

C. Contact Deposits

As the glacier melted and retreated, sediments were released forming layers of sand and gravel called ice contact deposits. These deposits have good drainage and permeability characteristics with a high water bearing capacity. These areas are easily excavated and are usually the sites of a community's sand and gravel pits. This material also goes by the name of "stratified drift". There are two stratified drift areas within Exeter: a large area in the Town's southeast corner, and a smaller deposit in the southwest corner. These deposits may contain large quantities of groundwater, thus making them potentially suitable sources for public water supplies. For a graphic depiction of the Town's aquifer areas, please review Map 10 (Aquifer Map).

D. Swamp and Marsh Deposits

These areas consist of muck, peat, silt, sand, and a little gravel, underlying poorly drained low-lying areas. Thickness ranges from a few feet to over twenty feet in some places. These areas are primarily located within the Town's wetland, floodplain, and shoreland areas.

E. Alluvium Deposits

These deposits consist of sand, silt, and a little gravel located beneath floodplains and existing streams. Deposits are usually ten feet thick or less in most places, and are underlain by marine silt and clay. These areas are usually located in close proximity to swamp and marsh deposits where the water table is at the surface. In Exeter, these deposits are located along the shorelands of the Town's most significant watercourses.

3. Topography

Exeter's existing topography is generally a result of the underlying bedrock, the effects of glaciation, and the weathering conditions which have occurred since the most recent glacier activity. Erosion and deposition caused by the glacier, and the formations created, are the most important factors in determining today's topography. Exeter's terrain is predominantly rolling with gentle slopes of 0-8 percent. There are no substantial hills or mountains within Exeter. The topography ranges from a low of slightly above mean sea level at the Squamscott River's edge, to a high of 232 near the Town's northern end, along Watson Road. For a graphic depiction of Exeter's topography, please review Map 3 (Topography) following page 9.

4. Soils

Knowledge about soils is critical in making sound land use decisions. With information regarding soil characteristics and limitations for development, land alteration and building activity can be directed away from poorly suited lands to areas with the capability to sustain development. For example, residential development should be located away from areas with unstable soil conditions, high water tables, and slow percolation rates because of the constraints for building foundations and septic system placement. Other soils are better suited for agricultural uses because of level topography, good drainage and lack of stoniness - important considerations in defining and establishing agricultural zoning districts.

A. Development Suitability

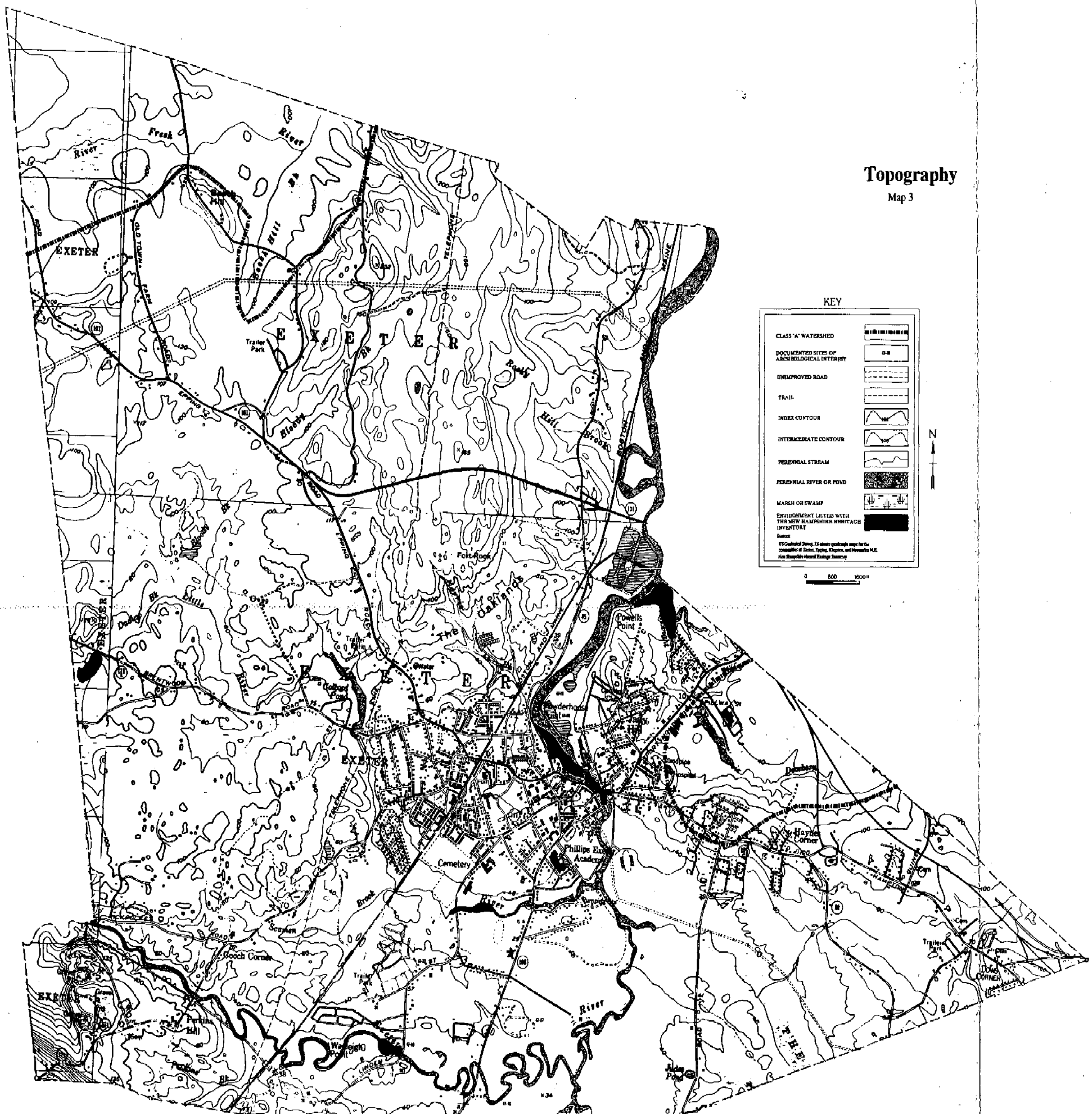
Much of Exeter's rural, undeveloped land is not served by the Town's public sewer and water systems. For these areas, the importance of soil-based information in the land use planning process is critical. The viability of on-site sewage disposal facilities depends on a careful evaluation of soil conditions. Soils should be reviewed in terms of their ability to handle wastewater disposal without adversely affecting groundwater resources.

Poor soil conditions and steep slopes cause severe limitations for on-site sewage disposal systems, hence restricting development. Concentrations of poor soil conditions are scattered throughout Exeter, however, significant areas can be found both north and south of the downtown area, especially along the Town's riverbanks and stream corridors. For a graphic depiction of Exeter's soil development capability, please review Map 4 (Soil Suitability for Septic Systems) which follows Map 3.

B. Agriculture and Forestry

Soil information has not only proven to be an excellent indicator of general development suitability, but also of critical resource areas such as wetlands, prime agricultural land, forest land, and wildlife habitat.

Important agricultural soils include "prime farmland" and "farmland of Statewide importance". As defined by the US Soil Conservation Service, "prime farmland" has the soil quality and moisture content needed to produce sustained high yields when managed according to modern farming methods. It can be farmed

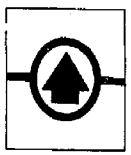

Topography
Map 3
KEY
CLASS "A" WATERSHED
DOCUMENTED SITES OF ARCHEOLOGICAL INTEREST
UNIMPROVED ROAD
TRAIL
INDEX CONTOUR
INTERMEDIATE CONTOUR
PERENNIAL STREAM
PERENNIAL RIVER OR POND
MARSH OR SWAMP
ENVIRONMENT LISTED WITH THE NEW HAMPSHIRE HERITAGE INVENTORY
N
EXETER
Phillips Exeter Academy
Cemetery
Gooch Corner
Perkins Hill
Powells Point
Trailer Park
Fort Rock
The Oaklands
Haydens Corner
River

Map 4

Town of Exeter -- Soil Suitability for Septic Systems

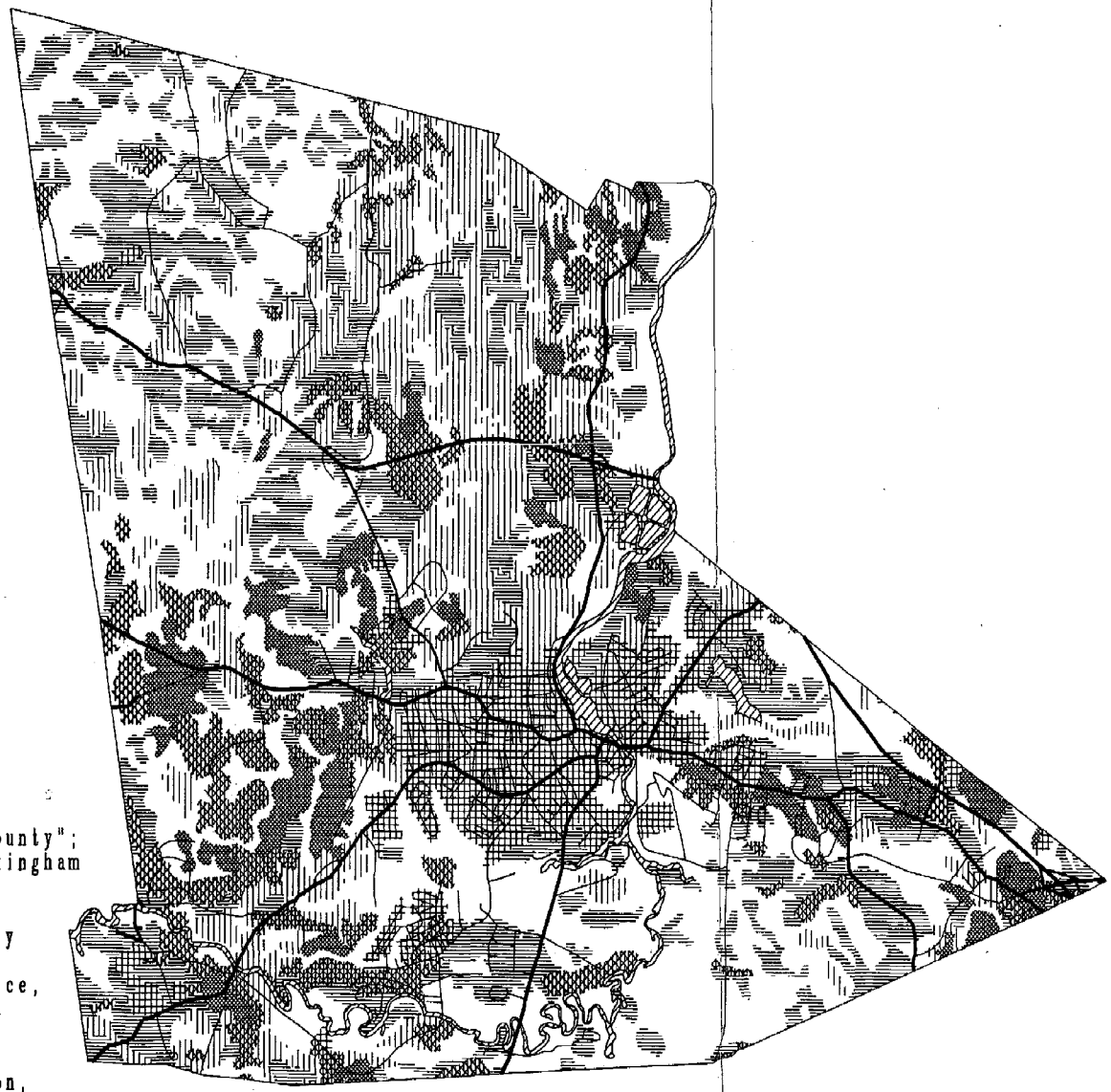
KEY

- Water
- Very Low Suitability
- Low Suitability
- Medium Suitability
- High Suitability
- Very High Suitability
- Not Rated/ Too Variable



Scale in Miles

0 2/3 1 1/3 3



Sources: "Soils Potential for Development-Rockingham County"; U.S.D.A. - Soil Conservation Service and Rockingham County Conservation Dist.; May 1987.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

Prepared by the Rockingham Planning Commission, May 1990. SRG

continuously or nearly continuously without degradation of the environment. It produces the highest yield for the least amount of energy used. It also requires the least investment to remain productive and is not susceptible to leaching from fertilizer or pesticide applications (source: Soils of New Hampshire, S.A.L. Pilgrim and N.K. Peterson, NH Agricultural Experiment Station, University of New Hampshire and the US Soil Conservation Service, December 1979). "Farmland of Statewide importance" has many of the same attributes of "prime farmland" but is generally of lesser quality.

Map 5 (Farmland Soils) following page 11 indicates that Exeter contains several significant concentrations of farmland soils. These areas are located along the banks of the Exeter River, Squamscott River, along both sides of Hampton Road, within the northwest corner of Town, and a large patch located just north of the downtown area.

The US Soil Conservation Service has also evaluated soils according to their suitability for timber production. In general, soils which are suitable for growing crops are suitable for growing trees as well. Thus, the farmland soils depicted on Map 5 are also suitable for timber stands.

The soils information for this section comes from soil survey sheets of the soon to be published Soil Survey of Rockingham County, New Hampshire, prepared by the US Soil Conservation Service. The County soil survey sheets were digitized into the Geographic Information System of the Rockingham Planning Commission.

5. Land Use and Zoning

The previous discussion focused on the natural, pre-developed conditions of Exeter's land area. However, these conditions can be significantly altered by man-made activity. For example, a shopping center located within soils best suited for farming destroys the agricultural value of the land. The ensuing discussion will review Exeter's existing land use pattern, as well as its existing zoning scheme.

A. Existing Land Use

According to the study, Land Use Change: Rockingham County New Hampshire; 1953-1982 (prepared by the NH Agricultural Experiment Station, UNH, 1987), approximately 48% of Exeter consists of

forest land while an equal percentage consists of man-made development. The remainder of Town consists of active agricultural land, idle land, and surface water resources. Since 1953, Exeter has lost approximately 1,200 acres of farmland and over 2,700 acres of forests, while gaining roughly 4,000 acres of new development. This trend towards urbanization, consisting primarily of residential development, has led to a corresponding reduction in open space. Table 1 below illustrates the changes in Exeter's land use pattern.

Table 1 - Exeter Existing Land Use: 1953, 1974, and 1982

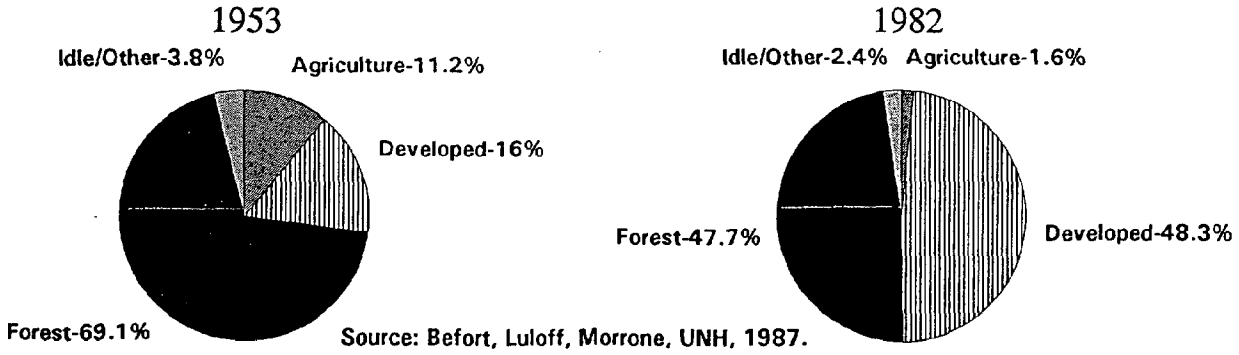
Land Use	Acres in 1953	Acres in 1974	Acres in 1982	% Change 1953-1982
Agriculture	1,380	864	195	-85.9%
Forest	8,525	7,805	5,885	-31.0%
Developed	1,970	3,690	5,965	202.0%
Idle	185	55	185	0.0%
Other	135	175	135	0.0%
Water	150	150	150	0.0%

Total acreage according to study: 12,345 acres.

Source: Land Use Change: Rockingham County, New Hampshire; 1953-1982, prepared by the NH Agricultural Experiment Station, UNH, 1987.

Figure 1 below (Distribution of Land Use) provides a graphic illustration of the Town's change in land use between 1953 and 1982. A graphic depiction of Exeter's existing land use pattern is depicted on Map 6 (Existing Land Use) following page 12. This map has been updated to reflect the Town's land use pattern as of January 1, 1991.

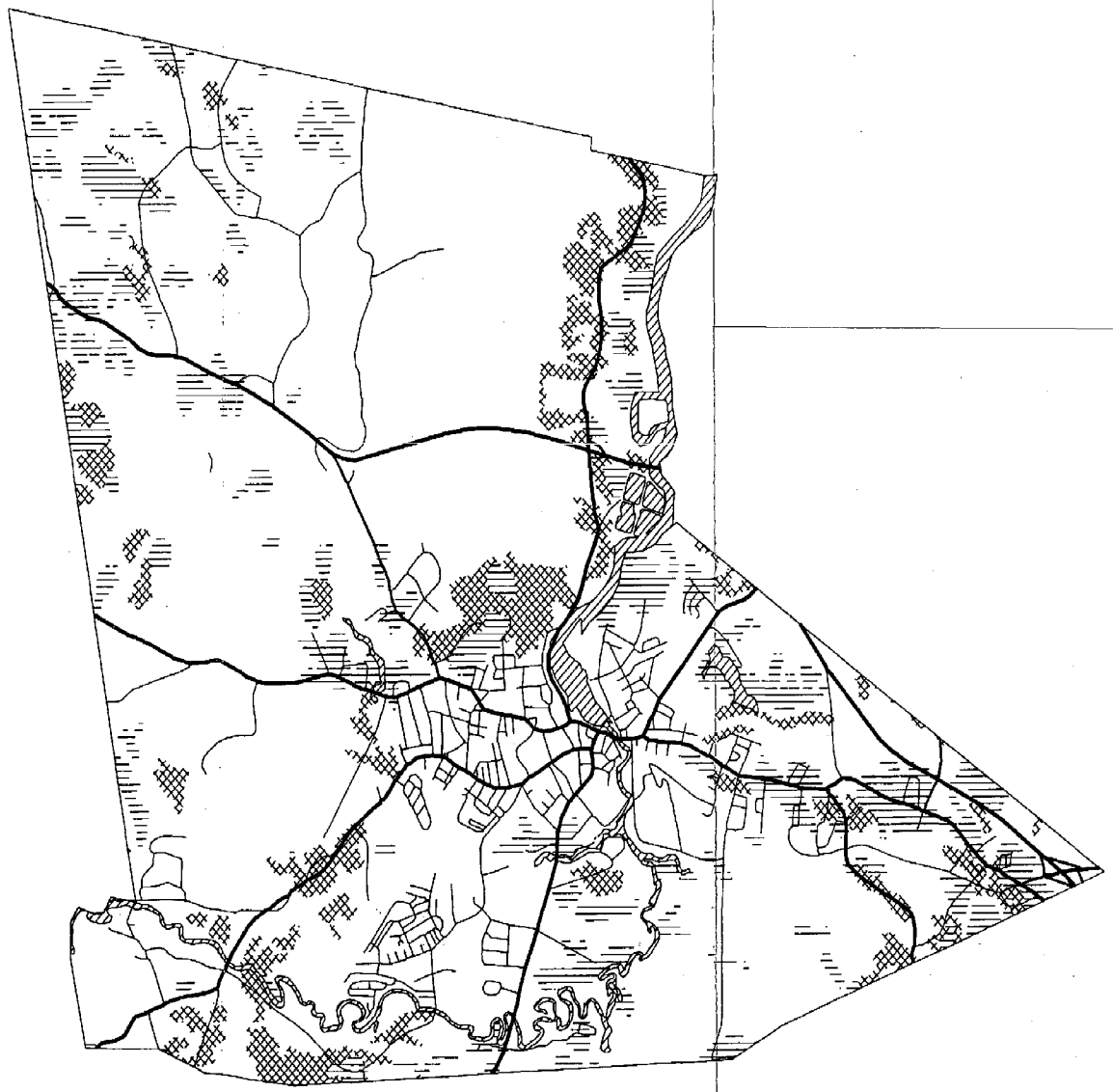
Distribution of Land Use - Exeter, N.H.
1953 and 1982



Source: Befort, Luloff, Morrone, UNH, 1987.

Map 5

Town of Exeter -- Farmland Soils



KEY

Water

Prime Farmland

Farmland of Statewide Importance

Scale in Miles

0 2/3 1 1/3 3

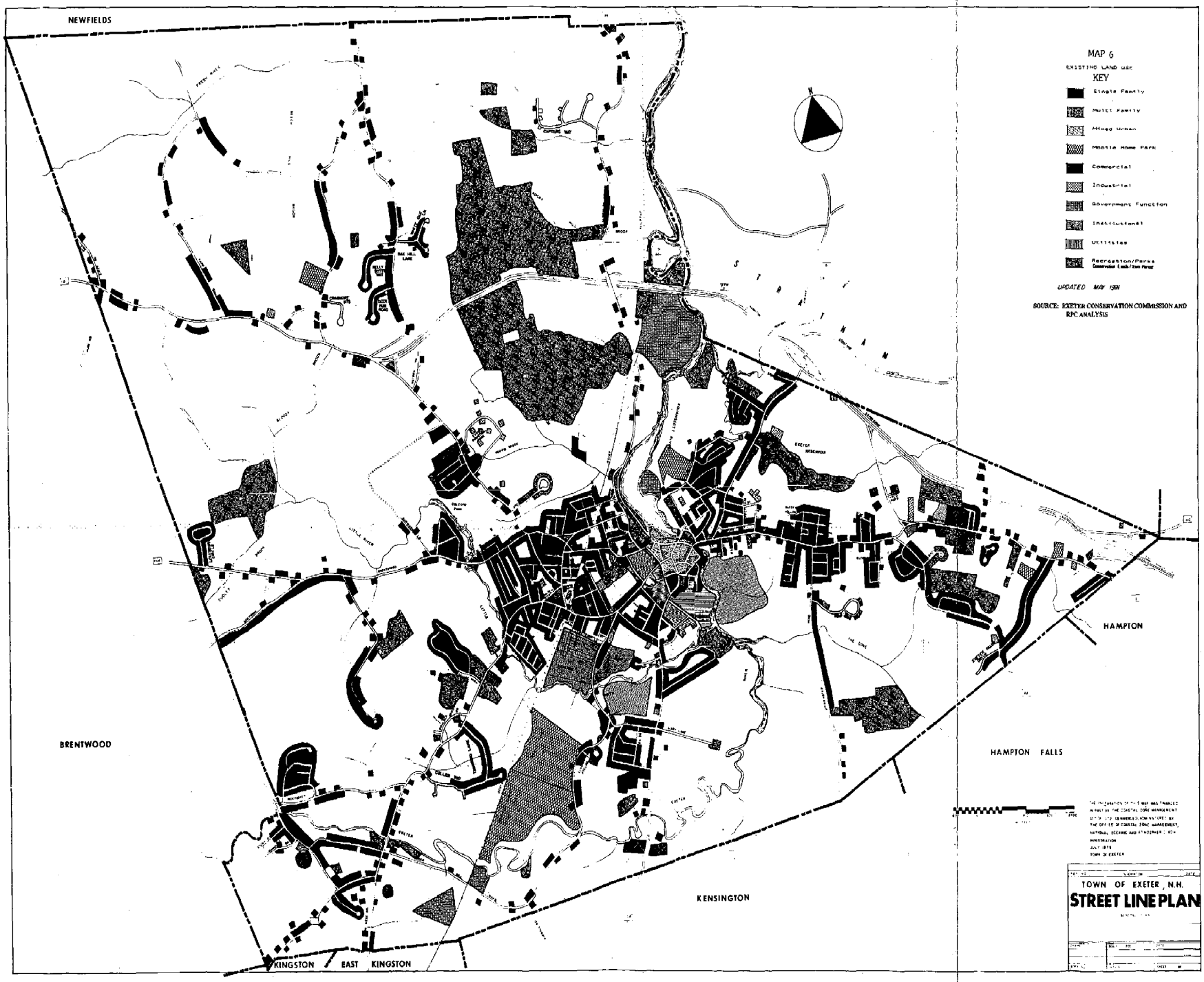
Sources: Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

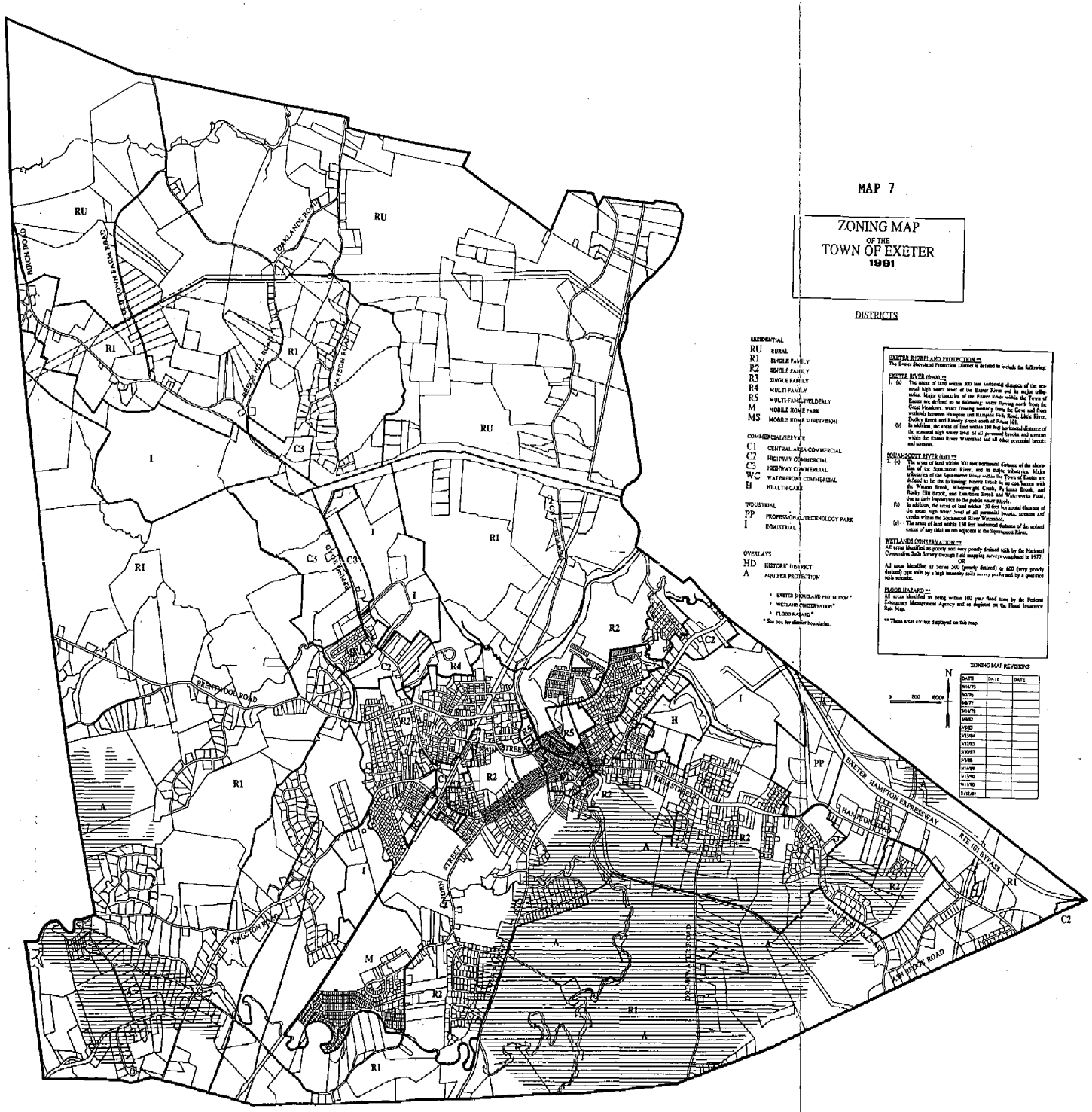
Prepared by the Rockingham Planning Commission, May 1991. SRG

B. Existing Zoning

Another consideration for open space planning is the Town's existing zoning arrangement. Exeter currently has 20 zoning districts: eight districts for various types of residential development; six districts for various types of commercial development; one district for industrial land uses; four environmental protection overlay districts, and; an overlay historic district. For a graphic depiction of Exeter's existing zoning arrangement, please review Map 7 (Generalized Zoning Map) on the following page.

In addition to the provisions regulating Exeter's environmental overlay districts, the Town's "Open Space Development" ordinance is another zoning mechanism which promotes open space preservation. This ordinance allows a development to concentrate a higher density of dwelling units in exchange for committing adjacent areas to common open space in perpetuity. The ordinance offers the possibility of a 10% density bonus if open lands or easements are conveyed to the Town for public use. Exeter's open space ordinance provides flexibility in the design of a development so that fragile areas and other important natural features can remain undeveloped.


NEWFIELDS
BRENTWOOD
KENSINGTON
HAMPTON
HAMPTON FALLS
KINGSTON / EAST KINGSTON
MAP 6
EXISTING LAND USE
KEY
Single Family
Multi Family
Mixed Urban
Mobile Home Park
Commercial
Industrial
Government Function
Institutional
Utilities
Recreation/Parks
Conservation Land/Tax Forest
UPDATED MAY 1991
SOURCE: EXETER CONSERVATION COMMISSION AND RPC ANALYSIS
TOWN OF EXETER, N.H.
STREET LINE PLAN



MAP 7

ZONING MAP OF THE TOWN OF EXETER 1991

DISTRICTS

RESIDENTIAL
- RU RURAL
- R1 SINGLE FAMILY
- R2 SINGLE FAMILY
- R3 SINGLE FAMILY
- R4 MULTI-FAMILY
- R5 MULTI-FAMILY/ELDERLY
- M MOBILE HOME PARK
- MS MOBILE HOME SUBDIVISION

COMMERCIAL/SERVICE
- C1 CENTRAL AREA COMMERCIAL
- C2 HIGHWAY COMMERCIAL
- C3 HIGHWAY COMMERCIAL
- WC WATERFRONT COMMERCIAL
- H HEALTH CARE

INDUSTRIAL
- PP PROFESSIONAL/TECHNOLOGY PARK
- I INDUSTRIAL

OVERLAYS
- HD HISTORIC DISTRICT
- A AQUIFER PROTECTION

* EXETER SHORELAND PROTECTION *
* WETLAND CONSERVATION *
* FLOOD HAZARD *
* See text for district boundaries.

EXETER SHORELAND PROTECTION **
The Exeter Shoreland Protection District is defined to include the following:

EXETER RIVER (Great) **
1. (a) The areas of land within 300 feet horizontal distance of the seasonal high water level of the Exeter River and its major tributaries. Major tributaries of the Exeter River within the Town of Exeter are defined to be following: water flowing south from the Great Woodlot, water flowing westerly from the Cove and from wetlands between Hampton and Hampton Falls Road, Little River, Dudley Brook and Bloody Brook south of Route 101.
(b) In addition, the areas of land within 150 feet horizontal distance of the seasonal high water level of all perennial brooks and streams within the Exeter River Watershed and all other perennial brooks and streams.

SQUAMSCOTT RIVER (Lub) **
2. (a) The areas of land within 300 feet horizontal distance of the shoreline of the Squamscott River, and its major tributaries. Major tributaries of the Squamscott River within the Town of Exeter are defined to be the following: Moody Brook to an confluence with the Wasson Brook, Wheelwright Creek, Pickpaw Brook, and Rocky Hill Brook, and Downtown Brook and Waterworks Pond, due to their importance to the public water supply.
(b) In addition, the areas of land within 150 feet horizontal distance of the mean high water level of all perennial brooks, streams and creeks within the Squamscott River Watershed.
(c) The areas of land within 150 feet horizontal distance of the upland extent of any tidal marsh adjacent to the Squamscott River.

WETLANDS CONSERVATION **
All areas identified as poorly and very poorly drained soils by the National Cooperative Soils Survey through field mapping surveys completed in 1977.
OR
All areas identified as Series 500 (poorly drained) or 600 (very poorly drained) type soils by a high intensity soils survey performed by a qualified soils scientist.

FLOOD HAZARD **
All areas identified as being within 100 year flood zone by the Federal Emergency Management Agency and as depicted on the Flood Insurance Rate Map.

** These areas are not displayed on this map.

N

0 500 1000ft

ZONING MAP REVISIONS

DATE	DATE	DATE
3/16/75		
3/2/76		
3/8/77		
3/14/78		
3/9/82		
3/8/83		
3/13/84		
3/12/85		
3/10/87		
3/3/88		
3/14/89		
3/13/90		
9/11/90		
3/10/91		

OPEN SPACE VALUES, INVENTORY, AND ANALYSIS

OPEN SPACE VALUES, INVENTORY, AND ANALYSIS

One of the primary responsibilities of a local conservation commission, as outlined in RSA 36-A:2, is the maintenance of an "index of the Town's natural and scenic resources." In addition, the conservation commission is charged with "recommending to the Selectmen a program for the protection, development and sound utilization of all the areas in the index." This plan is developed to assist the Exeter Conservation Commission in achieving those objectives.

Items described in the accompanying index include: water resources, recreation, forestry and agriculture, flora and fauna habitat, aesthetics, education and research, plus historic and archeological sites.

1. Water Resources

The ensuing discussion of water resources is broken down into three components: a description of values, an inventory, and an analysis which includes a needs assessment and recommendations. Water resources to be describe in this section include: watersheds, perennial streams and waterbodies, wetlands, floodplains, shorelands, and groundwater. For a more complete description and analysis of the Town's water resources, please review the Water Resource Management and Protection Plan for the Town of Exeter, New Hampshire, prepared by the Rockingham Planning Commission in 1990.

Watersheds, Perennial Streams, and Waterbodies

A. Values

As with all natural features, watercourses and waterbodies have multiple, interrelated values. These surface water resources are a key resource for fish, wildlife habitat, recreation, aesthetics, and ground-water recharge.

1) Fisheries and Wildlife: Water is the essential element in any wildlife habitat. In addition to providing food, waterbodies and watercourses also provide protection for waterfowl, songbirds, birds of prey (e.g., the Great Blue Heron and the Double-Crested Cormorant), and for many small animals and game species. Clean, oxygen-rich waters are also necessary for a healthy and diverse fish population.

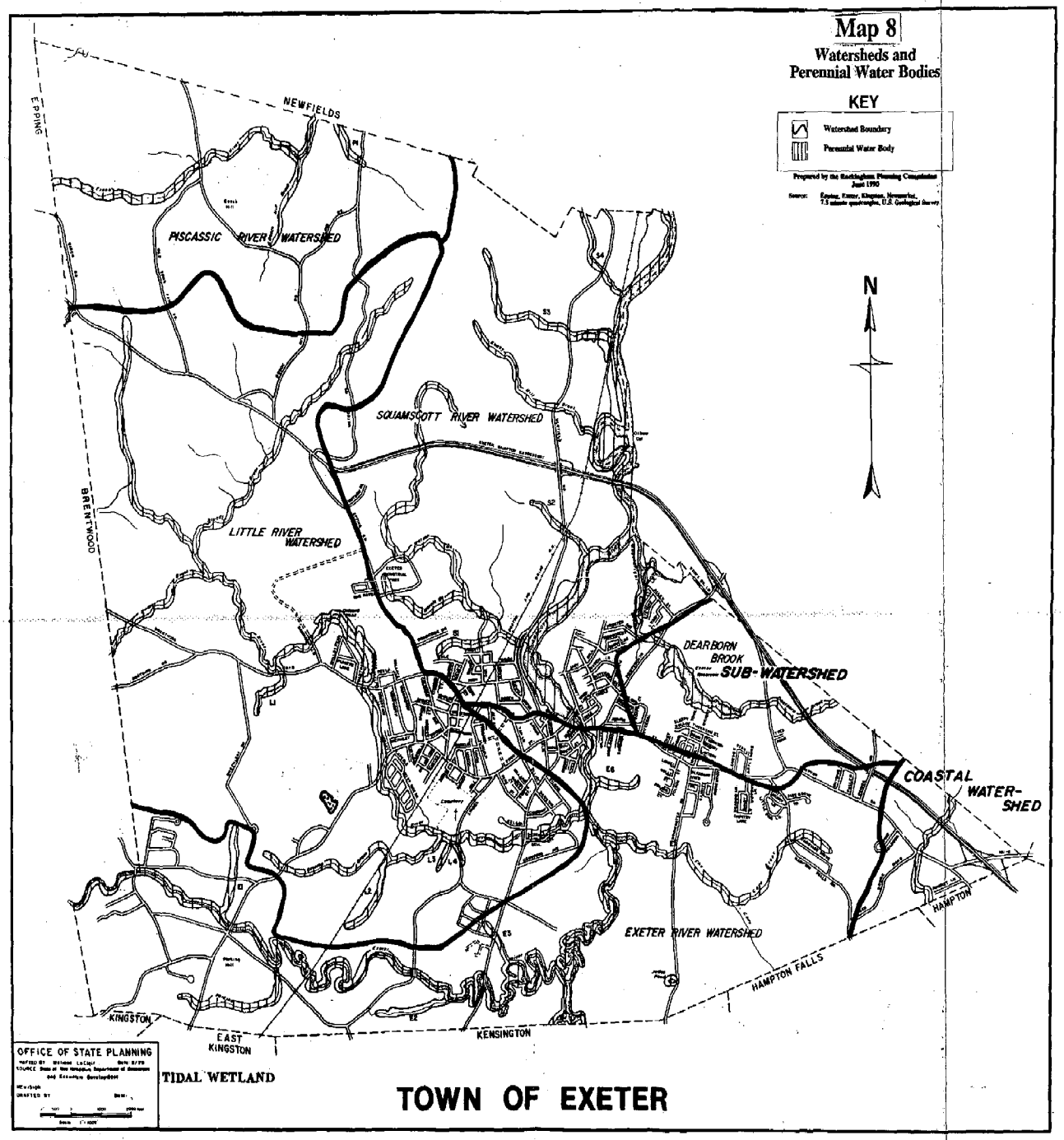
2) Recreation and Aesthetics: Areas containing good fisheries or wildlife habitat provide high recreational value to local fishermen and hunters. Other active recreational pursuits include swimming and boating, which require sufficient area, clean water, and adequate access for optimal conditions. Moreover, waterbodies and watercourses often provide high quality scenic views. Examples of scenic waterways in Exeter include the downtown waterfront park, the Squamscott River along the Swasey Parkway, and the Exeter River throughout the Exeter Academy private trail system.

3) Groundwater Recharge: The quantity and quality of surface water and groundwater resources are closely related. The two resources often act as discharge and recharge points for each other. When there is little rain, groundwater is released to maintain streamflow. When flooding occurs, excess water seeps back into wetlands, woodlands, and grasslands to recharge groundwater. Pumping of wells lowers the groundwater locally and can draw water to the wells from nearby ponds and streams through the process of induced infiltration. Since surface water and groundwater resources have a symbiotic relationship, efforts to protect one will provide some degree of protection to the other.

B. Inventory

1) Watersheds: Exeter contains approximately 150 acres of surface water, which is equivalent to 1.2% of the Town's total acreage. Exeter forms a portion of four regional watersheds: the drainage areas for the Piscassic River, Exeter River, the tidal Squamscott River, and the Coastal Watershed. Exeter also forms a portion of the smaller Dearborn Brook and Little River sub-watersheds. These watersheds were identified on the "New Hampshire Hydrologic Unit Map" (Source: US Department of Agriculture, Soil Conservation Service, May 1982). The watershed boundaries within Exeter are shown on Map 8 (Watersheds and Perennial Waterbodies) on the following page.

It should be noted that the Piscassic River Watershed and the Dearborn Brook Sub-Watershed have received a water quality classification of "A" from the State Legislature. RSA 149:3 defines Class A waters as being "of the highest quality and potentially acceptable as public water supply sources after disinfection. No sewage or wastes shall be discharged into these waters." The Piscassic River is one of only four


Map 8
Watersheds and Perennial Water Bodies
KEY
Watershed Boundary
Perennial Water Body
Prepared by the Rockingham Planning Commission
June 1990
N
NEWFIELDS
EPPING
BRENTWOOD
PISCASSIC RIVER WATERSHED
SQUAMSCOTT RIVER WATERSHED
LITTLE RIVER WATERSHED
DEARBORN BROOK SUB-WATERSHED
COASTAL WATER-SHED
EXETER RIVER WATERSHED
HAMPTON
HAMPTON FALLS
KENSINGTON
EAST KINGSTON
KINGSTON
TIDAL WETLAND
OFFICE OF STATE PLANNING
TOWN OF EXETER

watersheds in the Rockingham Planning Region to receive a Class A designation. Although the Piscassic River itself does not flow through Exeter, it is significant to note that the River is the longest stretch of Class A waters within the Region. The Dearborn Brook Sub-Watershed has received a Class A designation because Dearborn Brook flows into the Exeter Reservoir, and is thus mixed with the Exeter River to become the source of the Town's drinking water supply.

All of the other watersheds and sub-watersheds of which Exeter forms a part have received a water quality classification of "B". RSA 149:3 defines Class B waters as being of the second highest quality, with no objectionable physical characteristics. No sewage or waste shall be discharged into these waters unless they have been treated. The waters of this class are considered acceptable for bathing and other recreation purposes and, after adequate treatment, for use as public water sources.

2) Perennial Streams: There are 31 watercourses within Exeter, the most significant being the Exeter River, Little River, Dearborn Brook, and the Squamscott River. The Town's drainage pattern is described in more detail below.

The Exeter River flows through Town in an easterly direction for a length of roughly six miles, until it empties into the Squamscott River. The Exeter River is fed by nine perennial tributaries, the most significant being the Little River, Perkins Brook and Great Brook.

The Little River flows through Exeter in a southeasterly direction for a length of roughly 6.2 miles, until it empties into the Exeter River. The Little River is fed by seven perennial tributaries, the most significant being Bloody Brook, Dudley Brook, and Scamen Brook. The Dearborn Brook originates in a large wetland area in Stratham, between Rollins Hill and Pine Hill. It flows through Exeter in a southwesterly direction for a length of approximately one mile before it empties into the Exeter Reservoir.

The tidal Squamscott River flows through Town in northerly direction for a length of 3.5 miles, until it empties into the Great Bay. The Squamscott River is fed by eight perennial tributaries, the most significant being Norris Brook, Watson Brook, Wheelwright Creek, and Rocky Hill Brook.

It should be noted that the Squamscott River falls within the Great Bay National Estuarine Research Reserve which was designated by the United States Congress in 1989 as the nation's 18th National Estuarine Research Reserve under the federal Coastal Management Act (CZMA). The CZMA created a federal-state partnership for the protection and management of coastal areas. The New Hampshire Coastal Program is administered by the NH Office of State Planning.

The Great Bay Reserve includes over 4,400 acres of tidal water areas representing the range of different environments around the estuary (saltmarsh areas, bluffs, rocky shores, woodlands, open fields, etc.). While the highest priority of the Reserve is to preserve Great Bay through an aggressive land acquisition program, there is also a strong emphasis on using the site for long-term research and education.

Also of interest is the "Great Bay Hydrologic Unit" project. It is sponsored by the US Department of Agriculture, and involves the following organizations: the Rockingham and Strafford County Conservation Districts, the Rockingham and Strafford County branches of the Soil Conservation Service (SCS), the Agricultural Conservation and Stabilization Service (ASCS) and the UNH Cooperative Extension Service, plus the US Geological Survey. The Hydrologic Unit provides non-point pollution source education to the public for the watershed area covering the Great Bay. The education effort is geared toward providing best management education materials for potentially hazardous land uses.

Within Exeter's portion of the Piscassic Watershed, there are three perennial streams which flow in a northerly direction, feeding the Piscassic River. These streams include the Fresh River, Beech Hill Brook, and an unnamed tributary. Within Exeter's portion of the Coastal Watershed, there is only one perennial stream (Ash Brook) which flows in a southerly direction before emptying into the Taylor River in Hampton.

3) Waterbodies: There are only four waterbodies of significance within Exeter: Colcord Pond, Judes Pond, Brickyard Pond, and the Exeter Reservoir. Colcord Pond was created by a dam located along the Little River, near Brentwood Road. The Pond is roughly 12 acres in size and is located at an elevation of 50 feet mean sea level (MSL). Judes Pond is located in south Exeter just west of Drinkwater Road. The

Pond is roughly two acres in size and is located at an elevation of 20 feet MSL. Brickyard Pond is located off of Kingston Road. The Pond is a little over one acre in size and is located at an elevation of 50 feet MSL. The Exeter Reservoir is located just east of Portsmouth Avenue. The Reservoir is roughly 26 acres in size and is located at an elevation of 40 feet MSL.

C. Analysis

All of the Great Bay's tributaries (including the Squamscott River and its tributaries) are now closed to shellfish harvesting because of the problems associated with improperly treated or untreated sewage. Although the Town of Exeter is currently engaged in upgrading its sewer system and wastewater treatment facility, strict and regular monitoring of discharges to the River must continue.

Another factor contributing to the Bay's degradation comes from poorly planned development and land alteration within the Bay's watershed. To promote the protection of the Great Bay Estuary, the Town should work with land owners within the watershed, the NH Office of State Planning, the Great Bay Estuarine System Conservation Trust, the NH Water Supply and Pollution Control Division, the NH Fish and Game Department, the Rockingham County Conservation District, and the Rockingham Planning Commission on wise land stewardship within the watershed.

In general, there is a direct relationship between land use and water quality. Uses located in areas with poor suitability can degrade and contaminate surface and ground-water resources, increase flood hazards, destroy water-based wildlife, and interfere with scenic and recreational values. It is the responsibility of the Town to take precautions, both regulatory and non-regulatory, to protect all water resources from incompatible uses and, in so doing, protect the health and general welfare of the community.

Wetlands

A. Values

For the purpose of this study, wetlands will be considered as those lands where saturation with water is the dominant factor determining the nature of the soil, as well as indigenous plant and animal communities. Marshes, swamps, and bogs have been well

known features of the landscape for centuries, but only recently have attempts been made to group these items under the single term of "wetlands". The Town of Exeter defines wetlands as "Those areas of land identified and delineated as consisting of poorly and very poorly drained soils as defined by the Soil Conservation Service/National Cooperative Soil Survey." (page 6 of the Exeter Zoning Ordinance, as amended through March 1991).

Historically, wetlands have been considered wastelands of little value to society, and have been subject to waste dumping, filling, and draining with little thought given to the consequences. However, recent scientific inquiry has lead to the understanding of the importance of wetlands in maintaining and improving environmental quality. They have been found to provide critical ecological and socially valuable functions, including:

1) acting as flood water storage areas;
2) absorbing and filtering pollutants and sediments;
3) helping to maintain groundwater and surface water levels;
4) providing habitat areas for plants, fish and wildlife;
5) providing unique opportunities for recreation and education; and
6) contributing to scenic value.

These values are discussed in further detail below. (Also review the diagrams presented in Appendix I - "Functions of Wetlands".)

1) Flood Control: Wetlands are natural flood storage areas which reduce peak flood levels and the likelihood of flash flooding by storing and slowly releasing flood waters. For example, when a stream overflows its banks, flood waters spread horizontally into surrounding wetlands where the vegetation acts to temporarily detain water. At this point, hydric soils hold the water in a sponge-like manner, to be released slowly over a period of time. Wetland soils and vegetation help to maintain the balance of age-old flood and drought cycles. Wetland protection efforts in a predominantly rural community wisely anticipates future development which may cause increased run-off, higher flood levels, and a greater likelihood of flooding.

2) Water Quality: Wetlands have a natural "self-cleaning" ability which, if not overtaxed, can filter or absorb pollutants from run-off before they enter a watercourse or waterbody. In many respects, wetlands function much like sophisticated sewage treatment plants by removing nutrients

and other pollutants prior to water resource discharge. This is done virtually at no cost to the tax-paying public. In addition, a wetland acts as a buffer zone to trap sediments resulting from natural and/or man-made erosion.

3) Water Supply: The flood storage function of wetlands also serves to collect surface water run-off and route it into the ground, thereby recharging groundwater resources. During periods of low flow, this stored groundwater can then replenish nearby surface water resources.

4) Habitat: Wetlands represent a critical link in the life cycles and food webs of fish and wildlife. Wetlands are nutrient-rich habitats which supply food, shelter, and spawning grounds for a variety of fish and wildlife. Coastal wetlands, such as those abutting the Squamscott River, provide critical habitat for shellfish and wading birds (e.g., herons and sandpipers).

5) Recreation and Education: Wetlands offer unspoiled, open space for the aesthetic enjoyment of nature, as well as other recreational activities such as bird watching, hiking, fishing, hunting, photography, and environmental education. High quality wetlands can also be used for biological research and as outdoor classrooms for students of all ages.

6) Aesthetics: Wetlands are a vital component of the Town's scenic landscape. The relatively flat landform and diversified vegetation of wetlands create a distinctive visual character. Wetland vegetation provides unique seasonal variations in color.

B. Inventory

Wetland types found in Exeter include shrub swamps, shallow and deep marshes, bog ponds, wet meadows, and forested swamps. Lands with soils having high water tables, and classified as poorly or very poorly drained soils by the Soil Conservation Service, are also considered to be wetlands. These poorly and very poorly drained soils are the foundation of the Town's Wetland Conservation District, established at the 1980 Town Meeting.

Exeter contains approximately 4,197 acres of wetland soils, which is equivalent to roughly 32% of the Town's total land area. The wetland acreage total can further be broken down by the acres of poorly drained soils (3,559 acres) and very poorly drained soils

(638 acres). Looking over the previous Table 1 (Existing Land Use), it appears that wetlands constitute more than 55% of the Town's open, undeveloped lands (note: open, undeveloped lands include: farmlands, forest lands, idle land, and other unclassified lands as identified in Table 1).

For a graphic depiction of Exeter's wetland areas, please review the accompanying Map 9 (Wetland Soils) on the following page. This map was created by digitizing the County soil survey sheets into the Rockingham Planning Commission's Geographic Information System. The County soil survey sheets were taken from the soon to be published Soil Survey of Rockingham County, New Hampshire, prepared by the Soil Conservation Service.

Also shown on Map 9 are the Town's "Prime Wetlands" which were documented and mapped by the Exeter Planning Department in 1983, using information provided by the Conservation Commission, as authorized under RSA 482-A:15. Prime Wetlands are considered such in that, because of their size, unspoiled character, fragile condition or other relevant factors, these areas are of substantial significance. During the review of dredge and fill applications, the New Hampshire Wetlands Board gives special consideration to wetland areas designated as Prime Wetlands. For more information on Exeter's Prime Wetland areas, please review the document, Prime Wetlands, a Report; Exeter, NH, on file with the Conservation Commission and the Exeter Planning Department.

C. Analysis

The filling of wetlands for building construction sites not only destroys wetlands and their benefits, but may lead to groundwater contamination as well. Leaching fields constructed in filled areas are more likely to be placed too close to the seasonal high water table, thus having an inadequate receiving layer for the proper treatment septic system effluent.

There is an ongoing need to protect wetlands within Exeter. Statewide, wetlands are under increasing development pressure due to the depletion of the area's most developable land. Although the US Army Corps of Engineers and the State of New Hampshire have laws and regulations governing wetlands, they do not always provide the degree of protection needed. Existing regulatory efforts look at each dredge and fill request as a separate application, resulting in a piecemeal approach. In addition, the inadequate staffing of federal and State inspectors means that some wetland activities escape scrutiny. In addition, the State's

Map 9

Town of Exeter -- Wetland Soils

KEY

- Water
- Poorly Drained
- Very Poorly Drained (Prime Wetlands)
- Tidal Wetlands

Scale in Miles

0 2/3 1 1/3 3

Sources: Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

Prepared by the Rockingham Planning Commission, May 1991. SRG

existing regulatory efforts only provide for wetland setbacks for the placement of septic systems, not general development activity. For these reasons, the Town should continue to exercise local control over its wetland areas well into the foreseeable future.

Floodplains

A. Values

Flooding is a natural process of the riverine system and adjacent surface water network. Periodic flooding helps to fertilize floodplain soils, and helps to maintain their productivity and that of the river corridor. Floodplains are located along sensitive shoreline areas which provide habitat for a wide variety of animals and plants.

During periods of flooding, enormous quantities of water are stored temporarily within floodplain soils, and within tributary wetlands. During such periods, groundwater reservoirs are recharged by excess surface water. As the flood levels decline, the water stored is slowly released back into the stream or river. Natural vegetation and wetland soils slow the water flow during the flood and help prevent soil erosion. In this manner, wetlands and floodplains naturally moderate the extremes of flooding.

B. Inventory

Exeter maintains participation in the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA). Exeter's 100-year flood zones were mapped by FEMA in 1982, resulting in a "Flood Insurance Rate Map" for the Town. A small-scale version of this map appears in this document as Map 2 (Flood Hazards and Bedrock Geology) following page 6. This map also shows the Town's bedrock geology, which is described in more detail in the Physical Characteristics and Land Use chapter.

C. Analysis

At the 1990 Town Meeting, Exeter voters adopted a revised Floodplain Management District Ordinance, which established land use control measures for the Town's flood prone areas. Although building within the floodplain was not prohibited, special construction and floodproofing standards were established. This ordinance was necessary to keep the Town in good standing with the National Flood Insurance Program, thus remaining eligible for flood insurance and federal disaster relief.

Even with a floodplain management ordinance in place, the Town should encourage landowners, private agencies, and the state to negotiate the purchase or donation of lands, or conservation easements, for floodplain areas; especially those located along the Squamscott River. This action would help to maintain the ecological and scenic integrity of Exeter's portion of the Great Bay estuary system.

As a general planning rule, floodplains are not suited for development. Buildings should be located away from these low-lying areas because of the potential for flooding and the unstable soil conditions. Development within the floodplain may also lead to surface water contamination caused by flood damage to septic systems, and the general flushing out of materials (such as trash, gasoline, oil, etc.) around a house or parking lot. Areas prone to flooding need to be protected in order to maintain their capacity to absorb, store, and transmit run-off and floodwater. Floodplains are part of the overall surface water system and should be respected as such.

Shorelands

A. Values

Shorelands are herein defined as those lands located adjacent to the water's edge of a perennial stream, river, or waterbody. Much of the discussion pertains to the riparian corridors of the Town's rivers and major streams. For discussion purposes, the term "river" will be used to cover all types of perennial watercourses (rivers, streams, and brooks) and waterbodies (lakes and ponds).

River corridors serve a number of functions, the most significant pertaining to: wildlife, floodwater storage, pollution abatement and filtration, river bank stabilization and water quality, recreation, aesthetics, and unique natural features. These values are described in more detail below.

1) Wildlife: In general, river corridors provide the richest habitats for fish, wildlife, and plant life. Many fish and wildlife populations need large tracts of land to maintain a viable population. Most species cannot survive within limited habitat areas. Wildlife must have travel lanes within their range, and waterfowl and other birds need ground-level nesting habitat. Protection of these linear river corridors is essential to the stability of wildlife

populations. This concept is in contrast with what is commonly known as "habitat islands", where wildlife refuge areas are separated by development, with no way for animals to travel from one area to another.

2) Floodwater Storage: The flood absorption function of shorelands and floodplains is described in detail in the previous discussion entitled "Floodplains".

3) Pollution Abatement and Filtration: Natural corridors along riverbanks can be considered as "pollution filter strips" because the shoreland vegetation acts to filter out sediment and pollutants from surface water run-off. Many scientific studies have repeatedly confirmed the need to retain a naturally vegetated buffer strip adjacent to the water line, to filter out pollutants from lawn fertilizers, agricultural pesticides, and run-off from roads. An absolute minimum of fifty feet (preferably 75 feet or more) is needed to protect surface waters from such substances, according to recently published data compiled by the Smithsonian Environmental Research Center (source: Planning for the Changing Rural Landscape of New England: Blending Theory and Practice, New England Center, University of New Hampshire, November 1987).

   In some cases, river corridors can be quite environmentally sensitive. In many instances, these areas consist of coarse-grained soils which have a limited ability to trap and hold contaminants. This can lead to water quality problems, especially when septic systems are constructed too close to shorelands. During periods of low water flow (such as the summer months), contaminated groundwater can seep into the watercourse. Thus, once again highlighting the need to protect both surface and groundwater resources.

4) River Bank Stabilization/Water Quality: River banks stripped of vegetation can be vulnerable to erosion. The roots of trees and other plant life along a natural shoreline help to stabilize the river banks from the erosive forces of wave action, flood flows, and overall surface water run-off. Removal of shoreline vegetation can raise water temperatures, and in turn lead to a deterioration of cold-water fisheries. In addition, bank erosion can cause sedimentation, which eliminates fish spawning and nursery areas, as well as depleting oxygen needed for adult fish.

5) Recreation: River corridors can provide ample recreational opportunities. Examples include: boat docks for power boating, rowing and canoeing, fishing, hiking trails within the corridor, horse trails, cross-country skiing, bird watching, and picnicking.

6) Aesthetics: The changes in flow levels, the diversity and color changes of shoreline vegetation, and the associated variety of wildlife, all contribute to the visual quality and scenic beauty of a river corridor. Such corridors present prime opportunities for interacting with the natural environment.

7) Unique Natural Features: Examples of unique natural features along river corridors include: waterfalls, rapids, meanders, and oxbows (such as the oxbow which Exeter shares with Stratham). In addition, rare and endangered plant species are often located along river banks.

B. Inventory

As previously stated, shorelands are found along the perimeters of watercourses and waterbodies. Exeter's surface water areas can be seen on Map 8 (Watersheds and Perennial Waterbodies) following page 14. Despite scientific efforts, there is no set width for a protective "shoreland" corridor. As a general rule of thumb, the shoreland values described above diminish as the distance between development and the water's edge decreases. A review of regulatory efforts throughout the State indicate that most municipalities regulate shoreland widths from lengths of fifty feet to as much as three hundred feet. Aside from the downtown area, Exeter's watercourses continue to maintain many miles of natural, undisturbed shoreland.

The Town of Exeter established a Shoreland Protection District at the 1989 Town Meeting, however, prior to this the Town had been regulating shoreland development through other regulatory efforts since the 1970's. According to the existing zoning ordinance, Exeter's shorelands are defined as follows: three hundred feet horizontal distance from the shoreline of the Squamscott River, Exeter River, and their major tributaries, and 150 feet horizontal distance from the shoreline of all other perennial streams and brooks within Town.

C. Analysis

Shoreland corridors are very important in terms of water quality, wildlife habitat, recreational opportunities, and scenic beauty. However, with "shorefront" property being at such a premium, these fragile lands are under intense development pressures. Once natural shoreland is developed, its social and ecological benefits are greatly diminished. Moreover, it is inequitable for a private landowner or developer to gain value from a river (which is considered by state law to be a public resource), and at the same time exclude the public from using the river by blocking physical and/or visual access.

Groundwater

A. Values

Groundwater is used to augment the Exeter municipal water system, and is also the primary source for several residential public water supplies scattered throughout Town. In addition, the Phillips Exeter Academy uses well water to irrigate its large open land areas. Favorable groundwater potential is typically found in areas of unconsolidated sediment (such as sand, gravel, and other stratified drift material) and, to a lesser extent, in bedrock fractures. Because of its high porosity, transmissivity, and hydraulic conductivity, areas of stratified drift material can yield large volumes of water when pumped.

The primary value of groundwater is as a source of water supply for individual water wells and for public water supply systems. Because of the great difference in treatment costs, municipalities tend to choose groundwater resources over surface water resources for the development of public water supplies. These resources are less costly to develop than man-made surface water supplies, in terms of land-acquisition, engineering, and treatment.

B. Inventory

The term "aquifer" is herein defined as earth material containing sufficient quantities of groundwater for pumping. The latest and most reliable source of information concerning the location of stratified drift deposits within Exeter comes from the recent groundwater mapping effort conducted by the United States Geological Survey (USGS). The USGS has characterized Exeter as having two types of stratified drift aquifers, labelled "Stratified Drift Aquifer" and "Stratified Drift Aquifer Over

Glacio-Estuarine Silts and Clays". This information has recently been published as part of a USGS report entitled "Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire", (USGS Water Investigations Report 84-4252; 1988).

As part of the study noted above, the Town's stratified drift aquifers were categorized into three transmissivity ranges: less than 500 square feet per day, 500-1,000 square feet per day, and 1,000-2,000 square feet per day. Transmissivity is the rate at which water is transmitted through a unit width of aquifer under a unit of hydraulic gradient. It is equal to the product of hydraulic conductivity and the aquifer's saturated thickness. The Town's aquifers are shown on Map 10 (Aquifer Map) on the following page. The Town's Aquifer Protection District, established in 1988, was amended in 1990 to include the aquifer boundaries as delineated in the 1988 USGS study.

C. Analysis

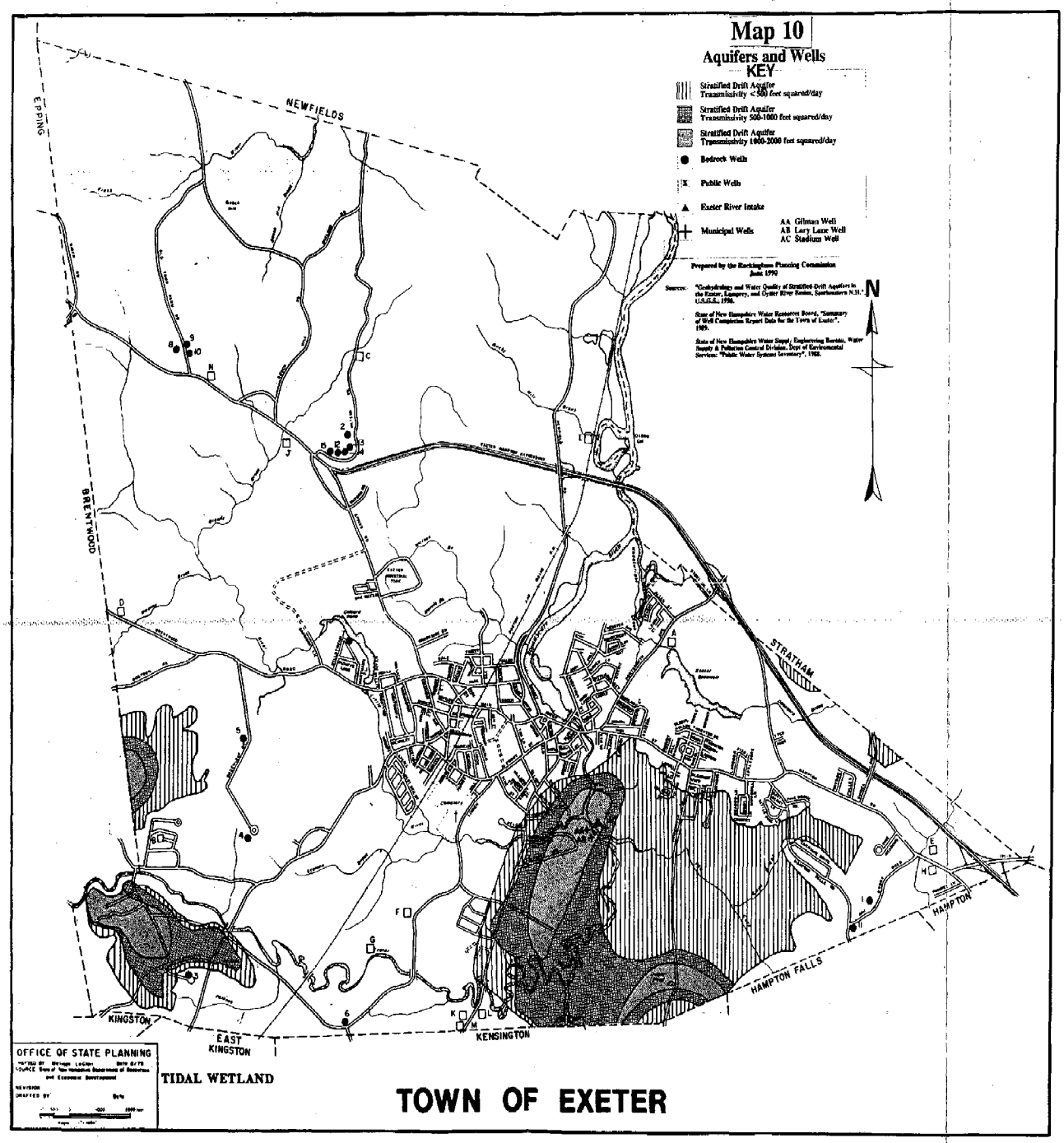
Undeveloped lands which serve as groundwater recharge areas help to protect the underlying groundwater by transmitting precipitation back into the ground, thus recharging the aquifer. However, excessive surface alteration or the presence of impervious surfaces (such as buildings, roads, parking areas, etc.) can impair the transmission of precipitation by displacing rain water, thus limiting recharge possibilities.

Groundwater <u>quality</u> can be impaired by a variety of materials. The most predominant sources of groundwater contamination include: landfills, commercial and industrial wastes, excessive use of agricultural fertilizers and pesticides, improperly treated human sewage, road salt, and underground storage tanks. Groundwater <u>quantity</u> can be reduced through contamination, over-pumping in the aquifer zone, excessive excavation, and through reducing the recharge area as discussed above.

2. Agriculture

A. Values

Aside from its obvious importance for growing food, farmland has value as a scenic resource, as wildlife habitat, and as a groundwater recharge area. Farming also provides economic benefits, especially to the local and regional economy. The benefits of agriculture are described more fully on the following page.


Map 10
Aquifers and Wells
KEY
Stratified Drift Aquifer
Transmissivity < 500 feet squared/day
Stratified Drift Aquifer
Transmissivity 500-1000 feet squared/day
Stratified Drift Aquifer
Transmissivity 1000-2000 feet squared/day
Bedrock Wells
Public Wells
Exeter River Intake
Municipal Wells
AA Gilman Well
AB Lary Lane Well
AC Stadium Well
Prepared by the Rockingham Planning Commission
June 1990
Sources: "Geohydrology and Water Quality of Stratified-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern N.H.", U.S.G.S., 1986.
State of New Hampshire Water Resources Board, "Summary of Well Completion Report Data for the Town of Exeter", 1989.
State of New Hampshire Water Supply, Engineering Bureau, Water Supply & Pollution Control Division, Dept of Environmental Services: "Public Water Systems Inventory", 1988.
N
NEWFIELDS
EPPING
BRENTWOOD
STRATHAM
HAMPTON
HAMPTON FALLS
KENSINGTON
EAST KINGSTON
KINGSTON
OFFICE OF STATE PLANNING
TIDAL WETLAND
TOWN OF EXETER

1) Recreation and Scenic Values: Farmlands of the Seacoast Region are typically large, open areas of rolling fields and pastures. They provide pleasant scenery and are an important component of a community's rural character. In addition, farmlands are well suited for many types of recreation, including hunting, cross-country skiing, and passive recreations uses such as hiking and bird watching. However, cropland and open fields are frequently the most imperiled areas of a community because of their high development suitability. It is ironic that the rural character of a community serves to attract new residents, while at the same time it is continually threatened as farmlands and fields are developed into new neighborhoods.

2) Wildlife: The habitat requirements of many wildlife species (e.g., pheasant, grouse, songbirds, mice, rabbits, woodchucks, deer, etc.) include open fields and the edges between fields and woodlands. Thus, the loss of farmland thereby restricts the habitat and range of native wildlife populations.

3) Aquifer Recharge: Groundwater supplies are replenished by the infiltration of rainwater through the ground. Infiltration cannot occur if the earth's surface is covered with impervious material such as buildings, roofs, driveways, and pavement. Agriculture is a desirable land use in an aquifer recharge zone, as it permits the unimpeded flow of water into the ground. Moreover, the soils which are most suited for agriculture (those which retain moisture for plants) function as water filters, thus providing ideal groundwater recharge conditions.

   The loss of farmland to development means both the loss of critical recharge surface area and the loss of water volume, as run-off is artificially directed away from the development. It should be remembered that while agriculture is beneficial in terms of recharge, some farming practices can be detrimental to water quality unless properly managed. The storage, use, and disposal of fertilizers, pesticides, and animal wastes need to be conducted in an environmentally safe manner.

4) Economic and Social Benefits: The local production of foodstuffs reduces the costs of transporting the goods to the markets, while delivering fresher products to the consumer. With local businesses as the marketplace, the retail trade income is enhanced, while consumer prices are kept low. Finally, the operation of a farm requires support industries such as farm equipment sales and service, and the sale of feed, fertilizer, and other supplies.

As discussed previously in the Physical Characteristics and Land Use chapter, the indirect economic benefits of farming relate to the real estate value of the farmland itself compared to the cost of providing public services to residents. When a residential subdivision consumes farmland, the cost to the Town to provide municipal services for additional residents is typically greater than the increased property tax revenue.

B. Inventory

Exeter is not vastly populated with agricultural operations, however, there are a few of significance, as depicted on Map 11 (Open Space Values) following page 46. The majority of uses are of the retail greenhouse and nursery variety, however, there are a few vegetable farms and large hay field areas. Table 2 below lists Exeter's more significant agricultural operations, including their general classification and contiguous land area.

Table 2 - Principal Commercial Farms

Farm Name	Type	Contiguous Acreage
Michaud Nursery	Nursery	2
Ellison Nursery	Nursery	2
Churchill Garden Center	Greenhouse	2
Stone Farm	Hay/Vegetables	41

Source: Rockingham County Cooperative Extension Office of the University of New Hampshire; and Town tax records.

C. Analysis

As in other parts of Rockingham County, the contribution of agriculture to the economy and work force has been steadily declining. If the conversion of agricultural land continues at the existing rate, then the future of farming in Exeter looks bleak. However, there are several land protection mechanisms designed to aid the farmer and save farmland. These include: the State's current use assessment program; the Trust for New Hampshire Lands acquisition program; and the Development Rights Program of the NH Department of Agriculture. These mechanisms, as well as many others, will be described more fully in the upcoming section entitled, "Methods of Open Space Protection".

Other than an outright land purchase, the acquisition of development rights is one of the most effective means of preserving farmland. After conveying these rights, the farmer still retains property ownership and has full farming rights to his land. Additionally, by receiving the cash value of the land's development rights, the farmer realizes the full market value of his land over time. The farmer can eventually sell his land to another farmer at an affordable price. Hence, the land and the industry are both preserved.

Obviously, purchasing development rights is a costly proposition and cannot be applied to every situation. In the absence of unlimited financial resources, there are several land planning techniques which can provide varying degrees of protection:

1) cluster and open space zoning;

2) agricultural zoning, and;

3) floodplain conservation zoning.

1) Exeter has adopted an open space development ordinance, which is an excellent example of creative zoning for open space preservation. The ordinance deals with both single family and multi-family residential development. This ordinance benefits the preservation of agricultural lands by allowing buildings to be clustered on a specified minimum acreage of the development, while keeping the parcel's remaining land open. This approach does not require either large public expenditures (for the purchase of development rights, etc.), or large private sacrifices.

Under such an ordinance, farmers who view their land as a "pension" need not destroy their farms in order to retire with a guaranteed income. In fact, they can pass on the farm house, barns, silos, and a large portion of the agriculturally productive land to the next generation. The majority of original farmland could continue to be farmed on a lease-back system from the community association which controls the open space as a permanent conservation area.

2) An agricultural zoning district is a planning mechanism which helps to preserve the economic integrity of working farms which have demonstrated a long range commitment to the landscape and the community as a whole. Monetary incentives can be established which encourage the selling of development rights, placing property in the State's current use program, and/or the ongoing use of the land in crops and pasture.

   In establishing an agricultural zoning district, planners must take care to buffer new residential developments from the existing farming operations. For example, many of the "side effects" of farming (manure odor, machine noise, etc.) can be offensive to nearby residences. Without proper consideration of existing farming operations, extensive new development in these areas can result in squeezing out agriculture as a land use.

3) Floodplain areas typically contain nutrient-rich, high quality farmland soils. Floodplain conservation zoning often prohibits building within the floodplain, but allows for the continuation of agricultural operations. Protecting floodplains from development can be justified on the basis of protecting the community's health, safety, and general welfare.

In Exeter, and throughout the Seacoast Region, there is a lack of public knowledge regarding the need for farmland protection, as well as the laws and public programs available for resource protection. There is also a lack of public consensus (especially within the farming community) about the viability of existing farmland protection efforts. If the Region's farmlands are to be protected, the various interest groups must come together and form such a consensus, and quickly. Without a concentrated and coordinated local and regional effort to preserve farmland, these resources will continue to dwindle until active farms become more like museums than integral parts of the Region's economy and landscape.

3. Forestry

A. Values

Forest land is a major renewable resource, providing both commodities (e.g., wood products and maple syrup), and non-commodity benefits (e.g., water resource protection, air quality maintenance, energy conservation, wildlife habitat, recreation and scenic quality). In general, forested lands have values similar to those of agricultural lands.

1) Economic: Most woodlots in the Seacoast Region are privately-owned, and many are managed for financial gain from the sale of timber products. There are examples of publicly-owned woodlots as well. The sale of timber from public lands can provide a community with money to cover the cost of managing the timber stand, while helping to increase the future yield of the forest through proper maintenance efforts.

2) Water Resource Protection: The broad category of water resource protection includes water conservation, flood control, erosion control, and water quality protection. Forests have a significant effect on the rate at which water will reach the ground, run off into surface waters, and infiltrate the earth's surface. By slowing the rate of run-off, forests serve to reduce flood levels, prevent excessive soil erosion, and filter pollutants from surface waters.

3) Air Quality and Energy Conservation: Forests act to moderate temperatures in their immediate vicinity and can provide nearby houses with cooling shade in the summer and can slow the cold winds in the winter. Hence, forests can reduce home heating and cooling costs to some degree. In addition, forests act as filters by removing particulates and absorbing carbon-dioxide from the air.

4) Wildlife Habitat: A rich forest wildlife habitat has a variety of vegetative cover types for browsing, resting, nesting and hiding. Most animals inhabit several different landscape types, including meadows, dense underbrush, and open woods, which provide food and shelter. The greater the number of interfaces between landscape types, the greater abundance of wildlife habitat. For habitats which consist primarily of densely canopied forests, where deep shade inhibits the growth of understory plants, the variety of animal species is quite different from habitats which contain

an assortment of vegetative cover types. Thus, a forest management program designed to improve wildlife habitat will undoubtedly result in an increase in the number of vegetative cover types and landscape types, while retaining adequate areas of old growth forests.

5) Recreation and Scenic Quality: Throughout Exeter, the pattern of forested land alternating with developed land gives the Town its rural character. The complexity and diversity which determine the wildlife value of a forest also helps to determine the scenic and recreational value of a forest. Forests are primarily used for passive recreational pursuits (bird watching, hiking, etc.), however, active recreation (such as hunting) is also common. The scenic quality of a forest can be improved by increasing the diversity of plant species and cover types, which will in turn enhance the wildlife value.

B. Inventory

According to an inventory maintained by the Rockingham County branch of the UNH Cooperative Extension Service, there are four "tree farms" within Exeter. The term "tree farm" refers to the National Tree Farm Program sponsored by the American Forestry Association. In order for a woodland to receive tree farm certification, the owner must prepare a long-range forest management plan approved by a professional forester, and submit the plan to the AFA.

It should also be noted that Exeter has four "big" or "champion" trees which are part of the AFA's Big Tree Program. Initiated in 1940, this program was designed to promote protection of the nation's oldest and tallest trees. The AFA publishes the National Register of Big Trees every four years, listing the vital statistics of all trees in the program. In New Hampshire, the Registry of Big Trees is administered by the UNH Cooperative Extension Service and the NH Division of Forests and Lands. Please contact these organizations for more information on how to nominate a tree.

Exeter's champion trees include: a magnolia tree located along Cass Street; a norway spruce located behind the Main Street School and the Lincoln Street School, and: a pin oak and river birch located along the Swasey Parkway. The locations of Exeter's managed woodlands and champion trees are depicted on Map 11 (Open Space Values) following page 46.

C. Analysis

As discussed previously, the acreage of the Town's forest land has decreased substantially during the past few decades. Even though forestry is not the most important component of the Town's economy, forested lands provide important wood products such as saw logs and cordwood. As with farmland, there are a number of land protection mechanisms which can help preserve forest lands. Once again, these mechanisms will be described more fully in the upcoming section entitled, "Methods of Open Space Protection". Although the Town has played an active role in promoting forest preservation through its open space development regulations, more will need to be done in the future. The next development boom in the Seacoast area will undoubtedly put pressure on land owners to develop lands which are currently considered forests. The Town should seek to have forest lands of manageable size (greater than ten acres) preserved through long-term forest management programs which provide for all forest benefits, including watershed protection, wildlife habitat, recreation, and aesthetics.

4. Recreation

A. Values

The importance of outdoor recreation to neighborhoods and the community as a whole is widely accepted by professional planners. Open space recreation offers a great opportunity to understand and appreciate the natural environment. For many residents, the decision to live in Exeter is strongly influenced by the diversity of opportunities to interact with the "great outdoors". Recreational opportunities are of value in terms of individual enjoyment, building a sense of community through group activities, and educating both children and adults about the natural environment.

B. Inventory

Exeter contains a number of areas which can be used for both active and passive recreation. Active recreation areas are those used for sporting activities, while passive recreation areas are those used for nature-oriented activities, such as hiking, bird-watching, etc. Within Exeter, there are five significant active recreation sites which are open to the general public. These sites are described in more detail below. A graphic depiction of these sites can be seen on Map 11 (Open Space Values), as well as the recreation areas associated with the Town's school system.

1) Exeter Recreation Park: This is a 22-acre parcel located off of Route 101 in the Town's eastern corner. Recreational facilities at this site include: a pool, ten tennis courts, two minor league baseball fields, two basketball courts, an adult softball field, two playground areas, an exercise trail, picnic tables, and a 100-car parking lot.

2) Gilman Park: This is a 15-acre parcel located at the intersection of Bell Avenue and Crawford Avenue. Recreational facilities at this site include: a basketball court, a baseball field, a boat launch, a foot-bridge, a playground area, plus a picnic area.

3) Park Street Common: This is a three-acre parcel located off of Park Street and Winter Street. Recreational facilities at this site include: a playground area and several picnic tables.

4) Front Street Park: This is a three-acre parcel located off of Front Street. This area contains a small basketball court and a playground area.

5) Waterfront Park: Located along the Squamscott River in downtown Exeter, this site is approximately 25,000 square feet in size. Facilities include a 300-foot boardwalk, a parking area, several park benches, and a boat ramp.

In addition to the above mentioned facilities, the Exeter Recreation Department maintains several smaller parks and sites which provide passive recreation and open space. These sites include: Gale Park, Juniper Ridge Park, Brick Yard Pond, Founders' Park, Pickpocket Dam Park, the String Bridge Park and Dam, and several common areas. In addition, the Department maintains the grounds associated with Town-owned buildings, as well as the Bandstand, Powder House, a number of small commons, and four inactive cemeteries (Front Street, Water Street, Guinea Road, and Folsom Street).

It should also be noted that the Exeter Conservation Commission administers a number of protected open space lands and easements which are available to the public for passive recreational use. A more complete description of these lands is presented in the upcoming Existing Open Space Lands chapter.

C. Analysis

The NH Office of State Planning has established guidelines to assist communities in recreation planning. Table 3 (Standards for Outdoor Recreation Facilities and Present Needs) lists several recreation planning standards taken from the publication, New Hampshire Outdoors: 1988-1993; State Comprehensive Outdoor Recreation Plan (prepared by the NH Office of State Planning, 1989). These standards are a helpful yardstick in terms of evaluating community needs for outdoor recreation facilities.

Table 3

Standards for Outdoor Recreation Facilities and Present Needs

Facility	Standards Per* 1,000 Persons	Exeter** Standard	Existing Facilities	Facility Needs
Baseball Fields	1.1	13-14	4	9-10
Basketball Courts	0.8	10	3	7
Boat Access	1.8	22-23	2	20-21
Ice Skating Areas	0.14	1-2	0	1-2
Open Space/Natural Areas (in acres)	51.0	637	909***	0
Community Parks (in acres)	6.0	75	48	27
Playgrounds	0.5	6-7	5	1-2
Soccer Fields	0.16	1-2	0	1-2
Tennis Courts	0.95	11-12	8	3-4
Hiking Trails (in miles)	2.2	24-25	unknown****	------

* = Source: New Hampshire Outdoors: 1988-1993; State Comprehensive Outdoor Recreation Plan; prepared by the NH Office of State Planning, 1989.

** = Based on the 1990 US Census population estimate of 12,481 residents.

*** = Sum total of open space lands (776.3 acres) and easements (132.4 acres administered by the Exeter Conservation Commission.

**** = It should be noted that Exeter has a number of hiking trails throughout its protected lands, however, their lengths are unknown at this time.

The previous table indicates that, with the exception of open space lands, the Town is slightly deficient in most recreation facilities, especially in terms of boating access. While compared to many communities in the Seacoast Region, Exeter supports an exemplary recreation program, it is clear that gaps do exist. With over 30 active adult softball teams, the Recreation Department has found it necessary to rent fields from Phillips Exeter Academy to supplement the Town's public fields. It should be noted that the Exeter Planning Board and Conservation Commission do encourage developers to convey open space lands and easements to the Town. It is possible that such open space lands could be developed into active recreation areas, thus supplementing the community's existing supply.

5. Habitat

A. Values

All wildlife have three basic requirements for survival: food, cover, and water. Fish, Amphibians, and waterfowl requires the presence of water for spawning and egg laying. Vegetation provides the necessary cover to serve as nursery habitat. Water also serves as spawning grounds for insects, which, in addition to vegetation, provide food for various animals. Fur-bearers such as muskrat, otter, mink, and beaver utilize wetlands as habitat. Coastal and inland marshes serve not only as breeding grounds for waterfowl, but also serve as critical resting and feeding areas during spring and fall migration.

The value of an area as habitat depends on a number of factors including size, contiguity with similar areas, and the amount of edge. Edge is the transitional area between habitat types. It consists of understory plants and early successional types of vegetation which provide both forage and cover for numerous species of birds and mammals. Edge can be created by utility transmission rights-of-way, crop and pasture lands, regrown old fields, and similar types of clearings. The habitat value and edge effect of an area may be significantly reduced if adjacent land uses and encroachments by man create barriers or threaten the area's integrity.

The term habitat can also be applied to plant species. Plants also require certain environmental conditions for survival. Wetland vegetation provides a good example of a variety of plants which require a specific set of conditions (i.e., soil type and water table elevation).

B. Inventory

As mentioned previously, Exeter's portion of the tidal Squamscott River falls within the federally designated Great Bay Estuary. This area provides prime habitat for many wildlife species. According to a study conducted by the NH Fish and Game Department, more than 90,000 birds reside in the estuary (source: Inventory of the Natural Resources of the Great Bay Estuarine System; NH Fish and Game Department, 1981). Thousands of Canada geese and black ducks rest and feed within the area during Autumn. Osprey are common during the spring and fall migration cycles. There are three rare and endangered species which live in the estuary: the bald eagle, common tern, and common loon.

Terrestrial mammals which utilize the Great Bay area includes: raccoons, whitetail deer, red fox, woodchuck, muskrats, chipmunks, grey squirrels, cottontail rabbits, mink, otter, and beaver. A complete inventory of all animals (and plants) which reside in the Great Bay can be found in the NH Fish and Game study cited above, as well as in the Great Bay National Estuarine Research Reserve Management Plan (prepared by the NH Office of State Planning in 1989).

In addition to excellent coastal habitat, Exeter also has important inland habitat areas. Examples include: wetlands, river and stream corridors, forests (coniferous, hardwood, and mixed woodlands), and open lands (meadows and fields). These habitat types support a wide range of animals including game species such as deer, coyotes, raccoons, rabbits, and turkeys. Exeter's prime wildlife habitat areas include: the wetland areas located in the Town's western half between Brentwood Road and Epping Road, the corridors of the Squamscott River, Exeter River, Little River, and the forest lands of the Town's northern sector. There is also quite a variety wildlife and plant types located in the wetland area known as "The Cove", which is located in the Town's southeast corner. This large wetland area extends into Hampton Falls and Kensington.

The Town's major watercourses are also the sites of fish stocking efforts by the NH Fish and Game Department. The Exeter River is stocked with brook trout, rainbow trout, brook trout, and american shad. The Squamscott River is stocked with heron, smelts, bluebacks, and american shad. The Little River is stocked with brook trout, brown trout, and rainbow trout. Several prime fishing spots are shown on Map 11 (Open Space Values) following page 46.

Natural plant communities in Exeter are typical of coastal New Hampshire, with vegetative patterns reflecting soil and moisture conditions. However, according to the NH Natural Heritage Inventory (NHNHI), there are six rare and endangered plant species located within Town. The NHNHI is a division of the NH Department of Resources and Economic Development, and is charged with collecting data on the status, location, and distribution of rare and endangered plant and animal species.

The rare and endangered plants within Exeter include: Common Moorhen, Slender Blue Flag, Climbing Hempweed, Robust Knotweed, Water-Plantain Spearwort, and Stout Bulrush. All of these plant species, with the exception of Common Moorhen and Water-Plantain Spearwort, are considered by the NHNHI as "imperilled in New Hampshire because of rarity". The Common Moorhen and Water-Plantain Spearwort are considered imperilled because of extreme rarity. The terms used by the NHNHI are explained more fully in Appendix II (Rare and Endangered Plants). A graphic depiction of the areas within Exeter which contain these plant species can be found on Map 11 (Open Space Values) following page 46.

C. Analysis

As contiguous tracts of open space become splintered with development, wildlife can no longer move easily from one natural area to another, and some must move away from the area's boundaries into the more protected center. This can be harmful to wildlife if the size of the habitat is related to food supply or to the amount of genetic diversity necessary for a healthy population. It is well known that some species of wildlife require fairly large areas of habitat to survive. For example, the ranges for pine marten and white tail deer are roughly 640 acres. Numerous plant species also require contiguous areas to proliferate.

In addition, small, isolated habitat areas have less diversity of plant and animal species than larger, contiguous areas. Each species has its own ratio of habitat needs for water, food, nesting or resting, breeding and cover. A species may require low wetland areas for one use and upland areas for another. If both types of areas are not accessible because of man-made development breaking the linkage between them, the species can no longer flourish.

Overall, large contiguous tracts of conservation land are necessary to protect the Town's current diversity of plant and animal species from the impact of habitat isolation and fragmentation. Thus, it is important to consider conservation lands not only as individual parcels, but also in relation to other protected lands. For these reasons, the Town should endeavor to acquire lands which are contiguous to existing protected parcels when possible. In conjunction, the Town should seek to preserve the natural corridors which link large tracts of open space in an effort to maintain habitat integrity.

Six rare and endangered plant species have been identified in Exeter. There are important biological and ecological reasons for protecting these plants. By preserving different types of vegetation, the diversity of ecosystems are maintained. If a species is lost, the overall biological complexity of the habitat is reduced. Hence, the Town should seek to protect these areas in order to preserve this piece of Exeter's natural heritage. Protection efforts should include both regulatory and non-regulatory measures.

6. Aesthetics

A. Values

Open space maintains a community's rural character by providing pleasant scenery and visual relief from developed lands. It provides natural buffers against noise and reduces the "overcrowded" feeling one can get from an urbanized area. In general, scenic resources contribute to the quality of life for Exeter residents, and are a key element of the Region's tourist economy.

The visual-cultural values of such areas are akin to a rich, complex, interwoven fabric of intangible values that can never truly be expressed with the spoken or written word. The value changes from person to person, from landscape to landscape. Researchers have attempted to measure the aesthetic values of scenic views through preference studies. Most of these studies have indicated that natural landscapes are preferred over landscapes which contain obtrusive, man-made structures (Source: A Proposed Method for Coastal Scenic Landscape Assessment, Maine Office of State Planning, 1987).

B. Inventory

Exeter's primary scenic vistas are located along the Town's major waterways. The Henderson Swasey Park area provides a wonderful view of the Squamscott River to the north, as well as the Town's waterfront park to the south. Strategic viewing points along the Exeter River looking west provide impressive sunset views. The golf course of the Exeter Country Club provides several excellent viewpoints of the Squamscott River. The Allen Street Woodland Park also provides an excellent view of the Squamscott River's tidal marsh areas.

It should also be noted that the entirety of Garrison Lane has been designated as a "Scenic Road" by a Town Meeting vote, in accordance with RSA 231:157. Scenic views of rolling fields can be seen along either side of this road. A scenic road designation prohibits tree cutting and stone wall removal along designated roadways, unless consent is given by the Planning Board. The entirety of Jolly Rand Road has also been designated as a scenic road, however, much of the road area has been overgrown with vegetation. Map 11 (Open Space Values) shows both of Exeter's scenic roads, as well as several scenic vista locations.

C. Analysis

One of the community's most valuable aesthetic resources is the scenic quality of its landscapes. These scenic areas provide a unique visual experience for residents, as well as helping to attract tourists who, in turn, contribute to the local economy. For the most part, Exeter's scenic views are on Town-owned, public land, thus, they are available to the general populace.

There is a great need to protect the scenic views which serve as "gateways" to the Town. As people enter into Exeter, the scenic quality of the immediate surroundings greatly influences the observer's impression of the Town as a whole. These areas also act as visual buffers between communities by interrupting what may one day be a road lined with buildings.

Exeter should protect its prominent scenic views from obtrusive development in close proximity. Scenic resource protection measures include encouraging cluster and open space developments, as well as the purchase of visually important lands or scenic easements to those lands. The Town should also consider selectively clearing roadside vegetation in order to open views of scenic fields and hillsides.

7. Education and Research

A. Values

Using a community's open spaces as outdoor classrooms allows people of all ages to learn about the natural world. Many environmentally sensitive lands (wetlands and forest lands) can serve as areas of scientific research and as outdoor educational exhibits which demonstrate the dynamics of ecological relationships. Interpretive hiking trails also provide an excellent means of teaching cultural and environmental lessons to the general public. As environmental education and the natural sciences become more common in primary and secondary schools, natural areas will become even more valuable for education.

B. Inventory

Exeter's existing outdoor education programs are primarily geared toward its youth. The local schools make use of a number of outdoor areas for natural resource education purposes, including Henderson Swasey Park and the Allen Street Park. The local Boy Scouts also make use of the Brickyard Pond area for learning activities.

Exeter's portion of the Great Bay estuary is one of the primary natural resource education sites in the Seacoast Region. The University of New Hampshire, which operates the Jackson Estuarine Laboratory in Durham, has been the primary agency to conduct research and education within the Great Bay area. There are a number of additional public and semi-public agencies which make use of this resource. For a more complete description of these agencies and their programs, please review the Great Bay National Estuarine Research Reserve Management Plan, previously cited. Exeter's portion of the Great Bay Reserve is shown on Map 11 (Open Space Values) following page 46.

C. Analysis

Environmental education is the study of contemporary conservation issues, ecology, biology, and the overall study, enjoyment, and understanding of the natural environment. Programs have been successfully implemented throughout the country for groups of all ages. The Town should promote increased conservation awareness and education at the primary and secondary levels. In particular, there are two educational programs which the Town should consider.

1) The School Department should consider instituting a stream study and water quality assessment curriculum. This is a program which can be set up with assistance from the Biology Bureau of the NH Department of Environmental Services. The program is designed for grades five through eight, and involves indoor classroom activities and outdoor field observations. Aspects of the program include stream monitoring, water testing, and water resource protection methods.

2) The School Department should consider instituting the "Discovering Spring Wetlands" curriculum designed by the Nongame Wildlife Program and the Outdoor Education Unit of the NH Fish and Game Department. The program is designed for fourth and fifth grade students, and involves indoor and outdoor activities relating to wetlands education.

Implementing these programs should be a joint effort between the Conservation Commission and the School Department. Exeter's portion of the Great Bay estuary system also presents a great opportunity for outdoor learning. Through the use of this resource, the Town can play an active role in this important function of the Great Bay Estuarine Research Reserve program. It should also be noted that the School Department owns a number of open lands which could be used for outdoor education activities. It is recommended that the Conservation Commission work with the School Department to investigate the feasibility of this option.

8. Historic and Archeological Sites

A. Values

Historic Sites: Since the focus of this plan is on open space lands, this section will discuss only historic sites, rather than historic structures. Although historic sites do enhance a town's character, their ultimate value for future residents is educational. In an effort to acknowledge a community's heritage, it is important for the townspeople to be aware of the historic events which have shaped the community's existence. If such sites are lost to development, their value is lost forever and cannot be replaced elsewhere.

Archeological Sites: New Hampshire contains a wide array of archeological sites worthy of protection. Such sites represent nonrenewable resources which contain the unique record of human achievements spanning well over 10,000 years of prehistory. This

period spans the age from the first occupation after the retreat of the glaciers (at the end of the Ice Age) through the displacement of the Native American Indian culture by European explorers and colonialists. Archeological sites are the only sources of information about the Native American cultural tradition. For the historical period of the Euro-American cultural tradition, archeological sites provide an important dimension for the understanding of history. Archeological sites may balance, expand, corroborate, or contradict the written and oral record of history and, together with our architectural heritage, provide physical reminders of the past.

Generally speaking, prehistoric sites are most likely found in areas with the following characteristics: proximity to water (both potable water, and waterways for travel); sandy and gravelly well-drained soils; level ground; exposure; proximity to raw material sources (Especially suitable rock for the making of tools, and; proximity to food sources (such as estuarine environments for shellfish beds, falls and rapids for restricting the passage of anadromous fish, freshwater marshes and thickets for other shellfish and small game, plus pockets of farmable soils, important to late prehistoric horticulturalists).

B. Inventory

Historic Sites: Exeter has a rich history, spanning portions of four centuries. Settled in 1638 by the Reverend John Wheelwright and several exiles from Massachusetts, the Town became one of the most significant communities in New Hampshire. In fact, Exeter was the state capitol during the revolutionary war. Once the war was over, the legislature voted to move the capitol to Concord, a more central location.

The National Historic Preservation Act of 1966 authorizes the Secretary of the Interior to maintain a National Register of Historic Landmarks and Places. Within Exeter, there are two historic districts listed in the National Register: the Front Street Historic District (containing over 40 structures), and the Waterfront/Commercial Historic District (containing 79 structures). A graphic depiction of these districts can be seen on both Map 7 (Generalized Zoning Map) and Map 11 (Open Space Values). Both districts display an excellent variety of architecture, including styles from the Georgian, Federal, Greek Revival, Gothic, Victorian, and Colonial periods.

In addition to the sites listed above, there were a number of structures identified as part of the environmental impact statements (EIS) for the various Route 101 expansion projects which would be eligible for listing on the National Register. Eligible sites include the Conner Farm site, the Rose Farm site, the Eastman Brothers Farm, the George Stockell House, plus twelve other structures. In addition to containing historic structures, several of the identified properties contain critical resources such as wetlands and floodplains. Perhaps the Conservation Commission could investigate the possibility of acquiring these properties through direct acquisition or easement.

Archeological Sites: The primary investigators of Exeter's archeological history are Gary Hume, NH State Archeologist, and Donald Foster, an archeologist at Phillips-Exeter Academy. According to the work of these gentlemen, there are at least 28 significant archeological sites within Exeter. These sites are depicted on Map 11 (Open Space Values) following page 46. As one can see, the majority of archeological sites are located in close proximity to the Town's waterways. Although the majority of identified sites are from the American Indian period, there are several sites which date back to prehistoric times. Items found at these sites include: bone chips, fire hearths, tools, arrowheads, pottery, and old structural foundations.

C. Analysis

The historic and archeological sites described above contribute to Exeter's unique history and cultural heritage. It is therefore, in the public interest to protect them. For privately owned historic sites, negotiations for easements may be the best means of protection. Regarding archeological sites within the Seacoast Region, the following is a paraphrased excerpt from a memo written by Gary Hume, the NH State Archeologist:

> Most recorded sites in the Coastal Region are located on flat, dry areas within 125 meters of various waterbodies. Because of the recreational and residential development which has taken place on waterfront areas in the Region, many potential archeological areas have been disturbed and destroyed. However, a number of small, undisturbed pockets may remain in the midst of developed areas. Large tracts of undisturbed land have high archeological potential.

The Division of Historic Resources (within the Department of Resources and Economic Development) recommends that before development takes place along the Region's waterfront areas, builders and/or planning boards check with them (the DHR) to see if the development may be disturbing potential archeological sites. Early consultation is preferred, so as to allow time for archeological studies and/or redevelopment of proposed projects.

According to RSA 290, it is illegal under most circumstances to disturb human remains without a permit. According to RSA 227-C:8, when unmarked human remains are discovered, excavation must be discontinued immediately. The discovery should be reported to the local police who will, in turn, notify a medical examiner and the State Archeologist when appropriate.

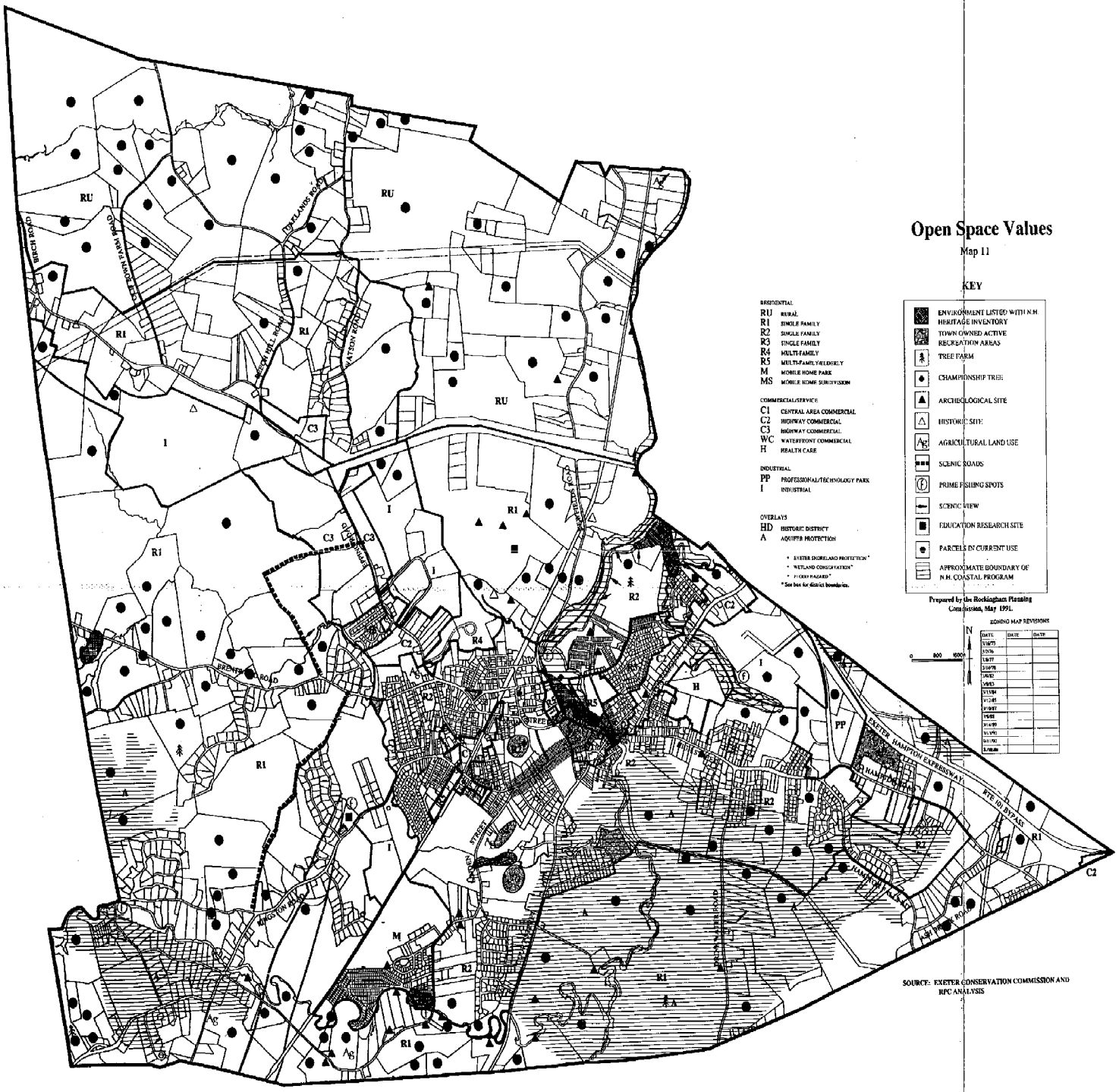
The Coastal Region is an area rich in archeological sites. Due to ideal conditions, the Native American Indians located their settlements on the shores of our various waterbodies. They left behind them many sites which can yield information about their culture. Unfortunately, the rapid development which has taken place in the Coastal Region has destroyed many sites. Based upon a 1986 field check of recorded sites, the attrition rate from development in the past ten years has been a staggering 25%! By making people more aware of the fact that archeological sites do exist in the Coastal Region, it may be possible to prevent destruction of these valuable, nonrenewable resources.

The Open Space Values Map

The Open Space Values Map (Map 11) on the following page shows a number of unique physical and environmental characteristics including: significant agricultural operations, certified tree farms, championship trees, active recreation areas, rare plant habitats, prime fishing spots, scenic roads, scenic views, outdoor education and research areas, historic sites, archeological sites, and parcels in "current use".

Although parcels in "current use" do not fit in neatly with the other physical and environmental features shown on Map 11, they deserve to be identified as open, undeveloped land. The State-sponsored Current Use Assessment Program, as authorized under RSA 79-A, is a property tax abatement program which provides reduced property assessments of field, farm, and forest land of ten (10) acres or more in size.

The current use program is also available to farmlands generating more than $2,500 annually. Landowners can apply to the program through the local tax assessor. The current use status remains with the land even if it is sold. Once the land is developed, the current owner is assessed a land use change tax equal to 10% of the fair market value of the property. As of January 1, 1991, Exeter has approximately 4,605 acres in the current use program; this represents roughly 35% of the Town's total land area.



Open Space Values

Map 11

KEY

RESIDENTIAL

- RU RURAL
- R1 SINGLE FAMILY
- R2 SINGLE FAMILY
- R3 SINGLE FAMILY
- R4 MULTI-FAMILY
- R5 MULTI-FAMILY/ELDERLY
- M MOBILE HOME PARK
- MS MOBILE HOME SUBDIVISION

COMMERCIAL/SERVICE

- C1 CENTRAL AREA COMMERCIAL
- C2 HIGHWAY COMMERCIAL
- C3 HIGHWAY COMMERCIAL
- WC WATERFRONT COMMERCIAL
- H HEALTH CARE

INDUSTRIAL

- PP PROFESSIONAL/TECHNOLOGY PARK
- I INDUSTRIAL

OVERLAYS

- HD HISTORIC DISTRICT
- A AQUIFER PROTECTION

- * EXETER SHORELAND PROTECTION*
- * WETLAND CONSERVATION*
- * FLOOD HAZARD*

* See box for district boundaries.

- ENVIRONMENT LISTED WITH N.H. HERITAGE INVENTORY
- TOWN OWNED ACTIVE RECREATION AREAS
- TREE FARM
- CHAMPIONSHIP TREE
- ARCHEOLOGICAL SITE
- HISTORIC SITE
- AGRICULTURAL LAND USE
- SCENIC ROADS
- PRIME FISHING SPOTS
- SCENIC VIEW
- EDUCATION RESEARCH SITE
- PARCELS IN CURRENT USE
- APPROXIMATE BOUNDARY OF N.H. COASTAL PROGRAM

Prepared by the Rockingham Planning Commission, May 1991.

ZONING MAP REVISIONS

DATE	DATE	DATE
3/16/73		
3/5/76		
3/8/77		
3/14/78		
3/6/82		
3/9/83		
3/13/84		
3/12/85		
3/10/87		
3/8/88		
3/14/89		
3/13/90		
3/11/90		
[illegible]		

0 800 1600

SOURCE: EXETER CONSERVATION COMMISSION AND RPC ANALYSIS

EXISTING PROTECTED LANDS AND OPEN SPACE

EXISTING PROTECTED LANDS AND OPEN SPACE

This section briefly describes the sizable publicly-owned open space lands, privately-owned open space lands, and protected parcels within Exeter. A distinction must be made between open spaces and protected lands, for they are not necessarily one and the same. Open space lands (either publicly or privately-owned) are not necessarily protected forever unless such a restriction is written into the property deed.

For the purpose of this report, Exeter's existing protected lands and open spaces have been broken down into six categories: lands administered by Conservation Commission, lands administered by the Recreation Department, other Town-owned lands, lands administered by the Trustees of Swasey Parkway, lands administered by the Trustees of Gilman Park, and privately-owned open space areas. These areas are described more fully below.

1. Lands Administered by the Conservation Commission

This category consists of lands and/or easements acquired by the Town for open space/conservation purposes. These lands are administered by the Conservation Commission in accordance with RSA 36-A. The Commission is actively involved in acquiring new parcels and/or easements through direct purchase or by gift. Currently, the Conservation Commission administers approximately 776.3 acres of conservation land, and three conservation easements consisting of roughly 132.4 acres.

A current listing of lands and easements administered by the Conservation Commission is presented in Appendix III, while a graphic depiction of these areas can be seen on Map 12 (Open Space and Protected Lands) following page 48. An inventory of these parcels can always be found in the annual Town Report. As one can see by comparing Map 12 and the various natural feature maps included in this document, the Town has made a concentrated effort to acquire land containing critical resources with an eye toward providing large, inter-connected habitat areas.

Appendix III and Map 12 are to be used in conjunction. Appendix III presents the lands administered by the Conservation Commission in numerical order, and the numerals of the inventory correspond to the numbered parcels on Map 12. Parcels which are not identified by number are part of larger conservation areas.

2. Lands Administered by the Recreation Department

This category includes the active recreation areas described in the previous inventory, as well as the smaller parks, common areas, and cemetery areas. These sites can be seen on two maps in this report: the more significant active recreation areas administered by the Recreation Department are shown on Map 11 (Open Space Values), however, this map also shows the recreation areas associated with the municipal school sites; while Map 6 (Existing Land Use) shows a number of lands under the category of "Parks and Recreation", however, many lands administered by the Conservation Commission also fall into this category. The most accurate depiction of the lands administered by the Recreation Department can be seen on the map entitled, "Lands Publicly Owned or Administered", which is on file with the Conservation Commission and Exeter Planning Department.

3. Other Town-Owned Lands

This category includes the land and buildings used by the various municipal departments for the daily operation of the Town. Facilities included in this category include: the town hall, municipal office building, fire station, police station, town library, the senior citizen center, town garage, wastewater treatment plant, landfill, and the waterworks complex. These lands are depicted on Map 6 (Existing Land Use) under the category entitled, "Government Function".

4. Lands Administered by the Trustees of Swasey Parkway

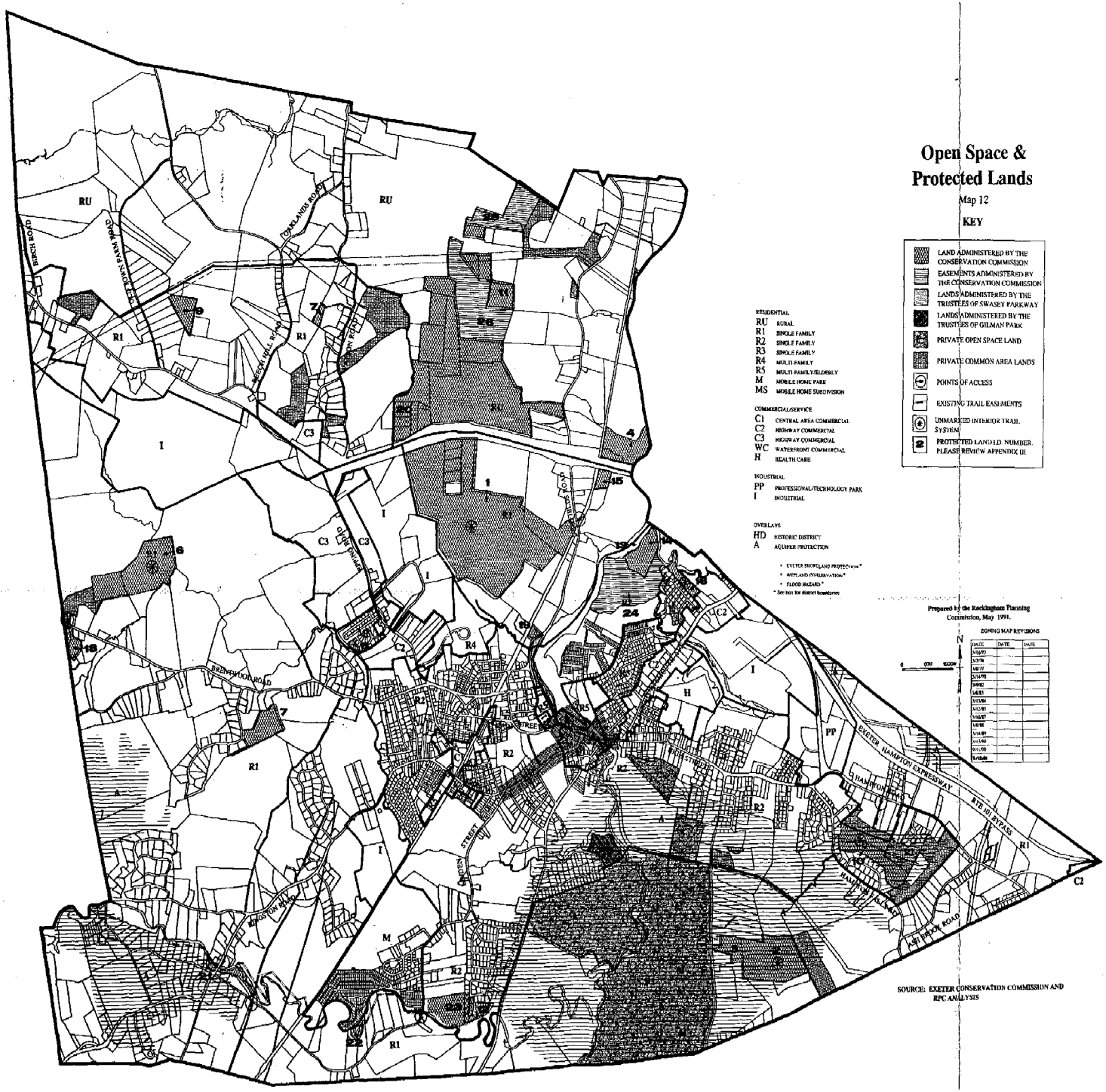
The land for Swasey Parkway was given to the Town by Doctor Ambrose Swasey. Dedicated and officially opened in 1931, Swasey Parkway was designed by the Olmsted Brothers landscape architectural firm of Boston. It is administered by an elected bard of trustees which works to maintain and improve the park solely with the interest of the trust fund originally provided by Doctor Swasey for this purpose. The site, located along between Water Street and the Squamscott River, is approximately 18 acres in size and is used for passive recreation. A long pedestrian walkway is provided, as well as a number of park benches. This site is depicted on Map 12 (Existing Open Space and Protected Lands) on the following page.

5. Lands Administered by the Trustees of Gilman Park

The land for Gilman Park was given to the Town by Daniel Gilman in 1891. Originally ten acres in size, the site is now a 15-acre recreational park located at the intersection of Bell Avenue and Crawford Avenue. Facilities at this site include: a basketball court,

Open Space & Protected Lands

Map 12



a baseball field, a boat launch, a foot-bridge, a playground area, plus a picnic area. Maintained by the Department of Recreation, the park is administered by an independent board of trustees. This site is depicted on both Map 11 (Open Space Values) and on Map 12 (Existing Open Space and Protected Lands).

6. Privately-Owned Open Space Areas

This category includes two types of land: the open space lands owned by the Phillips-Exeter Academy, and open space lands associated with residential subdivisions. The Academy has an abundance of land between Court Street and Drinkwater Road which contains several athletic fields and an extensive trail system along the Exeter River. In the case of residential subdivisions being built under the Town's "Open Space Development" ordinance, such developments have set aside open space areas to be owned in common by landowners within the subdivision. Both types of privately-owned open space areas are shown on Map 12 (Existing Open Space and Protected Lands).

GOALS AND RECOMMENDATIONS

GOALS AND RECOMMENDATIONS

Thus far, this document has provided a general description of the concept of open space, a discussion of physical characteristics and land use, and an inventory and analysis of natural features and other open space values. The information gathered as part of this effort has been analyzed with a view towards formulating an open space plan for Exeter's future. Set forth below are a set of goals for maintaining, preserving, enhancing open space opportunities within Exeter, plus a set of recommendations designed to achieve the stated goals. Goals and recommendations are set forth for all of the previously discussed open space values, including: water resources, agriculture, forestry, recreation, habitat, aesthetics, education and research, plus historic and archeological sites.

1. Water Resources

Goal: To protect all environmentally sensitive water resources by preventing detrimental land alteration, excessive development, and opportunities for pollution.

Recommendations: There are several options which the Town could pursue, including: establishing additional protection standards for Class A watersheds, limiting vegetative buffer disturbance along the Town's shorelands, working with neighboring communities to protect the Squamscott River and Great Bay, acquiring environmentally sensitive lands, and providing additional access points along the Town's primary waterways. These options are described in more detail below.

A. As mentioned previously, Exeter forms a portion of two Class "A" watersheds: the Piscassic River Watershed and the Dearborn Brook Watershed. In an effort to maintain the environmental integrity of the water resources within these two watersheds, the Town should investigate the possibility of enacting stronger development standards for these watershed areas. Having special standards for these areas would undoubtedly require the establishment of a watershed protection district and ordinance. Items to consider when writing such an ordinance include: nitrogen loading requirements for septic systems, limiting the amount of land disturbance allowed per lot, strict requirements for erosion and sediment control, assessing the use of road salt for road maintenance, and requiring the use of best management practices for potentially hazardous non-residential uses within the watersheds as part of the conditions of an occupancy permit.

B. The provisions of the Town's shoreland and wetland protection districts go a long way in terms of protecting these resources. However, the issue of altering the required vegetative buffer is not sufficiently addressed by either ordinance. It is well documented that surface water resources which do not have an adequate natural vegetative buffer are more susceptible to the effects of nonpoint pollution, erosion and sedimentation, and acidity. Thus, in order to mitigate these potential problems, the Town should make the effort to ensure that a sufficient natural vegetative buffer is maintained. The problem is that residential lawn maintenance often encroaches upon the required buffer. Another problem is the thinning of trees within the buffer in order to obtain better scenic views for the residences along the shoreline. It is recommended that the Planning Board and Conservation Commission work together to come up with a realistic, workable regulatory measure aimed at limiting the amount of vegetative disturbance within the established protective buffers.

C. It is recommended that the Town work with other municipalities abutting the Squamscott River and Great Bay to develop a regional protection plan for coordinated shoreline protection and wise land stewardship. There are a number of public and quasi-public organizations which could render assistance for this effort, including the NH Coastal Program, NH Fish and Game Department, NH Department of Environmental Services, Great Bay Estuarine System Conservation Trust, Rockingham Planning Commission, Rockingham County Conservation District, to name just a few.

D. The Town should continue its existing efforts to acquire land and/or easements for environmentally sensitive areas located along the Town's shorelines, wetlands, floodplains, and above the Town's aquifers. Methods of open space acquisition are outlined in detail within the upcoming section entitled, "Open Space Plan".

E. The Planning Board should conduct a periodic review of all policies, ordinances and regulations to ensure that the stated goals are indeed in the public interest, and that the Town's regulatory framework is working to further the goals in a reasonably satisfactory manner.

2. Agriculture

Goal: To preserve significant farmland areas for future agricultural production and the maintenance of rural character.

Recommendations: It is recommended that the Town pursue a strategy of public education, plus conduct a landowner outreach program in an effort to preserve and protect important agricultural lands. Such an outreach program should be geared toward identifying key parcels and educating landowners about options for protection. Specific recommendations include:

A. The Conservation Commission should compile an inventory of agricultural lands which may become available for donation and/or protection. This inventory should not be limited to existing farming operations, rather, it should include lands which contain soils suitable for agricultural use. Map 5 (Farmland Soils) can be used to identify areas for protection.

B. The Conservation Commission should contact landowners regarding possible land preservation techniques in an effort to fully inform these people of their options. In many cases, bad land use planning comes from ignorance of available options. This should certainly be done for the Conner Farm property located along Route 101 in the western half of Exeter. In addition to its agricultural suitability, this site contains an abundance of open space values, such as: significant wetland areas, floodplains, and scenic views. It should also be noted that this site is eligible for nomination to the National Register of Historic Sites.

C. In an effort to make the retention of agricultural lands more economically feasible, the Town Assessor should provide information about the state's Current Use Program to farmland owners who qualify.

D. The Conservation Commission should educate farmland owners about creative development techniques so that, if necessary, financial needs may be met while preserving important farmlands. This should also be done by the Planning Board during its development review process. In many cases, the Planning Board can work with a landowner to design a subdivision plan which will help the landowner realize his economic interest while at the same time maximizing open space retention.

3. Forestry

Goal: To preserve significant woodlands and forest areas for future resource production, environmental quality maintenance, and the preservation of rural character.

Recommendations: The recommendations listed above for agriculture can also be applied to agricultural lands. In addition, the Town should seek to have forested lands of manageable size (ten acres or more) preserved through sound, long-term forest management programs which provide for all forest benefits, including watershed protection, wildlife habitat, recreation and aesthetics.

4. Recreation

Goal: To maintain and enhance existing active and passive recreation sites and facilities; to expand recreation opportunities by securing additional lands and by adding or expanding facilities.

Recommendations: Options here deal with increasing opportunities for boating and public access, upgrading existing facilities, investigating potential funding sources, and acquiring land for new recreation facilities. Specific recommendations include:

A. In an effort to increase boating opportunities, the Recreation Department should investigate the possibility of establishing additional public access points along the Exeter and Squamscott River. This will undoubtedly require the acquisition of shorefront lands or easements.

B. The Town should work with the Port Authority to establish new mooring sites within the harbor area and other points along the Squamscott River.

C. Regarding existing public open space areas, the Conservation Commission should map existing interior trailways and establish trails for the parcels where none exist. This effort will involve clearing out existing trails and creating new ones, establishing a signage system to mark the trails and point out interesting items, and compiling a map showing the various trail systems. Perhaps this map could be published in pamphlet form and be made available to Town residents. The Conservation Commission should encourage the use of volunteers for the clearing and marking of trails, as well as for trail maintenance. Visitor parking should also

be addressed as part of this endeavor. In order for the public to fully utilize the Town's trail systems, adequate parking provisions will have to be made.

D. The Planning Board should seek to establish public trail corridors when reviewing open space development proposals. In the event that public trail corridors cannot be obtained, the Planning Board should, at the very least, strive to protect environmentally sensitive areas in the form of private protected lands.

E. The Conservation Commission should seek to establish a public hiking trail system by interconnecting (through easements and other agreements with landowners) a network of trails which link public conservation and recreation lands.

F. In an effort to meet state standards for outdoor recreation facilities, the Town should conduct an inventory of possible active recreation sites which may become available for donation/ acquisition. The Town should seek funding sources for additional active recreation sites. Another option would be to designate funds within the Town's Capital Improvements Program for site acquisition and facility improvements.

5. Habitat

Goal: To preserve and protect populations and habitats of rare and/or endangered plant and animal species, natural habitats of high productivity, and migration corridors for wildlife.

Recommendations: The options described below are aimed at maintaining existing wildlife corridors and creating habitat areas which are large enough to support a variety of wildlife species.

A. The Town should hire a consultant to identify and inventory habitat areas for game and non-game wildlife that are valued, but not necessarily rare; these may include deer yards, freshwater riparian habitats, and saltwater wetlands associated with estuarine systems. In addition, attempts should be made to identify important migration corridors for wildlife.

B. The Conservation Commission should seek to protect habitat areas for rare and/or endangered species through the use of conservation easements or fee-simple acquisition. Assistance in such an effort could be rendered by the Nature Conservancy

or the NH Natural Heritage Inventory. Although neither organization contains a funding program available for local communities, the Nature Conservancy can provide fund raising assistance. The Conservancy is willing to work with the Town to identify appropriate fund raising programs and potential financial contributors.

C. The Conservation Commission should attempt to preserve wildlife corridors that link large tracts of open space in order to maintain habitat integrity. To this end, large tracts of open land adjacent to existing protected lands should be targeted for protection.

6. Aesthetics

Goal: To retain scenic vistas and natural areas which enhance the aesthetic quality and visual character of the Town.

Recommendations: The proposals here deal with protecting the Town's scenic views along its major roadways, the maintenance of existing protected lands, ordinance review and open space planning during the Planning Board's development review process.

A. The Town should work toward protecting its high quality scenic views through easements and/or land acquisition. The Town currently has a number of publicly accessible scenic views along the Squamscott River and Exeter River, however, the scenic views along the Town's "gateways" could be further enhanced. As mentioned previously, the scenic views along the major roadways leading into town greatly influences the observer's impression of the community as a whole. In terms of protecting and enhancing the Town's scenic resources, the Conservation Commission should focus its efforts on the open fields which have frontage along the major gateways to the Town.

B. As the administrator of the Town's conservation lands, the Conservation Commission should establish an on-going program geared toward the maintenance of existing open space and protected lands. The Town's numerous amount of conservation lands require continuous maintenance in terms of keeping trails clear, picking up garbage, and rectifying safety hazards. The Conservation Commission should organize a set of volunteers, with each volunteer responsible for the maintenance and clean-up of a particular site.

C. The Planning Board and Conservation Commission should periodically review the Town's Open Space Development Ordinance to make sure that it adequately provides for the protection of meaningful, usable open space areas.

D. The Planning Board should encourage applicants for large scale developments to come before the Board for a preliminary consultation before an application is officially submitted. This will give the Board and the applicant the chance to discuss the design concept in an informal matter, before the plan is committed to paper and a significant investment has been made. During such a discussion, the Board and the applicant could address such items as the location of all proposed structures, the location of roadways and parking areas, the location of open space areas, and the possibility of conservation easements.

7. Education and Research

Goal: To provide adequate opportunities for education and research by protecting existing natural environmental areas and acquiring new sites which could offer expanded learning opportunities.

Recommendations: The Conservation Commission should work with the NH Fish and Game Department to develop education and research opportunities within the Great Bay estuary. In addition, the Commission should promote increased conservation awareness through education at the primary and secondary school levels. The Commission should work with the School Board in arranging for conservation related field trips, workshops, and educational programs such as those listed on page 41.

8. Historic and Archeological Sites

Goal: To preserve significant historical and archeological sites and educate the public about these resources, as they are an important and irreplaceable part of Exeter's cultural heritage.

Recommendations: The Town should endeavor to preserve historical/ archeological sites of significance and educate the public as to their value. In addition, the Town should work with the NH Department of Historic Resources to inventory historic and archeological sites of significance.

OPEN SPACE PLAN

OPEN SPACE PLAN

1. General

Thus far, this document has presented a general description of open space, a discussion of physical characteristics and land use, an inventory and analysis of open space values, plus a set of recommendations designed to guide the community in its future open space planning efforts. It is clear from the previous inventory that Exeter is fortunate to have a number of high quality natural resources and open space lands worthy of protection.

The next part of the document is the "plan" component, which identifies specific parcels to be protected, assesses why they should be protected, and describes the various land protection options available to the Town. In addition, proposals for new trail systems, scenic roads, and a pedestrian underpass are also described as part of the plan.

2. The Plan

It would be unrealistic to expect to preserve all of the Town's identified critical resource areas in their natural state, therefore, prioritizing specific parcels for protection is essential. Map 13 (Open Space Plan), following page 58, outlines a two tier open space protection strategy: primary acquisition parcels and secondary acquisition parcels. Primary and secondary acquisition parcels were identified as such because they contain multiple resource values. For instance, several parcels adjacent to the Henderson Swasey Park were identified for primary acquisition. Acquiring these parcels will help to protect several large wetland areas, a large forest area, and several archeological sites, while at the same time increasing passive recreation opportunities for Exeter residents and enlarging a significant wildlife habitat area.

The designation of primary and secondary acquisition parcels should not lead the reader to believe that the primary acquisition parcels are more valuable than those designated as secondary. Primary acquisition parcels are sites where the landowner has been approached by the Conservation Commission regarding protection measures. Secondary acquisition parcels are sites identified for protection, however, the Conservation Commission has yet to approach the landowner regarding land protection options.

Map 13 on the following page identifies several proposed trail networks which will link together some of the more important open space parcels throughout Exeter. A trail system is proposed which would connect the existing trails located off of Riverbend Circle along the Exeter River so that a continuous trail is established from Riverbend Circle to the Town's western border. Implementing this proposal will result in 2.5 miles of trails along the Exeter River. Another trail system is proposed which would utilize the existing utility easement extending from Old Town Farm Road to The Oaklands Conservation Land. A small trail segment is needed along Brentwood Road in order to link the Town's two existing scenic roads: Jolly Rand Road and Garrison Lane. A trail is also proposed along the eastern shoreline of the Squamscott River which would link the downtown area to the Exeter Country Club conservation easement. In its existing state, the Exeter Reservoir is an under-utilized community resource. A trail is proposed which would begin off of Portsmouth Avenue and follow the boundaries of the Reservoir, ending once again at Portsmouth Avenue.

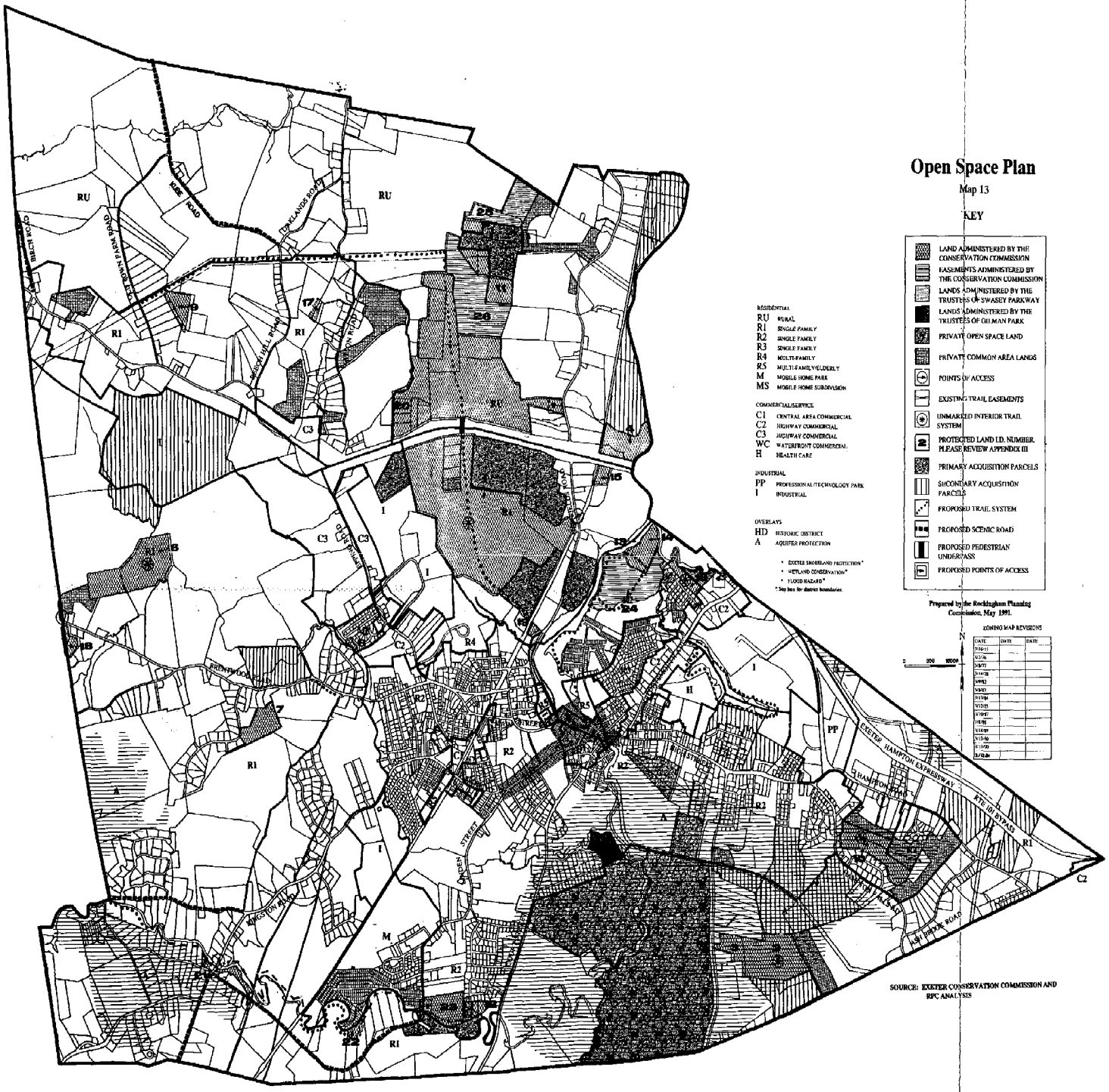
Regarding the Town's existing protected lands, many parcels have existing trail systems which are unmarked, while other parcels need to have trail systems created. It is a priority of the Conservation Commission to clearly mark existing trail systems, and establish new trail systems for those parcels which have no interior trail network. Once this effort is completed, the Commission should prepare an educational pamphlet which clearly identifies (in map form) the Town's existing protected lands, their points of access, and their interior trail systems. Such a pamphlet would help to publicize the efforts of the Conservation Commission, while educating the general public about their community resources.

A pedestrian underpass is proposed which would link Henderson Swasey Park and The Oaklands Conservation Land. The Conservation Commission is currently negotiating with the NH Department of Transportation to create such an underpass as part of the Route 101 reconstruction effort. This would create a series of connected protected lands which would stretch from the downtown area to the Town's northern border. The general location of the proposed underpass is depicted on Map 13.

Map 13 shows the locations of six roads which are proposed for scenic road designation, including: Birch Road, Kube Road, Beech Hill Road, John West Road, Powder Mill Road, and Pickpocket Road. Scenic road designation will not prohibit development along these roads, rather, such designation helps to ensure that future development along these roads will unfold in a manner consistent with their rural character. Under such a designation, tree cutting and stone wall removal would be prohibited unless the Planning Board approves.

Open Space Plan

Map 13



3. Methods of Open Space Protection

The previous section identified open space lands which are recommended for protection. The next step is to outline all of the possible options for protection. Such options can be broken down into three categories: voluntary land protection techniques, land use planning techniques, and public and quasi-public programs. Also described are the duties and responsibilities of Conservation Commissions in New Hampshire. The section ends with a discussion of the unique challenges facing the Exeter Conservation Commission.

A. Voluntary Land Protection Techniques

Under this category, there are a number of methods to choose from which can help to permanently protect suitable open space areas, including: fee simple purchase, purchase and leaseback, purchase and resale or lease, purchase of development rights and conservation easements, donation of land, bargain sale, transfer of development rights, plus options and right of first refusal. These methods are described in more detail below.

1. Fee Simple Purchase

Most lands are commonly held in fee simple, that is, the holder of the title possesses all rights associated with the property. The most common method of protecting open space areas has been through direct purchase of property. An important consideration to remember is that open space lands are often purchased at their market value based on their development potential. Purchasing open space lands at full market value can be prohibitively expensive. The total cost of borrowing, including principal and interest must be carefully studied.

Land purchased for conservation purposes will generate no property taxes, however, it will not demand much in the way of public services. There are two options which can be used to recover the costs associated with a fee simple purchase: purchase and leaseback, and purchase and resale with covenants. The first option allows the community to lease the land back for a particular use compatible with open space preservation (such as farming or forestry), thus recouping a portion of the land's purchase price. Lease agreements should be written in a manner which protects the community while being sensitive to the landowner's needs. The second

option allows the land to be resold with a deed committing the buyer to maintain the parcel as open space. As above, the new landowner could use the property for uses which are compatible with open space preservation.

2. Purchase of Development Rights and Conservation Easements

This method operates on the assumption that the right to develop a parcel is separable from the ownership of the land. Thus, the right to develop can be purchased by the community. In this case, the buyer pays the owner the difference between the open space value of the land and its appraised value for other types of uses (residential, commercial, etc.). For example, if a parcel is appraised to have a fair market value of $5,000 per acre and an open space value of $1,000 per acre, then the development rights are worth $4,000 per acre.

Once the development rights are sold, the owner still retains the other rights associated with property ownership. Unless a right-of-way or conservation easement has been purchased, the owner can prevent the public from entering the land. The owner is still responsible for property taxes, which must be assessed by giving consideration to the rights which have been removed. Purchasing development rights allows the landowner to receive the land's development value without having to convert the land to other uses. Thus, in a sense, the landowner is paid for not developing the land.

Development rights are also referred to as scenic, conservation, or development easements. Easements which allow the holder (the public for example) to use the land for conservation or recreational purposes are called "affirmative" easements. Easements which prevent the landowner from doing something with the land (such as develop it) are termed "negative" easements. Currently, the Town has three conservation easements. These easements are described in more detail in Appendix III (Lands Administered by the Conservation Commission).

There are four methods by which the Town can acquire development rights: direct purchase of development rights, purchase and resale with restrictions, purchase and lease with restrictions, and donation of development rights and/or easements. By donating development rights, the landowner can receive a reduction in local property tax, federal income tax, capital gains tax, and estate tax. With all of these

methods, the restrictions on development run with the land, and are written into the deed which is binding on future landowners.

3. Donation of Land

In terms of monetary expense, the outright donation of open space lands is the preferable option. The benefits to the landowner are reductions in a variety of federal, state, and local taxes. There are five methods of donation: fee simple, less than fee simple, donation with a reserved life estate, donation of an undivided interest in the land, and donation by bequest. These methods are briefly described below.

The fee simple method is a gift of the entire interest in the property. Full legal title passes by deed to the beneficiary (the community in this case), and the landowner no longer possesses any control over the land. However, the landowner may specify in the deed that the land is to be used solely for a specific purpose (such as tree farming or agriculture). Less than fee simple is a gift of partial interest in the property. The landowner retains legal title to the property, but gives up some of the rights to its use.

The donation with a reserved life estate is when a landowner donates property to the community but retains possession and use of the property for his own lifetime and/or the lifetime of other family members. A donation of undivided interest in land is a gift of a percentage interest in the land, not any specific, physical portion. As a result, the land as a unit will be owned as tenants in common by those parties who have interest in the property. Donation by bequest is when a landowner donates land in his or her will to the community. In such cases, the donated land is not subject to estate or inheritance taxes.

4. Bargain Sale

This is the sale of property for less than full market value. It can be considered a combination land sale and charitable contribution. The amount deductible for income tax purposes is the difference between the land's fair market value and the actual sale price. For example, a landowner has a property worth $500,000 based on a real estate appraisal. The land is sold to the community for $200,000. The difference of $300,000 is the value that the owner is

contributing as a gift. This value is considered a tax deductible donation, however, current tax law limits the deduction to 30% of the owner's adjusted gross income (AGI). Thus, if the landowner has an AGI of $50,000, the deduction in any one year would be $15,000. The landowner can carry forward any unused amount for five additional tax years.

In addition to a charitable deduction, the landowner can receive the following monetary benefits: cash from the sale, a capital gains tax reduction, avoidance of brokerage fees, and the avoidance of a higher tax bracket which could otherwise result from a full value sale of the land. Any transfer of property, either in fee-simple, development rights, or a conservation easement may be the subject of a bargain sale.

5. Transfer of Development Rights (TDR)

This technique is similar to the purchase of development rights in that the right to develop is separate from the concept of ownership. A TDR program can protect critical resource areas by shifting development potential from one part of town to another. Such a program requires the zoning of a community to have a transfer zone (consisting of lands designated for protection) and a receiving zone (consisting of a portion of town more suited for intensive development). A landowner would sell a property's development rights directly to a developer or indirectly through a public agency who would then transfer the development rights to the town's receiving area. The property to be protected would then be subject to deed restrictions barring future development. The success of a TDR program depends on a vigorous real estate market. Without strong demand for development rights, just compensation for the seller appears impossible.

6. Options and Rights of First Refusal

If the community cannot afford to purchase a site immediately, perhaps an option or right of first refusal can be obtained. An option establishes a price at which the community could purchase the land during a specified period of time. A right of first refusal is less specific; it simply guarantees the community the opportunity to purchase a site for a price equal to a bona fide offer from another interested party. Once another offer has been made, the community has the opportunity to match the offer.

B. Land Use Planning Techniques

Zoning should be used to protect large, dispersed, critical environmental resources such as floodplains, wetlands, shorelands, and aquifers. For example, it would be very difficult, costly, and inefficient for the Town to purchase all of its prime wetland areas when effective protection could be accomplished through zoning. Exeter has long understood this planning truism, as is evident by the presence of wetland, shoreland, and aquifer protection districts within the Zoning Ordinance. The Town also has a Floodplain Development Ordinance in place. Although several New Hampshire communities have established agricultural zoning districts which require larger lot sizes in an effort to protect large parcels of farmland, such zoning is not the best method of protection and could result in a legal challenge for the Town.

The Town's Open Space Development Ordinance is another creative planning technique. Essentially a variation on the cluster principle, this ordinance allows for homes to be arranged closer together in groups or clusters on smaller lot sizes than those normally required by the zoning arrangement. Clustering housing units permits variation in lot size, shape and orientation without an increase in the overall density of the development. By clustering housing units to the side or rear of a site, large open space areas can be preserved. As another means of creating protected open space lands, the Planning Board and Conservation Commission have in recent years moved to obtain conservation easement agreements during the development review process.

C. Public and Quasi-Public Programs

There are a number of open space protection programs offered by various State and local agencies, as well as several programs offered by quasi-public groups such as the Audubon Society, the Society for the Protection of New Hampshire Forests and the Rockingham Land Trust. Many of these quasi-public organizations work hand-in-hand with the State, while others work independently. The programs offered by these organizations are described in more detail below.

State and Local Programs

1. Current Use - One of the more distressing realities of owning large parcels of open land has been the exceptionally high property tax rates throughout New Hampshire. One method

of reducing this burden is through the State-sponsored Current Use Assessment Program. Authorized under RSA 79-A, this property tax abatement program provides for reduced property assessments of field, farm and forests lands of ten (10) acres or more in size. Landowners can apply to the program through the local tax assessor. As mentioned previously, current use lands cannot be developed without paying a land use change tax equal to 10% of the fair market value of the property.

2. The Office of Recreation Services within the NH Department of Resources and Economic Development administers the federal Land and Water Conservation Fund. This fund provides 50% matching grants to municipalities for the acquisition of open space lands.

3. New Hampshire has ten County Conservation Districts to assist landowners in sustaining the productivity of their farmland. As part of their effort to protect the land, these organizations accept and monitor conservation easements. A branch office of the USDA Soil Conservation Service can also be found within the local Conservation District office. For Rockingham County, the County Conservation District office is located in Exeter.

4. The NH Department of Agriculture works in a variety of ways to protect the State's farmland resources, including the purchase of development rights program, technical assistance on land use issues, conservation programs and efforts to improve the economic return of farm enterprises. Since the farms of New Hampshire consistently contain multiple open space values (e.g., scenic vistas, farmland soils, wetlands, floodplains, etc.), these programs which work toward the preservation and enhancement of farmlands also help to maintain the integrity of prime open space areas.

5. Land Conservation Investment Program (LCIP) - This is a State-sponsored land acquisition program established by the legislature in May of 1987. It is administered by the NH Office of State Planning. The program provides funds for land acquisition which must be matched by municipalities in the form of cash, land, or interest in land. Exeter has made use of this program to acquire several key open space parcels. The Town should continue to pursue the LCIP funding option as long as the program is available.

Quasi-Public Programs

1. The Audubon Society of New Hampshire encourages the preservation of wildlife habitat and natural areas through education and land acquisition. The Society acquires land through gift, bequest, trust and purchase. In many cases, the Society will accept unrestricted gifts of land having little or no wildlife or natural value for the purpose of resale, thus raising endowment funds to support their land acquisition and management program.

2. The Society for the Protection of New Hampshire Forests promotes the conservation and wise use of natural resources and strives to protect productive forest and agricultural lands. It owns and manages over 18,000 acres of land received by gift or purchase, and monitors conservation easements on over 15,000 acres. The Society also maintains a revolving Environmental Loan Fund (ELF) which makes loans to municipal, conservation, and other agencies to acquire, protect and preserve open space areas.

3. The Rockingham Land Trust, located in Exeter, is a non-profit land trust organization which accepts gifts by donation or bequest, and monitors conservation easements on several properties throughout the immediate area. The Trust can provide communities and landowners with a variety of options for protecting open space areas.

D. Conservation Commission

The Conservation Commission, as well as the Board of Selectmen, plays a critical role in the conservation and preservation of open space in Exeter. The Commission typically provides information and instruction to other local officials regarding lands in need of protection as well as offering advice on the best way to protect identified parcels. More often than not, the Conservation Commission is responsible for implementing land protection efforts.

Chapter 36-A of the RSA's establishes the right of a municipality to create a conservation commission for the purpose of "proper utilization and protection of the natural resources and for the protection of watershed resources of said town." The commissions also have the legislative authority to inventory open space lands, aesthetic features, water resources and other natural features,

plus make recommendations to the selectmen on the wise use of such lands. In addition, RSA 36-A:4 allows conservation commissions to receive gifts of property and/or money for conservation purposes, subject to the approval of selectmen.

There are certain organizational stresses which are unique to the Exeter Conservation Commission. For one thing, the mission of the organization has changed, with a number of additional duties being added. Besides being responsible for compiling and maintaining a natural resource inventory for the Town, making recommendations regarding lands in need of protection, and administering the Town's substantial amount of conservation lands, the Commission must, under State law, respond to the State Wetlands Board regarding all proposed Dredge and Fill Permit requests within Exeter. Since the Town is the site of several substantial, State-sponsored highway projects, which typically involve significant wetland alteration, responding to Dredge and Fill Permit requests can be quite a time consuming endeavor.

As mentioned previously, the Conservation Commission is responsible for administering over 900 acres of conservation lands and easements. With the land acquisition projects currently underway, this total could easily exceed 1,000 acres by the years end. This is a substantial amount of land to care for. The Commission is responsible for trail maintenance, marking trails, creating trails where there are none, trash pick-up, and providing public access. Dispatching these duties properly would be quite an endeavor for a professional, let alone a volunteer board.

In addition to the known conservation lands, the Commission is certain that there are a number of parcels which are unclear in terms of ownership and location. It is quite possible that the Town could lay claim to many of these parcels, however, doing so would require a substantial amount of deed research and legal work. Thus far, the responsibility for this effort has fallen on the shoulders of the Conservation Commission. Additionally, the Commission is responsible for land owner contacts regarding parcels identified for protection. This endeavor also requires a substantial amount of deed research and legal leg-work.

The Conservation Commission also takes its public education responsibility quite seriously. The Commission would very much like to be involved with the School Department and other civic groups regarding natural resource and conservation education programs. The Commission would also like to provide the general public with information regarding the Town's numerous land

holdings. As mentioned previously, the Commission has long wanted to produce a pamphlet and map describing the Town's conservation lands and trail systems. Much of this work has had to be put on the back-burner, because of the Commission's existing heavy work load.

Since the inception of the Exeter Conservation Commission in 1965, its responsibilities and duties have substantially increased. The heavy work load has created a great deal of organization stress, which could hamper its efforts to plan for the future. Under the current situation, the Commission has little time for establishing a yearly work program, let alone long-range planning. In addition, the Commission does not have the time to adequately review and respond to the Planning Board regarding development proposals. Such a situation almost invariably results in a few lost opportunities. Factor into the equation that the Board is made up of volunteers, whose membership changes from year to year. Thus, time must be set aside every year to educate new members about the duties, responsibilities, and current activities of the Conservation Commission.

The above discussion certainly indicates that the Conservation Commission is in need of assistance. The Town should consider hiring an administrator for the Commission, even if only on a part-time basis. The duties of this position could entail the following: handling the paper work, writing correspondence, conducting deed research, preparing maps, organizing trail maintenance and clean-up efforts, and helping the Commission put together a yearly work program. If it is not financially feasible to create such a position, perhaps the Town's Planning and Zoning Department could be rearranged to accommodate some of the Commission's existing responsibilities.

Another item to consider is the method of financing the Commission's activities. Currently, the Commission's funding requests are placed on the Town Warrant Article to come before the voters at the annual Town Meeting. Since the Commission invariably requests a similar amount of funds every year, perhaps it would be wise to weave the Commission's funding request into the Town's annual budget. In this manner, the Town could plan ahead for such funding by incorporating the monetary needs of the Commission into the Town's Capital Improvements Program. This could, in turn, spur the Commission into establishing long-range planning goals.

Since the writing of the Town's last master plan in 1985, the Exeter Conservation Commission has made great strides in terms of protecting environmentally sensitive open space lands. In 1985, the Town had approximately 494 acres of protected lands; as of the writing of this document, this figure has swelled to over 900 acres of protected lands and conservation easements. Many of the newly acquired parcels contain significant amounts of wetlands and floodplains, and many are located above aquifers and along the Town's riverbanks. Certainly, the Town can be proud of its recent land protection efforts, and it is hoped that this document will provide the necessary guidance for the Town to continue along this path.

CONCLUSION

CONCLUSION

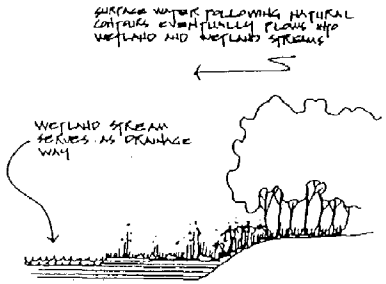
The open space resources of Exeter constitute an important component of the Town's landscape. Open space provides the basic visual identity of the community and provides excellent recreational and ecological values as well. Without adequate open space areas, the community's quality of life and rural character would be greatly reduced. The Conservation Commission should be lauded for past and present efforts to protect, preserve, and enhance the Town's open space resources.

This plan has been prepared to guide the community in its future open space protection efforts. The plan is not intended to be a regulatory document, rather, it contains recommendations that, if acted upon in a timely manner, can help to ensure that important open space lands are protected as the Town continues to develop. As a chapter of the Exeter Master Plan, this document is intended as a guidance tool for local officials and governmental bodies; to be used for general community planning purposes as well as during the development review process.

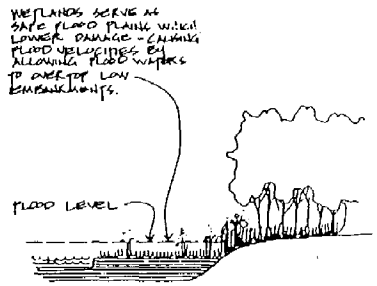
The conservation of valuable and unique natural resources and the preservation of open space is important to Exeter. This plan is intended to guide the Town in its effort to maintain its historic community character while accommodating new growth. This plan is a significant component of the Town's overall community development strategy: building what needs to be built while preserving what needs to be preserved.

APPENDICES

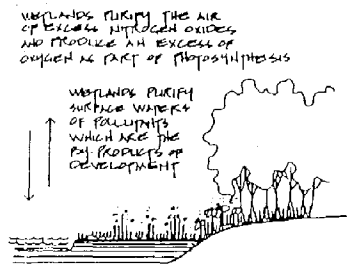
FUNCTIONS OF WETLANDS



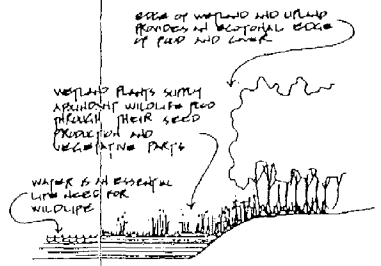
WETLANDS AS DRAINAGE WAYS



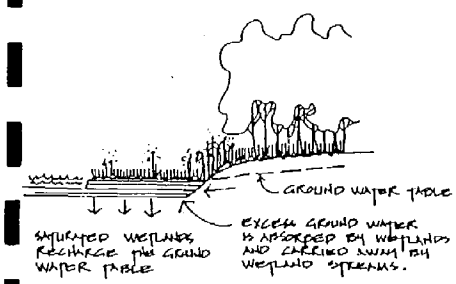
WETLANDS AS NATURAL FLOOD PLAINS



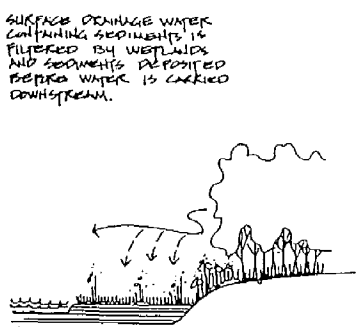
WETLANDS AS POLLUTANT MODIFIERS



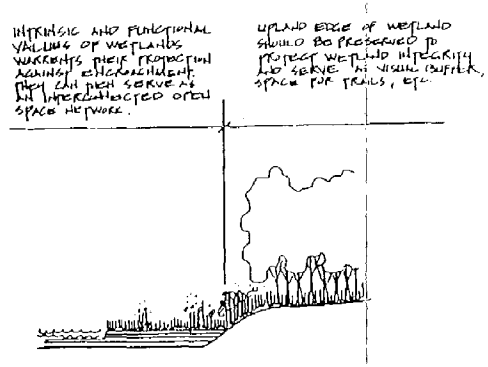
WETLANDS AS WILDLIFE HABITATS



WETLANDS AS GROUND WATER RECHARGE AND DISCHARGE AREAS



WETLANDS AS SILTATION SETTLEMENT AREAS



WETLANDS AS NATURAL OPEN SPACE NETWORKS

Source: Open Space and Recreation Plan Bedford, prepared by Environmental Collaborative, Cambridge, Mass.

For a more complete description of wetland functions and values, please review the publication, Method for the Evaluation of Inland Wetlands in New Hampshire, prepared by the Audubon Society of New Hampshire, 1990.

APPENDIX II

RARE AND ENDANGERED SPECIES

TOWN OF EXETER, NH

S Rank	G Rank	State	Scientific Name	Common Name
S1	G5	ST	Gallinula Chloropus	Common Moorhen
S2	G4, G5	ST	Iris Prismatica	Slender Blue Flag
S2	G5	ST	Mikania Scandens	Climbing Hempweed
S2	G3, G5	ST	Polygonum Robustius	Robust Knotweed
S2	G5	ST	Scirpus Robustus	Stout Bulrush
S1, S2	G4, G5	ST	Ranunculus Ambigens	Water-Plantian Spearwart

THE RANKING SYSTEM DEVELOPED BY THE NATURE CONSERVANCY AND USED BY ALL STATE NATURAL HERITAGE PROGRAMS FOR "ELEMENTS" OF NATURAL DIVERSITY (RARE SPECIES AND EXEMPLARY NATURAL COMMUNITIES)

Each element is assigned a single global rank by specialists under the guidance of the national Science Department of The Nature Conservancy. State ranks within each state, in which the element occurs, are assigned by the state Heritage Program and will vary from state to state.

GLOBAL ELEMENT RANKS:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor of its biology making it especially vulnerable to extinction. [Critically endangered throughout range.]

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of other factors demonstrably making it very vulnerable to extinction throughout its range. [Endangered throughout range.]

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single state, a physiographic region) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100. [Threatened throughout range].

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GA = Accidental in North America (not part of the established biota, usually a species of bird).

GE = An exotic species established in North America (e.g., Japanese Honeysuckle).

GH = Of historical occurrence throughout its range, i.e. formerly part of the established biota, with the expectation that it may be rediscovered (e.g., Ivory-billed Woodpecker).

The New Hampshire Natural Heritage Inventory does not inventory GA or GE species.

STATE ELEMENT RANKS:

S1 = Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor of its biology making it especially vulnerable to extirpation from the state. [Critically endangered in state.]

S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of other factors demonstrably making it very vulnerable to extirpation from the state. [Endangered in state].

S3 = Rare in state (on the order of 20+ occurrences). [Threatened in state].

S4 = Apparently secure in state.

S5 = Demonstrably secure in state.

SA = Accidental in state, including species which only sporadically breed in state.

SE = An exotic species established in state; may be native elsewhere in North America (e.g., house finch).

SH = Of historical occurrence in the state with the expectation that it may be rediscovered.

SU = Possibly in peril in state but status uncertain; need more information.

SX = Apparently extirpated from state.

The New Hampshire Natural Heritage Inventory primarily inventories elements in the S1 and S2 categories plus several selected elements ranked S3.

Key to Status

NH Native Plant Protection Act: RSA 217-A:3,III (endangered plants) and RSA 217-A:3,XII (threatened plants). State protected animals: Fish & Game Rules Chapt. Fis 1000 Conservation of Endangered Species. Part Fis 1001.01 (endangered animals) and 1001.02 (threatened animals).

SE = State Endangered
ST = State Threatened

Federal Endangered Species Act, 1973. Public Law 93-205, as amended.

LE = Federally Endangered
LT = Federally Threatened
FC = Federal Candidate Species (includes C1, C2, 3C, etc.)
PE = Proposed Endangered
PT = Proposed Threatened

APPENDIX III

LANDS AND EASEMENTS ADMINISTERED BY

THE EXETER CONSERVATION COMMISSION

	Lands	Approximate Acreage	Year Acquired
	Henderson Swasey Land	188.0	1973
	Mary Williams Land	7.0	
	Arthur Plouffe Land	13.0	
	Ruth Churchill Land	3.0	1976
	Industrial Park Land	16.0	1967
	Eleanor Manix Dawson/Dagostino Land	20.0	1984
1.	Henderson Swasey Park Total	247.0	
2.	Smith Cove (Drinkwater Road)	46.8	1979
3.	Page Land (Drinkwater Road)	8.5	1978
4.	Molloy Land (Great Roundabout)	3.0	1976
	Herman Smith Land (Great Throw)	2.0	
5.	P.E.A. Land (exact location unknown)	8.0	1981
6.	Houch/Kazanjian Land (Brentwood Road)	74.3	1987
7.	Cheney Land (Greenleaf Drive)	16.5	1983
8.	Colcord Pond	2.8	1984
9.	Tomilson & Kenick Land	10.5	
10.	Enwright Land (Hampton Falls Road)	30.4	1986
11.	P.E.A. Land Oaklands	15.0	
	Eleanor Manix Dawson/Dagostino (several parcels)	44.0	1984
12.	Tara Development Company Land (Riverbend Circle)	5.0	1986
13.	Irvine Conservation Area (Powell's Point)	13.4	1989
14.	Irvine Hays Marsh	3.3	1989
15.	Wilfred Moreau Nursery	4.6	1967
16.	Allen Street Woodland Park	9.0	1990
17.	Richard Parker Land	3.0	
18.	Dudley Land (Brentwood Road)	12.0	
19.	Simmons Land (Newfields Road)	1.7	1991

APPENDIX III (CONTINUED)

Lands	Approximate Acreage	Year Acquired
Deene Land	153.0	1991
Chamberlin Land	4.0	1991
Stockbridge Land	5.0	1991
Jensen Land	37.5	1991
20. The Oaklands Conservation Land Total	199.5	1991
21. Juniper Ridge	2.0	1991
22. Shaw Land	3.0	1979
23. McDonnell Property	11.0	1991

TOTAL LANDS ADMINISTERED BY THE CONSERVATION COMMISSION: 776.3 ACRES.

Easements	Approximate Acreage	Year Acquired
24. Exeter Country Club	55.4	1989
25. Captain's Meadow	27.0	1991
26. Tom Chamberlin	50.0	1991

TOTAL EASEMENTS ADMINISTERED BY THE CONSERVATION COMMISSION: 132.4 ACRES.

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